

Conservation Education Training Manual



This training course manual was originally developed by the Conservation Education Committee of the Association of Zoos and Aquariums (AZA). The manual has also been adapted for the Academy of Conservation Training Course by the Conservation and Education Department of Zoo Atlanta for Chinese zoo and aquarium educators. We hope conservation educators will continue to customize the lessons in this manual for use in their specific region. Having the manual is not the same as participating in the course. The facilitators provide their expertise and activities that are not represented in the manual.

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Curriculum Acknowledgements

This manual was made possible through the contributions of many individuals representing numerous organizations over many years. Although the bulk of the work for compiling this edition was completed in 2010, much of the content was derived from several previous iterations of the Association of Zoos and Aquariums (AZA) Conservation Education Course. Therefore, we would like to express our appreciation to the following individuals and organizations for their support and assistance with the creation of this manual:

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Section 1: What is Conservation Education?

Introduction

The purpose of this section is to convey the critical elements of a zoo/aquarium conservation education experience. Although each facility may want to develop their own customized definition, educators should keep in mind the critical elements of all conservation education experiences. Whether we are talking with visitors informally in our parks or as part of a formal program, educators should be able to define the important work they do.

Key Points

All conservation education experiences should:

- Add to the wildlife knowledge of the audience
- Address people's attitude toward wildlife
- Inspire conservation action (behavior)
- Evaluate its impact on visitors
- Utilize trained professionals in all experiences

There are many definitions for conservation education. But any well-thought out definition should include that conservation education:

- Is a process
- Connects audiences to nature/wildlife
- Involves knowledge, attitudes and behaviors about wildlife and wild places
- Influences audiences in a positive way about wildlife and wild places
- Encourages audiences to take action for conservation - behavior change and messaging
- Measures impact through evaluation
- Inspires people to care

The most important thing AZA zoos/aquariums can do to positively influence visitors is to be clear about the message, communicate it directly and succinctly, use staff and volunteers to reinforce it personally and build long-term relationships.

Inherent in most zoo/aquarium missions is a desire to change visitor behavior and attitudes, with the aim of creating a more environmentally aware and responsive population. Our institutions hope to increase awareness of conservation and conservation actions and that our visitors will become better stewards of the environment.

What is the Purpose of a Zoo/Aquarium?

The purpose of a zoo/aquarium is to connect people with wildlife in order to benefit the conservation of species in the wild. The words 'zoo,' 'aquarium,' and 'conservation' should be synonymous in the minds of our visitors.

Zoos/aquariums provide wildlife experiences that increase knowledge, change attitudes, make emotional connections and create beneficial behaviors in zoo/aquarium visitors that can positively impact their conservation in the wild. With over 143 million visitors to

zoos/aquariums, it is the responsibility of institutions to engage visitors in conservation issues and encourage positive behaviors that help protect wildlife.

In a 2005 national poll, 95% of U.S. adults agreed that seeing elephants in real life fosters a greater appreciation of these majestic animals and encourages people to learn more about them. In this same survey, 86% of respondents agreed that visiting zoos/aquariums encourages people to donate money or time to wildlife conservation.

A Summary of Education Theory

Introduction

Education theory based on educational research is the foundation of what we do. It is critical to have an underlying knowledge of learning theories in order to understand how learning happens in the zoo/aquarium fields. A learning theory attempts to describe how people and animals learn, thereby helping us understand the inherently complex process of learning. Learning theories provide educators with vocabulary and a conceptual framework for interpreting the examples of learning that we observe. The other suggests where to look for solutions to practical problems.

The ten learning theories provided in this section are: Constructivism, Behaviorism, Neuroscience, Brain-Based Learning, Learning Styles, Multiple Intelligences, Right Brain/Left Brain Thinking, Communities of Practice, Observation Learning, Lev Vygotsky and Social Cognition. This is not an exhaustive list, but rather an introductory look at educational theories.

Key Point

- Provide definitions for a variety of education learning theories that can be applied in the zoo/aquarium setting.

Constructivism

Constructivism is a philosophy of learning founded on the premise that, by reflecting on our experiences, we construct our own understanding of the world we live in. Each of us generates our own "rules" and "mental models," which we use to make sense of our experiences. Learning, therefore, is simply the process of adjusting our mental models to accommodate new experiences.

Behaviorism

Behaviorism is a learning theory that only focuses on objectively observable behaviors and discounts any independent activities of the mind. Behavior theorists define learning as nothing more than the acquisition of new behavior based on environmental conditions.

Piaget

Swiss biologist and psychologist Jean Piaget (1896-1980) is renowned for constructing a highly influential model of child development and learning. Piaget's theory is based on the idea that the developing child builds cognitive structures—in other words, mental "maps," schemes, or networked concepts for understanding and responding to physical experiences within his or her environment. Piaget further attested that a child's cognitive structure increases in sophistication with development, moving from a few innate reflexes such as crying and sucking to highly complex mental activities.

Neuroscience

Neuroscience is the study of the human nervous system, the brain, and the biological basis of consciousness, perception, memory, and learning.

Brain-based Learning

This learning theory is based on the structure and function of the brain. As long as the brain is not prohibited from fulfilling its normal processes, learning will occur.

People often say that everyone *can* learn. Yet the reality is that everyone *does* learn. Every person is born with a brain that functions as an immensely powerful processor. Traditional schooling, however, often inhibits learning by discouraging, ignoring, or punishing the brain's natural learning processes.

Learning Styles

This approach to learning emphasizes the fact that individuals perceive and process information in very different ways. The learning styles theory implies that how much individuals learn has more to do with whether the educational experience is geared toward their particular style of learning than whether or not they are "smart." In fact, educators should not ask, "Is this student smart?" but rather "How is this student smart?"

Auditory -A student with an auditory learning style learns best when information is delivered in auditory formats such as lectures, discussions, oral readings, audio recordings, or podcasts. Auditory learners do well in classroom settings where professor lectures and student discussions are the norm. These students also do well with taped courses and group study situations.

Visual -A student with a visual learning style learns best when information is presented in visual formats such as books, articles, web pages, images, videos, or diagrams. Visual learners do well with class handouts, power point presentations, movies, and chalkboards. These students take detailed notes, highlight their texts, and use flow charts for study aids.

Tactile -A student with a tactile learning style learns best when information is conveyed in "hands-on" settings such as trade positions, labs, workshops, or participatory classes. Tactile learners respond well to touching and creating things in areas such as art and science. These students want to hold and manipulate the subject matter, rather than merely viewing an image of it.

Multiple Intelligences

This theory of human intelligence, developed by psychologist Howard Gardner, suggests there are at least seven ways that people have of perceiving and understanding the world. Gardner labels each of these ways a distinct "intelligence"-in other words, a set of skills allowing individuals to find and resolve genuine problems they face.

- Linguistic intelligence ("word smart")
- Logical-mathematical intelligence ("number/reasoning smart")
- Spatial intelligence ("picture smart")
- Bodily-Kinesthetic intelligence ("body smart")
- Musical intelligence ("music smart")

- Interpersonal intelligence ("people smart")
- Intrapersonal intelligence ("self smart")
- Naturalist intelligence ("nature smart")

Right Brain vs. Left Brain

This theory of the structure and functions of the mind suggests that the two different sides of the brain control two different "modes" of thinking. It also suggests that each of us prefers one mode over the other.

Communities of Practice

This approach views learning as an act of membership in a "community of practice." The theory seeks to understand both the structure of communities and how learning occurs in them.

Observational Learning

Observational learning, also called social learning theory, occurs when an observer's behavior changes after viewing the behavior of a model. An observer's behavior can be affected by the positive or negative consequences-called vicarious reinforcement or vicarious punishment- of a model's behavior.

Lev Vygotsky and Social Cognition

The social cognition learning model asserts that culture is the prime determinant of individual development. Humans are the only species to have created culture, and every human child develops in the context of a culture. Therefore, a child's learning development is affected in ways large and small by the culture-including the culture of family environment-in which he or she is enmeshed.

Reviewing a Variety of Teaching Methods

Introduction

Every conservation educator uses their knowledge of teaching methods to convey content to audiences. Using multiple methods creates a more dynamic learning environment and can be applied to one learning experience. In fact, this adds to the energy, creativity and fun in every zoo/aquarium experience. A few of these successful methods are identified below.

Key Points

- To review a variety of teaching methods that encourage active learning
- To apply these methods in learning experiences at zoos/aquariums

Lecture

The lecture is perhaps the best instructional method for conveying a large amount of information in the shortest amount of time. Accompanied by a power point slide show, this may be the most widely used method of teaching in learning environments today. When conducted with enthusiasm for the subject matter, compelling images, and a question-and-answer session at the end, the lecture can be a very effective method of communicating information to young adult and adult audiences.

Collaborative/Cooperative/Peer Learning

This instructional method is a successful teaching strategy in which small teams, each with students of different levels of ability, use a variety of learning activities to improve their understanding of a subject. Students learn with and from each other without the immediate intervention of a teacher. Each member of a team is responsible not only for learning what is taught but also for helping teammates learn, thus creating an atmosphere of achievement. Students work through the assignment until all group members successfully understand and complete it.

Problem-based Learning

Problem-based learning (PBL) is an instructional method that challenges students to working cooperatively in groups to seek solutions to real world problems. These problems are used to engage students' curiosity and initiate learning the subject matter. PBL prepares students to think critically and analytically, and to find and use appropriate learning resources.

Problem-based learning will provide you and/or your students with opportunities to:

- Examine and try out what you know
- Discover what you need to learn
- Develop your people skills for achieving higher performance in teams
- Improve your communications skills
- State and defend positions with evidence and sound argument
- Become more flexible in processing information and meeting obligations
- Practice skills that you will need after your education

Inquiry-based Learning

Asking questions is at the heart of inquiry-based learning. The goal is not to ask just any questions but ones that your audience honestly cares about. As the educator, your role is to

guide the audience in finding the answers themselves and encourage them to ask new questions along the way.

Inquiry-based learning is one of many terms used to describe educational approaches that are driven by a learner's questions. It is inspired by what is sometimes called a constructivist approach to education, which posits that there are many ways of constructing meaning from the building blocks of knowledge and that imparting the skills of "how to learn" is more important than any particular information being presented.

Hands-on Learning

Hands-on learning is any educational experience that *actively* involves people in manipulating objects to gain knowledge or understanding. Hands-on quite literally means having students 'manipulate' the things they are studying - plants, rocks, insects, water, magnetic fields - and 'handle' scientific instruments - rulers, balances, test tubes, thermometers, microscopes, telescopes, cameras, meters, calculators, and computers. In a more general sense, it means learning through experience. Studies have shown that hands-on learning results in learners with a deeper understanding of the concepts than those taught in traditional lecture-based lessons.

Technology in the Classroom

Technology inspires creativity and hands-on learning and can be easily integrated into the curriculum. Technology allows students to see teaching – and learning – in a whole new way. Technology in the classroom may mean using interactive whiteboards, audience response systems, and computers to do on-line searches, content research and power point presentations. All of these build technology skills critical in today's professional world.

Learning Styles

People learn in different ways. This method incorporates different styles of learning in the development of activities to reach a wide range of visitors. Research demonstrates that, as the result of heredity, upbringing, and current environmental demands, different individuals have a tendency to both perceive and process information differently. Therefore, teachers should introduce a wide variety of experiential elements into the classroom, such as sound, music, visuals, movement, experience, and even talking. Teachers should employ a variety of assessment techniques that include each of the different learning styles.

Connecting Visitors to Wildlife

Introduction

In this section participants will explore the importance of connecting audiences to wildlife through a respectful portrayal and stewardship. This is truly the important mission of AZA institutions.

Key Points

- Effective conservation education in zoos/aquariums creates positive connections between visitors and animals.
- As the caretakers of wild animals, it is the duty of AZA zoos/aquariums to present and treat our animals respectfully and ethically.
- Respectful portrayal of animals includes encouraging natural behaviors of animals.

Overview

With the increase of technology in our daily lives, children all over the world have very few real life experiences in nature and with animals. Global media dominates knowledge of nature and the environment and discourages children from making their own decisions. To reverse this trend, children need exposure to animals and nature to sustain their interest, trust, and ultimately, concern towards wildlife and nature. Zoos/aquariums have the unique opportunity to use their living collections to foster empathy and make connections to inspire conservation action. Conservation education in zoos/aquariums plays a key role in fostering these by forming connections between animals and the public through effective conservation education programming and exhibit interpretation, and if done appropriately, is a powerful tool in encouraging environmental stewardship behaviors in the future.

Renewing our Connections to Wildlife

Connecting our zoo/aquarium visitors and program participants to wildlife supports the conservation mission of zoos/aquariums. By building connections into our zoo/aquarium exhibits and programs, our visitors and program participants will begin to understand animals more fully and their respect for animals will increase. As visitors and program participants increase their respect for animals, they will begin to increase their stewardship behaviors, truly making an impact on species survival and environmental protection.

Act Naturally

To renew our visitors' connections to the natural world, it is important that AZA zoo/aquarium animals are presented respectfully and ethically. This includes encouraging animals to express natural behaviors and experience normal social groupings, rather than exhibiting behaviors created solely for human enjoyment. In the wild, animals do not naturally ride bicycles, stand on their heads, balance on balls, jump through rings of fire or wear clothes. Instead, they form complex relationships and play important roles in our ecosystem.

In caring for wild animals in zoos/aquariums, it is also important to remember that they are wild animals, rather than domesticated pets. Domesticated animals are selectively bred and thus modified from their wild ancestors, for use by humans who control the animal's breeding and food supply. There have been no significant additions of animals deemed domesticated since 2500 B.C.

It is very important to convey to our visitors that wild animals in zoos/aquariums are not tame. This distinction affects how we portray these animals with our visitors, as well as ensuring animal welfare and public safety. For example, providing visitors with the opportunity to have their picture taken with a chained tiger may seem like an ideal way for them to make a personal connection with that animal; however, it does not present the animal as it would behave in the wild. Therefore, instead of viewing tigers as majestic animals exhibiting power and grace, the visitor could instead develop an impression of tigers as being weak, powerless and as a pet. Most importantly, this up-close encounter could pose a serious safety risk for the visitor and animal alike.

Program Animals

Well-managed program animals are a wonderful way for zoo/aquarium visitors to have up-close experiences with animals that still maintain the safety and integrity of the animals. Careful selection of program animals ensures that animal welfare and safety are top priorities. The Association of Zoos & Aquariums (AZA) supports the appropriate use of program animals as an important and powerful educational tool that provides a variety of benefits to zoo/aquarium educators seeking to convey cognitive and affective (emotional) messages about conservation and wildlife. The use of program animals can provide the compelling experience necessary to make inspirational connections between our visitors and wildlife that prepares them to reflect on their own relationships with nature.

Strategies for Zoo/Aquarium Educators to Connect Visitors to Wildlife

Here are a few tips to help you learn more about your zoo/aquarium animals. Share what you learn to make the animals relevant to your visitors' lives and inspire them to conservation action:

- Get to know the animals as individuals.
- Spend time watching the animals you will be talking about.
- Understand animals' needs and feelings.
- Gather personal stories by talking to keepers and vet staff.
- Gain understanding of how to conserve animals' habitats.
- Communicate this with visitors.
- Make personal connections to animals.
 - Go beyond teaching about parts and physiology to how to care for plants and animals.
 - Talk about your animals as individuals—names, personalities, stories, likes, dislikes, etc...
 - Weave in facts relative to the individual and their unique behaviors.
 - Stress value of animals.
 - FUN is good!

The MOST important thing you can do is to ensure that whatever activities you do connect people in a positive and respectful way to your animals.

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Incorporating Key Conservation Messages into Visitor Interactions

Introduction

This section presents empowering conservation messages that are endorsed and used by zoos/aquariums in the U.S. Participants are encouraged to discuss what types of conservation messages would be most appropriate and influential to use in programs and exhibits. AZA's conservation messages are broad statements that have an important bearing on the future survival of wildlife. One or two of these messages should help form your educational objectives for each visitor experience or program.

Key Points

- All educational experiences should include focused conservation messages.
- Conservation messages should be positive, relevant and appropriate to the age of the audience.
- You, as the future leaders of Conservation Education, should participate in integrating these messages into programs.

Vision, Value and Barriers in Messaging

What is a conservation message? It is a brief, values-based statement aimed at a target audience that captures a positive concept (think, feel, do). A message should move people from their entry point toward a desired behavior. Zoos/aquariums must select messages that are:

- Legitimate for zoos/aquariums (i.e. connected to living collections)
- Demonstrable and integrated into programs and/or exhibits
- Understandable, doable, relevant and rewarding to audiences

Create a Framework for Message Delivery that is Easy to Implement and Includes:

- *A Value*—A message that taps the audience's existing values.
- *Overcome a Barrier*—A message that identifies and overcomes existing barriers to the action you want the audience to take.
- *The Ask*—A message that asks the target audience to take a specific, doable action.
- *The Vision*—A message that explains the benefit of doing what you ask and connects that benefit to something the target audience wants (should link to the value tapped in the value message point).

Example: Climate Change and the Oceans

- *Target Audience*—Parents visiting aquariums.
- *Value*—Parents want healthy oceans and thriving marine wildlife that they and their children can enjoy for the future. (AZA Conservation Message # 5 below. Human experiences in wild places enrich our lives and inspire our choices for future generations.).
- *Barrier*—Don't perceive climate change as a threat to the oceans or marine wildlife.
- *Tap into Their Value*—There are danger signs around the world that the ocean and the marine life that we value, like whales, seals, crabs and clown fish, are suffering from the full force of climate change.

- *Overcome the barrier*—The science is clear in identifying ocean acidification, coral reef destruction, dead zones, food supplies disruption and at <insert organization here>, our organization is working to help protect the ocean and its marine life that we cherish.
- *The Ask*—Join us in our efforts to learn more and do more to keep the wonder of our ocean world and its magnificent life with us now and forever by...
- *The Vision*—Together we can make the future of the oceans one we all look forward to seeing.

What are the Conservation Messages?

The Association of Zoos and Aquariums Conservation Education Committee, a volunteer organization within our profession of leaders in conservation education, worked together to create a list of conservation messages appropriate to our zoos/aquariums. Educators thus strive to incorporate one of the following main conservation messages in their programs and exhibits. Review these messages with your education development team every time you begin a new project or program to get everyone in the habit of using them. Soon, with practice using this tool, the team will easily select which messages are the best fit for programs.

In a zoo/aquarium, you can incorporate many positive messages, BUT you should focus program or exhibit content on one or two main messages. All of the conservation messages below focus on one of the following goals: illustrating the impact humans have on the environment, fostering feelings of empathy appreciation towards other species, and conveying how individuals can help protect animals and the environment.

All life on Earth exists within an ecosystem.

- An impact on any element of an ecosystem has ramifications throughout the ecosystem.

A healthy habitat is one component of an ecosystem.

- A healthy habitat is critical to wildlife survival.

All life on Earth is valuable and should be treated as such.

- All animals and plant life are valuable and important beyond their utility to humans.
- All animals have the same needs, which include food, clean water, shelter and a safe place to raise young.
- All animals should be treated with respect.
- Interdependent relationships (biodiversity) between groups of living things are important and valuable.

Healthy ecosystems provide many essential services and benefits that sustain and improve human lives.

- Natural systems maintain a habitable planet by regulating the climate and by cycling water, oxygen and carbon dioxide and soil nutrients.
- Natural systems provide human beings with essential services that sustain life on Earth: fresh air, clean water, soil and oceans that can produce food.

- Biological diversity provides a multitude of natural resources used commercially for food, shelter, fiber, and other products.
- People depend on thousands of plants and animals to live their daily lives.
- Nature is the primary sources for many common medicines upon which so many of us depend, and is also the likely source for promising new pharmaceuticals that may hold the secret for combating cancers, AIDS, and other threatening diseases.
- Healthy ecosystems underpin healthy human economics and sustainable nature systems support sustainable human communities. Many jobs such as fishing and farming depend directly on protecting natural ecosystems.

Human experiences in wild places enrich our lives and inspire our choices for future generations.

- Nature provides wondrous places to play and recreate, to explore, to be creative, to learn and enjoy both as individuals and with our friends and families.
- The beauty and resources of the natural world are national treasures. They help define America's national heritage and character, and provide the nation with valuable and irreplaceable natural resources.
- The variety of life on Earth, its biodiversity, is both essential and inspirational for human existence.

Human beings are responsible for dramatic changes to ecosystems at a rate unprecedented in Earth's history.

- The growth of the human population coupled with the increased consumption of resources by individuals has a direct impact on the planet's finite resources and wildlife.
- The primary human threats to endangered species are climate change and pollution, habitat destruction and fragmentation, introduced species and diseases, pet trade and over consumption of individual species.

Humans have the responsibility to care for the Earth, to leave healthy ecosystems for our families and future generations.

- Due to the unprecedented changes the human species is causing on the planet, we must often intervene to save wildlife.
- Many decisions involved with caring for the Earth are extremely complex, and must take into account both human and animal needs.

Responsible zoos/aquariums strive to conserve ecosystems and promote care and positive action for the natural world.

- Responsible zoos/aquariums share knowledge, ideas and projects that empower people to take conservation action.
- Responsible zoos/aquariums are active partners in the conservation community and help further conservation efforts worldwide by seeking workable and realistic solutions to conservation problems.
- Responsible zoos/aquariums provide animal and nature experiences that engender a sense of wonder.
- Responsible zoos/aquariums disseminate valuable information about animals and the ecosystems they inhabit.

- Responsible zoos/aquariums model caring by being leaders in animal care.

Through informed actions, individuals can positively impact the survival of wildlife. Some of these actions include:

- Making appropriate daily individual lifestyle decisions that benefit the environment and animals, including planting gardens, making informed food and consumption choices (no Styrofoam), making informed pet purchases (no exotic animals), disposing of garbage properly and picking up litter, continuing to reuse and recycle materials and continuing to conserve energy.
- Protecting and restoring natural wildlife areas, including returning land from farming to forests and not picking wild plants.
- Enforced government protection of air, water and land.
- Sharing the need to protect nature and make positive lifestyle choices that benefit the environment with others.
- Joining or starting a conservation club or organization, support existing conservation organizations, including AZA zoos/aquariums.

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Identifying Conservation Actions

Introduction

Every interaction with visitors should include a conservation action that is a behavior that visitor's can do to help wildlife. Educators should always have an action in mind when talking with visitors and groups. Be sure to know what action you'll be suggesting as your final destination and be sure to get there, even if many other distractions occur within the visitor experience or program.

Key Points

- Educators drive the conversation and programming direction.
- You are not finished with the interaction until you've delivered the conservation action (The Ask).
- Be innovative! Always be looking for new ways to connect your audience to an action.
- Memorize the conservation actions so that you can offer a number of actions based on the experience.
- If conservation actions are delivered effectively, your institutions can positively impact millions of visitors each year.

Give Visitors Specific Ways to Affect Change—Conservation Actions

Besides conveying accurate, engaging information and giving visitors opportunities to connect with animals, we must empower them with specific ways they can help protect wildlife. Believe it or not, we are actually driving the direction of the conversation and program, not the audience. You can guide conversations in a particular direction by the types of questions that you ask. Know where you are going and have an action in mind. Be sure to answer all the audience's great questions with enthusiasm but be sure to offer a suggested action. Remember, we have a conservation mission that we have promised to uphold. So, be thinking of new ways to encourage positive wildlife actions and strive to include multiple actions if possible.

Make sure to consider the ages of the audience members - what can children realistically do to help wildlife? Encourage them to come up with examples of how they can help wildlife in their daily lives.

Wildlife Conservation Actions

As conservation educators of living collections, our first priority is providing our audiences with actions that directly benefit wildlife. Studies have shown that people want to contribute to wildlife conservation efforts, but they are unsure about what actions to take. Here are some actions that can directly impact wildlife:

Become Well Informed

Children

- Read a great book about animals or visit a reputable website with your parent's permission.
- Spend time observing animals in your backyard to learn how to identify them and understand more about their behaviors.

Adults

- Join organizations devoted to protecting wildlife and habitats.
- Attend classes, lectures, watch nature shows & read articles to keep current on issues affecting the environment.
- Visit other zoos, aquariums, nature centers, national parks, and botanical gardens.

Take Action

Children

- Adopt an animal at your local zoo/aquarium.
- Focus your next school project on a favorite animal and share your passion with your classmates.
- Create backyard habitats by adding a bird bath or planting native flowers, shrubs, and trees as food sources and nesting sites for wildlife.
- Go on a nature hike to identify animals and animal clues in your neighborhood.
- Reduce, reuse, recycle, and replenish everything you can.

Adults

- Share and discuss what they have learned with others and how they can help protect wildlife and the environment.
- Volunteer for a wildlife conservation or rehabilitation organization.
- Organize community or school litter clean-ups that keep ecosystems healthy for wildlife.
- Take your family camping, hiking, biking, kayaking or for a beach/river walk to raise their appreciation of wildlife and the outdoors.
- Sponsor an endangered species through a wildlife conservation organization.
- Choose your pets wisely and be sure they were not taken from the wild.
- Set a good example of conservation behaviors for children in your family.

AZA accredited zoos and aquariums provide opportunities for guests to connect with wildlife and nature. Staff members and volunteers can help create and inspire champions for wildlife by delivering messages that promote environmentally responsible behaviors.

AZA's Conservation Education Committee has developed a list of environmentally responsible behaviors that reside under two principal headings: *Connect with Wildlife and Nature* and *Become a Champion for Wildlife*. Under each heading are specific actions that support and relate to the primary behavior. The recommendations were selected based on the following criteria:

- Legitimate for zoos/aquariums (i.e. connected to living collections)
- Demonstrable, significant and integrated into programs and/or exhibits
- Understandable, doable, relevant and rewarding to audiences

Of course, this is not an exhaustive list and not all behaviors will be appropriate for every audience or facility. Choose those that best align with your goals, are most relevant to your audience and are most likely to enhance their experience. Many of the ideas listed can be expanded or modified to meet your specific needs. And if you think of a new or different

behavior, feel free to add to the list. Share your idea(s) and experience(s) with other zoo/aquarium educators!

<u>Connect with Wildlife and Nature</u>	<u>Become a Champion for Wildlife</u>
<ul style="list-style-type: none">• Go outside! Enjoy nature and animals!• Visit your local AZA facility.• Read, write and learn about wildlife and nature.• Celebrate wildlife and nature!	<ul style="list-style-type: none">• Keep habitats healthy.• Be a responsible pet owner.• Make wise purchases of goods and food.• Share your time, talent and treasure in support of wildlife and nature conservation programs.• Vote for wildlife and nature.• Recognize and celebrate wildlife champions!

Climate Change Actions

These conservation actions support sustainable living practices and have become more critical as the need to address climate change issues mount. Zoo and aquarium educators have the ability to be strong advocates for sustainable development and living. Through our exhibits and the diverse means of communicating with our audiences, we can embrace the notion of moving visitors to a new understanding of how they can contribute to a sustainable world. Here are actions, geared towards 6-11 year old children that can help:

Energy Reduction

- Turn lights off when leaving a room.
- Use cold water when doing laundry.
- Unplug your computer, TV, DVD players, before going to bed.
- Turn your bedroom into a “green space” by using compact fluorescent lighting, recycle bins, etc.

Water Use Reduction

- Turn off water while brushing teeth.
- Minimize showers to 5 minutes.
- Install a low flow shower head to use less water.
- Take cooler showers to save on heating energy.
- Tell your parents about low flow toilets or convert your toilet to low flow (place a 1 liter bottle in the tank to use less water).
- Collect shower water/dish water for your garden.
- Get a rain barrel for your backyard to water your garden.
- When your parents are planning a family vacation ask them to look for hotels that are a part of the green lodging group.
- If you have a leaky faucet in your house, ask your parents if you can help them fix it.
- Fill a pitcher with water and leave it in the fridge so you don't run the tap waiting for cold water.

Alternative Transportation

- Carpool.
- Tell your parents about the great fuel economy of hybrid cars.
- Check the tire pressure (to improve fuel economy) before heading out in your carpool.
- Help your mom/dad organize a carpool with friends.
- Ride a bicycle (skate board, roller blades) to school.

Waste Reduction

- Use a reusable lunch box / grocery bag.
- Use a reusable water bottle.
- Use powdered drink mixes in your reusable bottle instead of bottled drinks.
- Use wrap-n-mats for your sandwiches to decrease plastic use.
- Wash and re-use plastic sandwich bags.
- Keep unused napkins, ketchup, mayonnaise and mustard packets to use later.
- Hand down items you no longer need or use to families in need (clothes, games, toys, movies).

- Donate old books, magazine and newspapers to a doctor's office, library, hospital or your art teacher; hold a book exchange with friends to recycle books you have already read.
- Next time you set the table for dinner, use cloth napkins or buy recycled paper napkins (tissues, paper towels, toilet paper, etc.).
- Celebrate your birthday without using disposable plates, cups and flatware. Use washable plates, cups and flatware or ones made from renewable resources such as bamboo, sugar cane or potato/corn starch.
- Start a compost pile in your backyard. Then use the dirt you made to help plant a garden.
- Use re-chargeable batteries for your toys and games. Recycle single use batteries.
- Check books out from the library or borrow them from a friend.
- Reuse yogurt cups to plant seeds for your garden.

Recycling

- Recycle all bottles, cans, and paper.
- Donate clothes you've outgrown or don't wear.
- Recycle/donate your cell phones.

Green Purchasing

- Purchase recycled paper goods (homework paper, toilet paper, napkins, printer paper, etc.).
- Look for ENERGY STAR appliances/technology.
- Ask your parents to purchase a duplexer for your home computer printer to double-side your copies and reduce paper use.
- Check out one "green" book from the library and read it.
- Visit the local farmers market and purchase locally-grown food for your school lunch.

Habitat/Wildlife Protection

- Plant a tree.
- Reduce your lawn and help wildlife by planting native flowers and shrubs.
- Plant a butterfly garden/hummingbird garden.
- Create a backyard habitat for wildlife.
- Use plants that require less watering.
- Replace grass with a native plant garden.
- Reduce the use of fertilizers and pesticides on your lawn (all drains lead to the ocean).
- Research natural pesticide recipes (peppermint soap) or natural cleaner recipes with your parents and then make your own.
- Plant an herb or veggie garden in your backyard. Then enjoy eating your work.
- Reduce the amount of meat you eat.
- Learn more about your favorite animal. The more we know about animals, the better we are able to conserve them.
- Tell your friends and family about the value of wildlife and wild places.
- Choose your pets wisely and be sure they are not taken from the wild and be sure you don't release pets into the wild.
- Hold a bake sale to support organizations that help wildlife and wild places.

Inspiring Staff and Visitors to Take Conservation Action

Introduction

The purpose of this section is to provide a summary of current research on why people do or do not take action, and to discuss the process of determining which conservation actions are important to encourage. The purpose is also to highlight the fact that our live animal collection is our greatest asset in creating an affective impact on our visitors. Finally, we will explore best practices in getting staff and visitors involved in taking action.

Key Points

- There is an immediate need to preserve wildlife, wild places and natural resources.
- With their millions of visitors each year, zoos/aquariums can make a large difference in getting people to take conservation action.
- A respectful presentation of our live animal collection is our greatest asset in connecting people to nature, which can affect their emotions, attitudes and conservation behavior.
- Zoo/aquarium educators can and should decide on key conservation actions for zoo/aquarium visitors.
- There are best practices in encouraging people to take action.

What do we Know About Why People Take Action?

How do zoos/aquariums influence conservation behaviors of our visitors? In recent years, zoos/aquariums have begun to ask the question, “Which conservation messages do our visitors take away with them when they leave our facility, and what do they do as a result of that experience?” Do visitors actually take the conservation actions we hope they will, and can we actually attribute those actions that they do take to their zoo/aquarium experience? We have begun to study those questions through audience research with visitors on grounds, and *longitudinal evaluation* (follow up studies with visitors after their visit, and perhaps months later). The emerging field of *conservation psychology* studies conservation-related behaviors; research from these professionals has contributed enormously to our body of knowledge. We have also looked well beyond our zoo/aquarium and museum industry to consider how other disciplines have successfully influenced behavior change, most notably the human health field.

This is what we know from conservation psychology and visitor behavior that applies to zoos/aquariums in the US:

- Adults involved in conservation have tended to have more free time to play in nature as children and/or had a significant adult in their life who encouraged interaction with nature. Children need to spend unstructured time in nature. We can provide those opportunities at our zoos/aquariums and we can encourage the development of outside/nature play opportunities in the communities we serve. This provides the base for future learning and action.
- We are exposed to many serious and complex conservation issues with dire consequences. While older children and adults can process this information, young children cannot. Exposure to negative conservation stories can actually cause

children to disassociate from nature. Avoid environmental tragedy messages for early childhood audiences. See the age-appropriate topics section in this manual.

- Adults who have personal nature experiences and/or who have experience as activists working toward social or environmental change are much more likely to take future environmental actions. Get people involved in doing some conservation action, which can lead to their taking further actions. Provide opportunities such as local clean-ups and habitat restoration work.
- There appears to be a biological basis for our attraction to animals. Visiting zoos/aquariums meets a human need that goes beyond recreation. Being near animals seems to satisfy this inner need.
- Different cultures perceive animals and people differently. Animal exhibits affect different cultural groups in different ways.
- People can gain a greater understanding of and feel more related to animals and their natural habitats by seeing similarities between human and animal behavior. Focus on relationships and similarities between humans and animals. There is a role for well-informed anthropomorphism in our messaging.
- Visitors perceive education to be one of the benefits of a zoo/aquarium.
- Although education is not the primary reason most people visit zoos/aquariums, in our visitors' minds it is one thing that distinguishes us from other leisure activities.
- Visitors can improve their understanding of conservation issues at zoos/aquariums from exhibits and demonstrations.
- Zoo/aquarium visits, especially up-close interactions with live animals, can affect visitor emotions and attitudes. Animals, the core resource of zoos/aquariums, evoke strong emotional responses from our visitors.
- Signs, or graphics, while appealing to a certain type of learner, may not be as effective as live interpretation. Person-to-person interpretation is usually the most effective form of communication.
- Zoo/aquarium exhibits can positively influence visitors' intentions toward conservation actions. Well-designed exhibits can be effective ways of changing visitors' receptivity toward conservation actions.
- The environments in which we house animals make a difference. Animals viewed in more natural environments (vs. obviously caged environments) are viewed for longer periods and may be viewed in a more positive way. The exhibit context in which visitors view animals is important.

Zoo/Aquarium Conservation Education

Zoo/aquarium education historically was based on the assumption that the more we could educate our visitors (increase their knowledge) the more likely we were to influence their attitudes toward wildlife, which would therefore lead to visitors taking conservation action. This model assumed that educating people about environmental issues would automatically result in more pro-environmental behavior. We now know that this model is invalid even in intensive or repeated learning situations. Behavioral psychology research has shown that in most cases, increases in knowledge and awareness did not lead to pro-environmental behavior. And, those who did take action were not necessarily very knowledgeable about the issue.

Zoo/aquarium educators can encourage a conservation ethic by creating opportunities for people to experience animals and develop a caring attitude towards them, and by encouraging children to explore and interact with nature.

Zoo/aquarium education is now focusing more on teaching skills for conservation action (for example, how to properly install and maintain a wild bird feeder), and taking the lead in involving people in direct conservation action (such as beach clean-ups). Zoos/aquariums are also turning more to applying what we know from conservation psychology and social marketing techniques to determine how we can be most effective in inspiring conservation action.

Social Marketing

Social Marketing draws on the tools of social psychology. It provides a short-term approach to change specific behaviors for targeted audiences. Social marketing is a campaign that uses strategies to activate motivations to taking action, and to eliminate barriers.

An important difference between social marketing and conservation education is that in social marketing, it is taking the action that it is important—*why* you take the action is not important. For example, you could conduct a social marketing campaign to get people to turn off their car's ignition while waiting, rather than idling their car, which contributes to air pollution. Some people may take the action because they are motivated to reduce air pollution, which is harmful to the environment. Others may take the same action, but for different reasons—they are motivated because the exhaust from an idling car is bad for children's health. Social marketing can use an emotional tool to connect to people and get them to take action.

Some Social Marketing Tools

Pledging—Ask people to make a commitment to taking an action, either by agreeing verbally, or writing it down (writing is more effective). If the person signs it, that is even more effective. If someone else sees them signing it, that is even more effective.

Prompts—Remind people of behavior *at the point where the behavior changes*, such as recycle bin labeling.

Presumptive Labeling—Label someone positively as environmentally friendly and they'll be more likely to do positive environmental behaviors.

Incremental Acquiescence—People who agree to a small request are more likely to agree to a larger one.

Adjusting Norms (or perceptions of norms)—Engage people to adopt an action on the basis that many other people are doing it, too. Will you give it a try? If everyone does it it's more effective.

Practices at Zoos/Aquariums that Positively Influence Impact of Zoo/Aquarium Visits From the AZA Multi-Institution Research Project (MIRP)

- Give explicit conservation messages.

- Concrete suggestions for ways people can facilitate and sustain conservation efforts back home are important.
- Facilitators and interpreters make a difference, so design strategies for increasing meaningful staff and volunteer interaction with visitors.
- Engage children at the pre-school, kindergarten and elementary level in specific activities that benefit the environment to encourage a conservation ethic.
- Design strategies for providing continued follow-up to visitors.

Approaches to changing people’s environmental behaviors currently are either long term (conservation education) or short-term (social marketing). Conservation education focuses on developing critical thinking skills to make informed decisions. This approach appears to influence the development of a conservation ethic. But this approach takes time. The critical conservation issues that we face suggest that more immediate means are necessary. Social marketing targets very specific behaviors for a specific audience. Zoos/aquariums may need to balance using both of these approaches.

Case Studies of Conservation Action in Aquariums

Seafood Watch program at the Monterey Bay Aquarium, California

Problem: At stores and restaurants, people are making decisions about fish purchases that are environmentally unsustainable.

Identify targeted behavior: Enable people to make good choices when purchasing seafood

What is the barrier to taking action? By talking to visitors, Aquarium staff determined that the barrier to taking action was a lack of knowledge about environmentally-friendly purchasing.

Solution: Create a sustainable seafood pocket guide.

Why did the Monterey Bay Aquarium target this behavior? The public told us they wanted this behavior, and it is a good fit for the institution. Aquarium staff conducted another survey: visitors want more information about seafood choices and many wanted guidance about what to avoid. The Aquarium asked people to *modify an existing behavior* rather than asking them to start a new behavior. Choose an attainable goal.

Chesapeake Bay program at the National Aquarium in Baltimore, Maryland

Chesapeake Bay watershed messaging: 70% of visitors to the National Aquarium in Baltimore (NAIB) live in this watershed. The Mountains to Sea Gallery at the Aquarium features Maryland. Graphic panels have pictures of people taking action—people see themselves taking action.

In the Chesapeake Bay watershed, 90% of grass beds have been destroyed. In the spartina school program, schools grow grasses to then plant. The NAIB’s ACT! Volunteer Conservation Team monitors Chesapeake’s plants in a multi-year involvement program. These volunteers plant sea grasses, and therefore help to conserve seahorses.

Getting Staff Involved in Taking Action: Green Teams

Many zoos/aquariums have established “Green teams” at their facilities. These are typically

comprised of a multi-disciplinary group of staff members who are enthusiastic about planning and implementing ways that the institution can “live” its conservation message by modeling resource conservation. These staff lead staff initiatives to institute butterfly gardens; water conservation measures; bat boxes on the grounds; energy conservation in zoo/aquarium offices; use of recycled paper and doubled-sided photocopying to save paper; hang bird houses and plant trees as food sources and nesting sites for wildlife; recycling of paper, cardboard, plastics, batteries, and other recyclable items; composting of food waste and herbivore animal manure; waste reduction programs in food service; and other environmentally-friendly practices. Involving staff at all levels of the organization in Green Teams builds staff morale, creates a sense of community, and saves the institution money. In addition, it provides a great model to visitors to your institution if you share those stories, and also provides a great model for schools. Each institution has different capacities. Which resource conservation actions could your zoo/aquarium realistically take?

Which Actions do we want to Encourage Visitors to Take?

How would we decide which actions we wanted to encourage? Woodland Park Zoo in Seattle, Washington USA proposed the following criteria to evaluate conservation actions their zoo will support. The action must be:

- *Significant*: Has a high impact, mitigates identified threat;
- *Measurable*: Results in conservation benefits that can be measured;
- *Effective*: Demonstrates benefits to animals;
- *Demonstrable*: Can be visibly modeled by the zoo, its staff and its volunteers;
- *Integrated*: Can be integrated into NW zoo exhibits and programs;
- *Relevant*: Is audience appropriate;
- *Doable*: Has a high probability of being adopted by target audience(s);
- *Clear*: Is easily communicated, graspable; and
- *Rewarding*: Has high appeal, has a cool factor.

To appeal to the different abilities and levels of interest of our varied audiences, they encouraged:

- Consumer Actions that relate to daily decisions about how we live and our buying habits, such as buying sustainable coffee, choosing to ride the bus rather than drive a car, reducing energy use, and recycling.
- Ecosystem Actions involve caring for nature through direct activity, e.g., putting up bird nest boxes, restoring a salmon stream, obtaining backyard habitat certification, and removing invasive species.
- Support Actions make an affirmative statement about ones’ values. These include joining an organization, donating money, supporting conservation commerce, and signing a petition.

Summary

While conservation education at zoos/aquariums does advocate for taking action, conservation education is a long-term approach to develop a conservation ethic. Given the immediacy of the need for action to preserve wildlife, wild places and natural resources, zoos/aquariums are examining an alternative, short-term approach to behavior change, social marketing. Our live animal collection is our greatest asset in creating an affective impact on our visitors. This connection with nature through animal demonstrations and close-up encounters with animals in a respectful way affects our visitors’ emotions,

attitudes and even behavior change. Zoo/aquarium staff can also become involved in conservation action through their involvement on institutional “green teams,” to promote environmentally responsible use of resources. Worldwide, over 600 million people visit zoos/aquariums annually. We have a tremendous opportunity to make a collective impact for the future of wildlife!

References Cited

Models of Behavior Change Workshop, AZA 2004 Annual Conference

O’Connor, Terry. 2005. From Inspiration to Action...and What We’re Learning Along the Way. *AZA Annual Conference Proceedings*.

Routman, Emily, Jackie Ogden and Keith Winsten. Ms. In progress. An educator’s perspective on the zoo experience: Education and the evaluation of exhibit design. In: *Wild Mammals in Captivity*.

Resources

Community-Based Social Marketing by Douglas McKenzie-Mohr (www.cbsm.com)

Best Practices in Inspiring Action

Children

- Nurture a caring and empathetic attitude toward animals. How specifically are you going to do it?
- Provide opportunities for children to spend time exploring nature. How can you specifically incorporate this into your programs?
- Avoid environmental tragedy messages for children 8 and younger. Negative environmental messages may cause young children to disassociate with nature.
- Develop a conservation ethic among urban children at the pre-school, kindergarten and elementary level, with encouragement for them to actively engage in specific activities that benefit the environment (positive messages about caring for animals and nature). How are you specifically going to do this at your zoo/aquarium?

Zoo/Aquarium Exhibits

- Design more naturalistic zoo/aquarium exhibits—the context in which visitors see animals is important to how visitors perceive animals. How can you assist at your zoo/aquarium?
- Design great exhibit interpretation—this can be effective in changing visitors' intentions toward conservation actions. What can you do at your zoo/aquarium to improve this?
- Zoo/aquarium visits, especially up-close interactions with live animals, can affect visitor emotions and attitudes. Animals, the core resource of zoos/aquariums, evoke strong emotional responses from our visitors. What are you currently doing with animals at your zoo/aquarium? How will you evaluate this experience to ensure that the animals are being appropriately presented?
- Provide education experiences to engage visitors. Visitors can improve their understanding of conservation issues at zoos/aquariums from exhibits and demonstrations. How will you evaluate your experiences at your zoo/aquarium? How will you improve this at your zoo/aquarium?
- Facilitators and interpreters make a difference, so increasing meaningful staff and volunteer interaction with visitors. What is currently happening at your zoo/aquarium? What specifically will you do to improve?

Conservation Messages

- Develop and use explicit conservation messages in exhibits and programs. What conservation messages are at your zoo/aquarium? What messages do you want your visitors to go away with?
- Provide concrete suggestions for different ways people can take action (as consumers, by taking direct action, contributing financial support). Be an advocate. What specific actions should you tell your visitors to do? How will you go about telling them to do this?

Teach People how to Take Action

- Model resource conservation behaviors at your zoo/aquarium. How will you do this at your zoo/aquarium?

- Take the lead. Get people involved in doing some conservation action, which can lead to their taking further actions. Provide opportunities such local clean-ups and habitat restoration work. How will you do this at your zoo/aquarium?
- Teach skills for conservation action (for example, how to properly install and maintain a wild bird feeder). How will you do this at your zoo/aquarium?

Social Marketing

- Social Marketing promotes one behavior at a time for one audience. What specific behavior will you promote at your zoo/aquarium? How will you do this?
- *Pledging*: Ask people to make a commitment to taking an action, either by agreeing verbally, or writing it down (writing is more effective). How will you incorporate at your zoo/aquarium?
- *Prompts*: Remind people of behavior *at the point where the behavior changes*, such as recycle bin labeling. How will you incorporate this at your zoo/aquarium?

Introduction to the Group Project

Introduction

The purpose of the Group Project is to design a new educational component (such as an experience, program or exhibit interpretive plan) for a fictional institution incorporating everything participants learn in Conservation Education Course. Participants will be assigned to work in teams to create a plan for how they will influence the AZA review committee that they should fund this new initiative. All groups will present their ideas on the final day.

Key Points

- There are many factors that need to be considered when designing an experience, program or exhibit interpretive plan.
- A grant proposal should be created so that your institution's goals are aligned with the needs of a funding agency.

Assignment

1. You and your team are members of the new education department of a fictional facility known as the *Perfect Zoo/Aquarium*. Your team has been given the opportunity to apply for a Conservation Endowment Fund (CEF) grant to implement one of the following conservation education programs at your institution:
 - An informal visitor experience on zoo/aquarium grounds (ex: presentation in front of an animal exhibit);
 - A program for school groups (ex: a classroom program on zoo/aquarium grounds);
 - A revenue-generating class for families (ex: Mommy & Me program); or
 - A plan for interpretation for a zoo/aquarium exhibit (a re-designed exhibit or a planned new exhibit).
2. CEF awards grants to build capacities of developing-country zoos/aquariums in order to improve their conservation programs. This year, the CEF review committee is interested in funding zoo/aquarium education programs that use their live animal collections to provide an experience or education program that positively connects people with animals to raise public awareness and appreciation of wildlife conservation issues, and/or stimulate conservation action in their local community.
3. The funding limit for CEF proposals is \$40,000 for no more than three years. This money can cover anything that furthers the institution's educational successes (personnel, programs, exhibit development, graphics, projects, vehicles, equipment, animal purchases, promotional materials, etc.) Your current education budget covers your team's salaries and \$10,000 for general supplies and administrative costs. You have a zoo/aquarium vehicle, a collection of program animals and a biofact collection. There is no volunteer or docent program. All other conditions are as you find them at your institution.
4. Your final project is the group presentation you will make to the CEF review committee on the last day of the course. You will have 15 minutes to present, followed by a 5-minute question and answer period. Applicants must demonstrate how their project will increase their zoo/aquarium's effectiveness in raising public

awareness and appreciation of wildlife conservation issues, or stimulate conservation action. Presentations must show how the “ADDIE” program design method was used to develop their project.

5. Be aware that the review committee may challenge your plans & all members of your team may be called upon to answer specific questions. It is not necessary to submit a written assignment, but certain content questions should be addressed as outlined in the following pages. The evaluation form that the review committee will use to rate your proposal is included at the end of this section. Individuals will also use this form to rate the presentations of the other groups, but oral feedback is not required.

Please Consider and Answer the Following in Your Group Project:

1. What are the challenges and issues you face at your zoo/aquarium that may be barriers to you implementing this experience, program or exhibit? How will you address these issues so you can move forward with this initiative?
2. What preliminary analysis will you do to learn more about your visitors and what they need? How will the results influence your program?
3. What programs does your institution currently offer? What are the needs of your community? Why do you consider this project to be timely and how does it address a critical need?
4. Explain the goal and rationale behind the proposed project. What will the specific outcomes be? Include how your evaluation plan will measure program effectiveness and apply evaluation data to strengthen the project.
5. What conservation actions are you promoting?
6. Describe the content of the experience, program or exhibit. What will people know, feel and do?
7. What resources do you have, and what do you need to initiate this?
8. Who will be used to execute this program? In what capacity will they be used?
9. What are the logistical considerations you will face and how will you plan for these?
10. How will you network with other colleagues to win their support and collaboration on this initiative?
11. Will your institution collaborate with local schools, universities, non-profits, community groups and government agencies? If yes, explain their contributions to the project.
12. Are you proposing the use of grant funds for any exhibit development? If so, please include descriptions of the exhibit, interpretives, graphics, etc. How will you develop graphics and interpretives for exhibit components?

13. What are your institution's plans for promotion of the program/project?

Group Project: Process Checklist

Day 1: Brainstorming & Analysis

- Assess the grant opportunity and the resources available to you.
- Assess your group and determine what each member brings to the table.
- Brainstorm how you would make your project successful?
- Determine what you need to know and where you are going to get it.
- Team Check: How is your team working together?
- *We cannot stress this enough: pick an approach early and stick with it!*

Day 2: Design

- Decide on your target audience and core messages (theme).
- Complete a basic outline of project goals & objectives.
- Design a strategy to address goals & outcomes (outreach, youth program, exhibit, etc.).
- Draft a basic budget (not detailed yet, but be realistic with funds).
- Team Check.

Day 3: Development

- Time to dive into specifics, flesh out your ideas.
- Integrate info from class topics over the past three days (program animals, learning styles, incorporating conservation messages).
- Think about partnerships and program sustainability.
- Develop your evaluation plan.
- Start to develop your presentation style, props, handouts, etc.
- Team Check.

Day 4: Implementation & Evaluation

- Evaluate what you've done thus far for strengths, weaknesses, and what is missing.
- Finalize the budget (this does not need to be handed in, but questions may be asked about it).
- Determine how you will make this program work and address the challenges you face.
- Practice presentation and timing.
- Make sure everyone has an equal part to play in the presentation and can answer questions from the WAZA review board.
- *Don't stress about it, remember this is supposed to be fun!*

Group Project: Proposal Rating Form

Please rank the following criteria, using a scale from 1 to 10, 5 being adequate, 10 being exceptional.

Analysis of Audience Need	1	2	3	4	5	6	7	8	9	10
Message Content	1	2	3	4	5	6	7	8	9	10
Conservation Component	1	2	3	4	5	6	7	8	9	10
Expected Outcomes	1	2	3	4	5	6	7	8	9	10
Implementation of Program	1	2	3	4	5	6	7	8	9	10
Methods of Evaluation	1	2	3	4	5	6	7	8	9	10
Creativity of Program	1	2	3	4	5	6	7	8	9	10
Program Sustainability	1	2	3	4	5	6	7	8	9	10
Use of Resources	1	2	3	4	5	6	7	8	9	10
Use of Team Approach	1	2	3	4	5	6	7	8	9	10
Creativity of Presentation	1	2	3	4	5	6	7	8	9	10

Total Score: _____

Group: _____

Project: _____

Strengths:

Weaknesses/Concerns:

Overall Comments:

Section 2: How do we Create a Visitor Experience?

Introduction

The purpose of this section is to discover the importance of the total visitor experience in conveying a zoo/aquarium's message. Participants will explore the many ways the public forms an impression of their facility and the rationale behind trying to shape that impression—to provide engaging experiences for visitors of all ages, to enhance visitor appreciation of wildlife, to encourage repeat visitation, and to communicate important messages about caring for wildlife. This section includes a group discussion and visualization activity.

Key Points

- Creating a positive visitor experience is critical for your zoo/aquarium's success.
- We should work to create a visitor experience because if we don't the visitor will create his own and will likely miss our conservation messages and could form a less than acceptable vision of the zoo/aquarium.
- A visitor's experience begins before they visit your facility through advertising, word-of-mouth, etc.
- Some messages the visitors receive are intentionally promoted by your facility and some are unintentional.
- Staff should examine their facility as a whole and to ensure positive messages are being conveyed in all areas and programs.
- Positive encounters with staff and volunteers and respectful treatment of the animals increase visitors' enjoyment, help them connect with the animals, and facilitate their understanding conservation messages.

When does a visitor's zoo/aquarium experience begin? It may be surprising to realize that the visitor experience begins before a person enters the facility. If people learn about your zoo/aquarium through your institution's web site; have seen an image of your facility on a billboard sign, on TV, or have seen a poster on public transportation; or have heard about your zoo/aquarium from a friend or family member, then your institution has already begun to communicate a message. At that moment, the person begins to get an impression of your zoo/aquarium that can influence his or her experience.

The messages we convey (both intentionally and sometimes, unintentionally) influence the visitor experience. If, as an institution, we do nothing to demonstrate that we care about visitors' experiences, which also sends a message. Sometimes zoos/aquariums unintentionally send mixed messages to visitors. For example, our education programs may present messages that it is important for us all to respect animals. However, in another area of the zoo/aquarium, visitors may observe animals housed in cramped, barred, or unclean cages. These conditions send a negative message about how the zoo/aquarium values animals. Contrast that with the positive message the zoo/aquarium sends when animals are treated gently and in a caring manner; have their needs of food, water, and shelter from heat, cold, and noise provided for them; and are portrayed in a naturalistic setting that evokes their natural habitat. The way animals are portrayed in the zoo/aquarium sends a strong message to visitors about respect for animals. If we want

visitors to treat animals appropriately and with respect, then everyone working at the zoo/aquarium must demonstrate that behavior.

Planning the visitor experience means that we have to look at our institution as a whole, including the experience a visitor has waiting in line to purchase a ticket to enter the zoo/aquarium, the quality of the food service, the cleanliness of the grounds and restrooms, the appearance of the exhibits, and the quality of animal care. As we will see in the section on Audiences, only when we meet people's basic needs are they ready to engage in learning. Zoos/aquariums accredited by the Association of Zoos and Aquariums in the U.S. have made improving exhibits and standards of care for animals a very high priority. It is only in more recent years that these institutions have been able to focus more resources on upgrading visitor amenities. Zoos/aquariums understand that they are competing for dollars spent on leisure-time activities. To satisfy visitor needs, encourage repeat visitation, and ensure our visitors are as receptive as possible to learning, we need to pay careful attention to visitor experiences and the messages we send.

Non-formal education experiences and programs at zoos/aquariums add to people's enjoyment of their visit and help them to make the connection between animals in the collection and their wild counterparts. The Multi Institutional Research Project in U.S. zoos/aquariums has demonstrated that one of the most effective strategies in communicating conservation messages is one-on-one encounters between visitors and zoo/aquarium staff or volunteers. Your efforts to provide engaging experiences for visitors of all ages at your zoo/aquarium enhances their appreciation of wildlife, encourages repeat visitation, and communicates important messages about caring for wildlife and the importance of protecting wild habitats.

Identifying our Audiences

Introduction

The purpose of this section is to show how to identify our audiences in order to develop meaningful and successful education programs that meet their needs.

Key Points

Identifying our audiences helps zoos/aquariums:

- Create more meaningful programs.
- Create more successful programs.
- Reduce 'communication gaps.'
- Fulfill our role to serve our community!

Introduction

In order to design effective programs, you need to know who your audience is because...

"We don't see things as they are; we see them as we are." —Anais Nin

We believe we understand who visitors are and what they need, but what do we really know? Each person is unique, and brings a lifetime of different experiences to their zoo/aquarium visit, which influences their perceptions.

Why People Visit Zoo/Aquariums

What are your top five reasons why people visit your zoo/aquarium? (Group Discussion)

As we will see in future sections of this course, children are capable of learning different things depending on their age and stage of development. People of all ages also have different learning styles. Choosing what to teach and how to teach different audiences is complex. So it is very helpful to understand as much as we can about our audience before we can begin to plan education programs for them.

Audience Information: Demographics

Demographics are characteristics of human populations, or segments of human populations. They may often be found from examining public records, such as census data. Demographics include things like gender, ethnicity and age.

You should also collect information on how visitors use your zoo/aquarium, so you can design education programs based on what types of people visit your institution. For example, do people come in family groups? And if so, what types of family groups are most common? Mother and child? Grandparents and grandchildren? Do young couples visit? Do people visit alone? Do teens visit in groups? Do school groups visit?

What types of visitors are at your zoo/aquarium? (Group Discussion)

Gender? Nationality? Age? _____

How do they visit? How many in a group_____

Make up of group- age/ gender_____

Identity-Related Motivational Categories of Visitors

We know that many different types of people come to zoos/aquariums. We also know that people visit for multiple reasons. These differences influence how individuals use these institutions and what benefits they derive. Historically, zoos/aquariums have used demographic categories like age, social group, nationality, level of education and visit frequency/ infrequency as a means for segmenting audiences. However, visitor demographics by themselves are not that helpful in telling us what knowledge and attitudes visitors bring with them during a visit, and how they might change afterwards. In response, recent research is revealing powerful new and more robust ways to understand and segment zoo/aquarium visitors.

This new strategy utilizes a series of identity-related motivations for distinguishing among visitors. Every visitor enters with a set of expectations that can be categorized as falling within one or some combination of five major identity-based categories:

- Experience Seeker—primarily derives satisfaction from the fact of visiting this important site. Often they are tourists, and want to have the experience of visiting a zoo/aquarium because that is what someone from out-of-town does when visiting this city.
- Professional/ Hobbyist—feels a close tie between the institution’s content and their professional or hobbyist passions. They visit because of a specific interest, knowledge or training in an area related to the zoo/aquarium and they are looking to specifically extend that interest, knowledge or training.
- Spiritual Pilgrim—is primarily seeking a contemplative and/or restorative experience. They visit the zoo/aquarium for reflective purposes; to get away from the noise of the city or to enjoy the peacefulness of the setting.
- Facilitator—is focused primarily on enabling the experience and learning of others in their accompanying social group. They visit the zoo/aquarium to satisfy the needs of others, i.e. their children.
- Explorer—is curiosity-driven and seeks to learn more about whatever they might encounter at the institution. They visit the zoo/aquarium to satisfy their own curiosity and desire to learn.

Research shows that individuals not only choose to visit or not visit zoos/aquariums based upon these identity-based motivations, but it also shows that these motivations largely determine how visitors conduct their visit and strongly influences long-term learning and sense of satisfaction with a visit.

How Can You Learn About Your Visitors?

You can learn about the population in your city through demographics posted on your city’s official website. Local organizations and associations may also track demographics for their membership, and can be a good source of information.

Your zoo/aquarium may already track demographic information for visitors and members; for example, your institution may already gather data that will enable you to track how

many and what percentage of your visitors come in family groups, and what is the average age of a child that comes to the zoo/aquarium in a family group.

You can also learn about your visitors by just observing them or asking them questions, as you will see in the audience observation activity and in the “front-end evaluation” section.

Visitor Needs

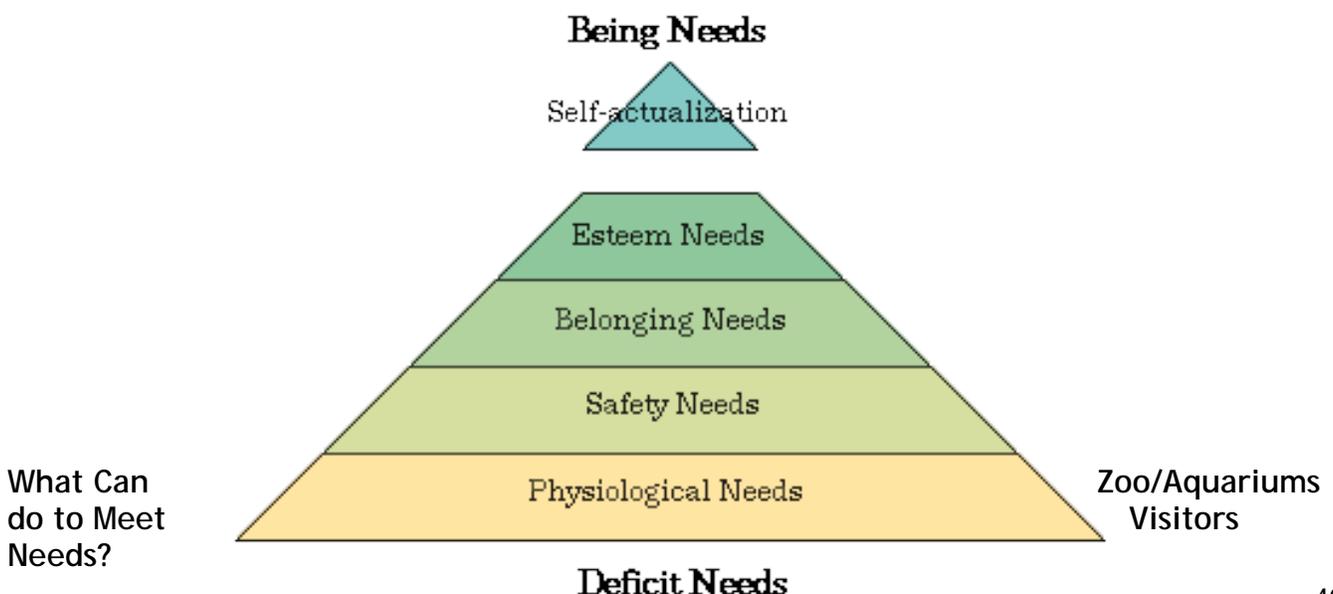
Visitors to any zoo/aquarium need, and have the right to have their needs met. Following are some things you should do for your visitors:

- *Comfort:* “Meet my basic needs.”
- *Orientation:* “Make it easy for me to find my way around.”
- *Welcome/belonging:* “Make me feel welcome.”
- *Enjoyment:* “I want to have fun!”
- *Socializing:* “I came to spend time with my family and friends.”
- *Respect:* “Accept me for who I am and what I know.”
- *Communication:* “Help me understand, and let me talk, too.”
- *Learning:* “I want to learn something new.”
- *Choice and control:* “Let me choose; give me some control.”
- *Challenge/confidence:* “Give me a challenge I know I can handle.”
- *Revitalization:* “Help me leave refreshed and restored.”

—Judy Rand, 1977, “The Visitor Bill of Rights.”

Visitors who have a positive experience at your zoo/aquarium will return, and tell others about their experience, too! This increases attendance revenue and enables you to reach these repeat visitors with your messages.

In a study of human behavior conducted in 1954, Abraham Maslow found that people could only attend to their “higher selves” if their basic and intermediate needs were met, or if they willingly decided to defer them. Maslow’s work indicates that if we better help people move on to higher levels if we meet their basic needs (the base levels of the pyramid) first.



Visitor Needs	Description	How Zoo/Aquariums Can Meet These Needs
Physiological Needs	Health, comfort, sanitation, physical well being.	Provide clean and sanitary grounds, exhibits and toilets; convenient and clean food facilities; water; and shade.
Safety and Security Needs	<i>Safety</i> : Feel safe and protected, free from danger. <i>Security</i> : self survival and group survival, consistency.	Ensure zoo/aquarium grounds are free from hazards; provide safe barriers to exhibits; ensure children can play safely and parents can see them at all times.
Love and Belonging Needs	Being accepted as oneself and accepted within the group.	Treat all people as individuals, and include all group members in programs.
Esteem Needs	Respect; recognition as being unique, special and different; attention; appreciation; and dignity. Confidence, competence, want stimulating information and to know the meaning of things.	Treat all adults and children with respect and dignity. In programs, provide opportunities for challenge that enable participants to succeed.
Growth Needs or Being Needs	<i>Understanding</i> : knowledge of relationships, integration of new knowledge and theory.	Through guided discussion, encourage participants to discover relationships and apply their new knowledge.
Growth Needs or Being Needs	<i>Aesthetic</i> : Appreciation for the order and balance of life; a sense of beauty and love for all.	Interpret the interdependence of all living things and the importance of humans as part of the environment.
Growth Needs or Being Needs	<i>Self-actualization</i> : Development of a consistent yet flexible life philosophy. Becoming the self that one truly is, or desires to be.	This is beyond what we can provide in a zoo/aquarium visit; however, providing visitors with a positive experience is important.

References Cited

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Identifying our Audiences

Audience Observation Activity

Name of Observer: _____ Date: _____

Location of Observation: _____ Time: _____

Weather: _____

Group Composition: (what can you observe?)

_____ # adult males,

_____ # adult females

_____ # boys, estimated age(s) _____

_____ # girls, estimated age(s) _____

Amount of time this group spent at the exhibit: _____

Observed behavior and comments watching animals:

Observed behavior and comments reading signs:

Other notes:

Learning Styles

Introduction

This section is designed as reference material to support the following topics: Howard Gardener's concept of multiple intelligences, identifying the characteristics of various learning styles, and how to engage people with different learning styles as you design education programs.

Key Points

- There are different ways people learn; these ways are often referred to as "intelligences."
- The ways people learn best often depends on the situation.
- Facilities should design activities and programs that incorporate different intelligences to best address visitors' different learning styles.

Experiential Learning

The purpose of creating experiences and various kinds of education programs for zoo/aquarium visitors is to connect people with nature in ways that are meaningful to them. As zoo/aquarium educators, our goals are to encourage awareness and appreciation of animals and the natural world, to create empathy for wildlife, and to inspire people to take action to support conservation of wildlife, wild places and natural resources. Education is more than transferring information and skills—it is important to have an emotional impact if we are going to influence people's attitudes and change behavior. Our visitors and participants in our programs all learn in different ways. Therefore, programs should incorporate ways to reach all learners.

*I hear and I forget
I see and I remember
I do and I understand*

—Confucius, 450 BC

Experiential learning, relating to, derived from, or providing experience, is a *learner-centered approach* that starts with the premise that people learn best from experience—essentially learning by doing. Experiential learning uses participants' own experience and their reflection about that experience (rather than exclusively lecture) as the means of generating understanding and transferring skills and knowledge. These experiences can be visual, auditory as well as tactile/kinesthetic.

This course includes many activities, so that participants learn through their experiences. We could simply distribute copies of the activities and suggest that you use them; however, by *participating* in these activities, you will also have a greater understanding of how to incorporate activities and other hands-on experiences into your own education programs. Because of your active participation, it is more likely that you will use an interactive style in your own programs, enhancing the visitors' experience.

As educators, we can facilitate experiential learning by encouraging participants to observe, to discover themselves, to develop their critical thinking skills, analyze, evaluate, and apply what they have learned.

Learning Styles

Visual Learners learn through seeing. People who are primarily visual learners may think in pictures—they learn through seeing diagrams, illustrations, visual media (slides, PowerPoint presentations), flipcharts and handouts. Visual learners may take detailed notes during a presentation to help them absorb the information. When learning something new, visual learners read directions and look at pictures.

Auditory Learners learn through listening. They learn best through lectures, discussions, and listening to and talking to others. Auditory learners often derive meaning from written words by reading them aloud. When they are learning something new, auditory learners prefer to have someone else help them with the task.

Tactile/Kinesthetic Learners learn through moving and touching. People whose preferred learning style is tactile/kinesthetic learn best through hands-on experiences, exploring the physical world around them. When learning something new, tactile/kinesthetic learners try various approaches and learn by doing.

Take a moment to review the description of these learning styles, which do you think most fits the way that you learn? _____

Teaching Style

In a traditional education model, learners are the passive receivers of knowledge from instructors. Research supports that a more effective approach in the zoo/aquarium informal learning environment is more student or participant centered. The instructor instead becomes a facilitator, coach and mentor, rather than the person who dispenses knowledge. This means that your role as an instructor is to guide participants to discovery through experiential learning that engages different learning styles, rather than to impart knowledge to them. You can provide opportunities for people to learn by doing, encourage them to share ideas with each other (by asking participants questions), and to apply what they have learned to other situations.

Multiple Intelligences

Traditionally, we have evaluated intelligence based on a person's verbal/linguistic and logical/mathematical skills (think of how we test children in schools). But intelligence is much broader and more complex than just these two areas. Psychologist Howard Gardner proposed his concept of "multiple intelligences," which has had a profound effect on how we think about education. Gardner's concept proposes there are at least eight kinds of intelligence that are equally important. They are "languages" that most people speak, and that cut through cultural, educational, and ability differences. According to Gardner, these multiple intelligences are not typically used independently—we do not have one or the other. Since each of us is unique, we have different intelligences, or skills—this is why we also learn in different ways. Multiple intelligences include:

- Linguistic/Verbal Intelligence relates to spoken and written language. People with linguistic intelligence have the ability to learn languages, and to effectively use language to express themselves both verbally and in writing.
- Logical/Mathematical Intelligence consists of the capacity to analyze problems logically. People with logical/mathematical intelligence are skilled in the use of mathematics, have the ability to investigate issues scientifically, can use deductive reasoning, and can detect patterns.
- Visual/Spatial Intelligence is the ability to perceive the visual/spatial world with accuracy, to visualize, and to represent visual or spatial ideas graphically. People with visual/spatial intelligence are sensitive to color, line, shape, form and space, and can recognize relationships among these.
- Musical Intelligence relates to the appreciation of musical patterns, including recognizing musical pitches, tones, and rhythms. People with musical intelligence also are skilled in performance and composition of music.
- Bodily/Kinesthetic Intelligence is the ability to control one's bodily motions and to handle objects skillfully (such as having a sense of fine motor control).
- Interpersonal Intelligence relates to the ability and desire to understand the intentions, motivations and needs of others. People with interpersonal intelligence can work effectively with others.
- Intrapersonal Intelligence is the ability to understand one's own feelings, fears and motivations—to know oneself.
- Naturalist Intelligence is the ability to recognize and distinguish plants and animals, and other features of the natural world such as rocks and clouds. People with naturalistic intelligence enjoy the physical environment and interacting with living things. They observe and notice characteristics of living things, and classify them.

As informal zoo/aquarium educators, we are uniquely suited to use our exhibits and animals to design visitor experiences and education programs that meet the diverse needs of different learning styles. In addition, to be an effective educator, you should ensure that your programs and exhibits provide people multiple ways to learn based on these learning styles. See Creating Experiences for Diverse Learning Styles Chart for specific examples of activities to include.

Summary

In order to engage people in learning, to influence their attitudes, and to encourage them to adopt new behaviors, the education experiences and programs you create must be meaningful to your participants. People have different learning styles, and if you can incorporate various activities in your programs that appeal to these different learning styles. While we all may be much more familiar with learning that is “teacher centered,” in which the instructor conveys information as participants listen, you can engage our audiences more effectively by instead creating a “learner-centered” atmosphere, where varied experiences appeal to different learning styles. As you design visitor experiences, exhibits and programs, incorporate a variety of approaches—experiment and see what works well with different audiences.

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Learning Styles

Creating Diverse Learning Experiences Chart

Learning Style Intelligence	Types of Activities That Appeal to this Learning Style
Linguistic/Verbal	Storytelling, journal writing, brainstorming, discussion, playing word games.
Logical/Mathematical	Apply math skills to other subject areas: use calculating, quantifying, classifying and categorizing activities, playing strategy games.
Visual/Spatial	Use visualization (Close your eyes and imagine...), drawing and other art activities, use symbols, create concept maps, mazes, puzzles, and use color.
Musical	Incorporate music, singing, change the words to songs to help people remember information, rhythmic games, dancing.
Bodily/Kinesthetic	Have participants create a skit, use touch and explore activities, whole-body games such as Animal Olympics, compare textures, use relief and topographical maps, crafts such as making a bird feeder.
Interpersonal	Have participants share with the group, cooperative group work, simulation activities, board games, role playing.
Intrapersonal	Include quiet time for reflection, journal writing, solitary games, allow free choice (participants choose what they want to do), attach personal connections (make it relevant to participants' own experience), goal setting.
Naturalist	Classifying natural objects (comparing leaf shapes), reading and writing about nature, exploring the outdoors, making and recording observations about nature, doing experiments, restoring natural habitat.

How to Create Engaging Visitor Experiences

Purpose

The purpose of this section is to provide participants with tips and best practices for interacting with the public, including techniques for exhibit interpretation and examples of public education activities. This section includes lecture, a connecting your audience activity, a demonstration of an interpretation station, and whole group discussion.

Key Points

- One reason visitors come to zoos/aquariums is to be entertained; therefore zoos/aquariums should offer activities that are not only educational but also engaging.
- A variety of public activity types exist from visitor-guided experiences to more structured presentations; several should be offered to meet the needs of different audiences.
- To be most effective, zoo/aquarium educators should account for and incorporate visitors' prior experiences and present material in multi contexts when conducting all activities.
- Any zoo/aquarium education activity should involve the audience as much as possible and encourage visitors to make emotional connections to the animals.

For the most part, the general public comes to the zoo/aquarium for entertainment purposes. It is important that they have an *educationally* entertaining day at the zoo/aquarium. However, if you simply list animal facts for your audience, it is unlikely that the visitors will enjoy their visit or remember much of what you say. The following are some tips and best practices for effective visitor education.

Offer a Variety of Visitor Education Experiences

Many opportunities for engaging visitors exist, from simple one-on-one conversations to more structured presentations. Zoos/aquariums should offer a variety of activities, as different formats will appeal to different audiences. Activities can occur on a regular schedule shared with the visitors or on an unscheduled, drop in basis. Some activities zoos/aquariums can offer include:

- Interpretation Stations— Trained staff or volunteers share animal stories with the public, engage visitors with questions and biofacts, conduct mission based activities or informal presentations, and answer visitors' questions.
- Keeper Talks/Training Demonstrations/Animal Feedings— Zoo/aquarium staff communicate with visitors about the care, training, and enrichment provided to the animals.
- Shows— Staff trained in performance techniques and animal handling perform skits or animal demonstrations to convey information about wildlife.
- Tours— Zoo/aquarium staff or volunteers tour visitors through the zoo/aquarium and sometimes behind-the-scenes areas, such as the commissary, vet clinic or nighttime animal holding areas.
- Animal Encounters— Zoo/aquarium staff or volunteers show visitors trained animals specifically used and trained for educational programming and share information about them. They may also give the public an opportunity to touch the animals.

- Storytelling— Storytellers, often hired on contractual basis, tell stories with animal characters to convey cultural, historical, conservation, and/or factual information about the animals.
- Themed Public Events— Special themed days, often included with zoo/aquarium admission, attract and educate visitors interested in that particular topic. For instance, Zoo Atlanta has an annual Enrichment Day where visitors can learn about and try out enrichment items the zoo/aquarium gives to the animals.

Connect with Your Audience

The following is a list of best practices:

- Ask their names : For small groups, ask visitors their names and use their names throughout the activity. This helps personalize a visitor’s experience at the zoo/aquarium.
- Find out what they already know: Every visitor brings his or her personal history with him. Past experiences, prior knowledge, and preconceptions all play a role in what a visitor is going to learn at the zoo/aquarium. What you attempt to communicate to visitors will only be effective if it strikes a chord and is relevant to their past experience in some way.
 - *Cognitive Map Theory* is a commonly accepted view of how people receive and store information. As information comes in, it is coded into simplified units, and stored in relation to pre-existing information. Networks and pathways form based on these associations of commonality. These are called cognitive maps. Information that is coming in is linked to the unit that best matches it. One way to draw on the audiences’ past experience is to ask an introductory question, such as “Who can tell me something about Giant Pandas?” Then relate audience responses to the content of your program. Another way to draw on the audiences’ prior knowledge is to use analogies. For example, you could compare a nictitating membrane on an alligator’s eyes to swim goggles. Or you could describe how a baby ostrich in its egg absorbs calcium from the shell like we absorb calcium from milk we drink and how both baby ostriches & humans need calcium to build strong bones. Further, to check for understanding, you could ask the audience comparative questions such as, “How is a bird designed like an airplane?” or “How is a tree like an apartment building?”
- React in a positive way—praise correct answers and gently redirect incorrect ones: Make a point of recognizing audience members, particularly children, when they give a correct or thoughtful answer. This means a lot to children - especially when coming from a zoo/aquarium expert! If an audience member gives an incorrect answer, instead of saying, “No, that’s wrong,” say something like, “That’s a good guess, but not the answer I was looking for. Any other ideas?” In other words, try point out the positive aspects of the effort and guide them to the correct answer instead of focusing on the ‘wrongness’ of the response.

Treat Misconceptions as Teachable Moments

There are all sorts of animal-related misconceptions and fears that you will encounter when interacting with the public, such as that snakes are slimy or bats are scary. Some of these

ideas stem from a lack of first-hand experience with the natural world. Misconceptions conveyed through movies, TV, word of mouth, and other media often supersede the truth. It is best to try to anticipate common misconceptions when designing an activity and to give visitors opportunities to discover otherwise for themselves -such as giving visitors the chance to touch a snake. Also, during the activity, it is wise to listen to the visitors' comments and try to politely correct any misconceptions. For example, you could say, "A lot of people think that, but actually..." Note that, when addressing misconceptions and fears, it is extremely important to be respectful of the visitors' comfort level and beliefs. A visitor with a snake phobia might not want to touch the snake no matter how safe and wonderful you tell him it is, but he may start to believe that a snake isn't slimy if a friend or family member who touches the animal reports that it isn't.

Stick Tightly to Themes

When conducting the activity, remember to only cover information that relates to the theme, not everything there is to know about that topic - quality of instruction is much more important than quantity. Visitors will only remember the information they can directly connect with, which is another reason to keep the quantity down, sharing only the information you think will connect best with your audience based on what your theme is and what you have learned from them. If you stick tightly to the activity theme, this will help keep both you and the audience focused. In addition, it will make the activity more interesting and easier for the audience to follow.

Involve Visitors as Much as Possible

Depending on the age of the audience, the following presentation techniques can be used to involve participants: stories, songs, body movements, asking open-ended questions, etc. For example, when you are explaining how an elephant uses its trunk just like we use our hands, you could have the children pretend to have a trunk and try to pick something up. You can also engage the audience in games, role-play or exploration stations. The more senses you have the audience use during your program - seeing, hearing, touching, and smelling - the greater their depth of understanding and enjoyment of the activity will be.

Use Additional Strategies for Outdoor Programs

When teaching a group outside, there are many distractions and there are additional strategies you can use to ensure your program is a success. After some practice, you will come up with tips that work great for you and your institution. Below are some tips to get you started:

- Grab the attention of passersby and invite them to join your demonstration.
- Make sure visitors can hear you and feel your excitement. There are many distractions outside, so you need to keep their attention and your volume and energy level can be a big factor.
- Use your best teaching practices at all times. Always ask them questions to find out what they know about your topic and provide things they can see, touch and do.
- Talk to the children and the adults in an age-appropriate manner and engage them both. You have to find ways to talk with both audiences so one isn't bored while you are addressing the other. Remember that both audiences need to hear your message. A great tip to keep them engaged is to challenge them to research together or do a project together, such as making a bird feeder or going hiking.

- Use their questions as teachable moments and transitions to your next item or topic. Let them guide your discussion or demonstration.
- When walking with a group, face them as much as possible. They will not be able to hear you otherwise and you will very quickly lose their attention.
- Stop frequently to allow them to catch up. Walking large groups through the zoo/aquarium is a new challenge all by itself. They will want to stop at each exhibit or restroom. Your job is to let them know when their will be breaks or what your destination is and that you can return to other exhibits later.
- Ask them questions to transition to the next exhibit or demonstration.
- Always ask them if they have any questions before moving on to a new topic or exhibit.

Encourage Visitors to Make Emotional Connections to the Animals

Recent research has indicated that knowledge of environmental issues alone does not encourage individuals to change their behavior to better protect the environment. An individual must care about the wildlife before he/she will be apt to help save it. Therefore every zoo/aquarium activity for the public should encourage visitors to make emotional connections to the animals. To do this, many zoos/aquariums employ the following strategies:

Use Names and Specific Information about Individual Animals in the Zoo/Aquarium

Many zoos/aquariums name their animals individually, especially large animals in their collection. Keepers have long been able to tell many animals apart by their appearance or individual behavior, and by now sharing a particular animal's name and stories about them, zoos/aquariums encourage the public to care about particular animals. For instance, a visitor may return again and again to see Victoria the elephant and her painting ability. Connecting with particular animals not only promotes return visits, but often the visitor's care for an animal grows into a concern for that species in general, so that in this example, the visitor might want to know how he/she can help protect elephants in the wild.

Choose Biofacts Wisely and Model How to Treat them with Respect

Biofacts are items that came from living things— such as a snake shed, panda skull, or bamboo. We suggest the following guidelines for using biofacts:

- *Ensure that all biofacts receive proper care.* Inquire about and follow any cleaning or special handling requirements.
- *Make sure you have secure storage for biofacts.* This is especially important for items from endangered species and materials stored in visitor areas (e.g. Exploration Stations). When not in use, items should be stored in a locked, weather-resistant area (e.g. a locked cabinet or office space).
- *Store all potentially fragile items in a padded container* (e.g. a hard plastic box with bubble wrap lining) or wrapped individually in bubble wrap within a larger container/storage space.
- *During programs, always handle biofacts with the respect that you would extend to any living animal.* Keep an attitude of reverence. Your attitude will affect the zoo/aquarium visitor. Trivializing interaction with biofacts may directly or indirectly lessen the value of the species in the mind of the audience. Also be sensitive that individuals in the audience may have had a significant relationship with the species from which the biofact has been collected.

- *Do not handle biofacts or make comments regarding the animal that would either directly or indirectly encourage the individual to obtain a similar biofact.* It is a zoo/aquarium's goal to motivate people to protect wildlife, not to motivate them to purchase wildlife products.
- *When choosing biofacts to use in an activity, remember the motto, "No gloom and doom before age 10."* Be aware of your audience and the educational materials you choose to use in a program. While certain biofacts may impress the audience, they may not always be suitable for young children if they relate to sensitive topics. Refer to the Age-Appropriate Instruction section of your manual for more information.

Draw Parallels Between People and Animals

Encourage the audience to identify similarities between humans and other species in aspects such as appearance, behavior, and social structure. For example, you could compare the parenting techniques of people and other primates. Also discuss common needs of humans and other animals. For instance, wild animals need clean air & water just like us.

Wrap-Up and Evaluate Your Program

At the end of an activity, conduct an "on the spot" evaluation to assess how well your audience learned your key points. (See the Evaluation and Assessing Audience Needs sections for suggestions on your "on the spot" evaluation.) If help is needed, review key points in your message. Allow time for audience questions, thank the visitors for coming to the zoo/aquarium, and end on a positive note - drawing attention to the next scheduled activity.

References

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How to Create Engaging Visitor Experiences

Interpretation Station Template

Program Subject (broad topic):

Audience:

Public, adults and children of all ages

Goal:

Objectives (3-5):

Program Theme (specific):

Resources

People: _____

Location of cart or station: _____

Materials (Lesson plan/script, biofacts, craft, game, cart/storage): _____

Financial: _____

Introduction to the Topic:

Body (including 3-5 main points):

Conclusion:

Activity Planning

Can you create a game or craft that will convey your goal? This needs to be inexpensive and quick so you can do this with the public outdoors.

Evaluation

What questions will you ask your audience to ensure they take your message? How will the craft look or the outcome of the game be to indicate your participants learned your message?

How to Create Engaging Visitor Experiences

Animal Encounter Template

Program Subject (broad topic):

Audience:

Public, adults and children of all ages

Goal:

Objectives (1-3):

Outcomes:

Program Theme (Be sure you can convey this with the use of animals):

Resources

Animal(s): _____

People: _____

Location of cart or station: _____

Materials (Lesson plan/script, animal carrier, newspaper, table at encounter location): _____

Financial: _____

Outline Content

What will you discuss and point out about each animal that conveys your program goals? Be sure to cover the basic animal information as well (animal species, name, age, unique characteristics, and conservation information).

Will the animal be touched by visitors? If yes, how? Two fingers, gently? Anti-bacterial wipes? If no, have explanation for visitors as to why not. The animal is too fragile, sensitive, etc. Define if there will be certain times for a 'yes' animal to be a 'no' animal. For instance, if there is food present or extremely large crowds animals should not be touched.

Evaluation

What questions will you ask your audience to ensure they take home your message?

How to Create Engaging Visitor Experiences

Building a Biofact Collection Template

1. Define your needs. What biofacts would help you convey the messages in your programs? Make a list of each program with the biofact(s) that would help and the purpose of each biofact. *Example:*

<u>Program Name</u>	<u>Biofact</u>	<u>Purpose</u>
Wetland Interpretation Station	Alligator Skull	Show adaptations to living in water (eyes, nose, etc.)

2. Do you need a permit to obtain any of the items you need? Contact your local wildlife authority to answer this.

3. What storage will you need for each biofact? Skulls and pelts can be very fragile and need a safe, dry place where they cannot be broken or torn. Obtain appropriate storage for each item prior to ordering the biofacts.

4. Where can you obtain the items you need? Again, contact your local wildlife authority, your veterinarian, or look to the Internet (Skulls Unlimited, etc.). The local wildlife authority can confiscate items obtained illegally (poaching) at airports/borders and these items can be used for educational purposes. Be sure you obtain your biofacts from a reputable source. You do not want any items that were obtained illegally or at an injury to the animal. Items from your local wildlife authority provide an excellent message to your visitors about the trouble people can get in when they participate in poaching. Don't be afraid to ask distributors where the items came from. This is critical to your conservation messages.

5. Do you have the finances/resources to obtain the items you need? Determine cost for each biofact and prioritize the list based on what your budget will allow. Combine biofacts for several programs/messages when possible.

6. Order and store the biofacts. As they are received, label each item very carefully and begin a list of the items you have and what programs and purposes each item will be used for. This will help you keep inventory of the items for a long time to come.

7. Add the biofacts to the lesson plans and scripts for which they will be used. Describe how each item should be displayed/shown and what messages should be conveyed with each. Train your staff on how to use/handle each item, the messaging, and storage/security.

Interpreting Controversial Issues

Introduction

The purpose of this session is to introduce participants to the idea that zoo/aquarium education sometimes includes interpretation of controversial subjects. Audience members may challenge instructors and possibly become confrontational. This section provides best practices to prepare participants for how to respond in these situations.

Key Points

- Zoo/aquarium education sometimes includes interpreting controversial issues.
- Visitors or participants in your programs may challenge your position on these issues, and may challenge you personally.
- There are best practices for dealing effectively with controversial subjects, and this section includes a summary of these practices.
- Practice ahead of time to become comfortable with your responses to these situations, and always be respectful of others' points of view.
- You are in charge of the group, and it is your decision when to continue a discussion or move on for the benefit of the group.

Zoo/aquarium educators may find themselves in the position of interpreting issues that challenge the beliefs or values of some of their audience members. This may provoke people to respond defensively or perhaps even angrily. It is important to understand that this may happen, and to prepare for how you will handle this situation when it arises. The following are some best practices for interpreting controversial issues.

Know What Controversial Subjects Are

Controversial issues can range from topics that affect a zoo/aquarium specifically, such as animal welfare or appropriate use of program animals, or issues that can be easily taught at a zoo/aquarium, such as wildlife in the pet trade.

Some of the challenges zoo/aquarium educators may encounter that affect zoos/aquariums are:

- Keeping animals in zoos/aquariums;
- Visitors feeding zoo/aquarium animals;
- Training wild animals;
- Keepers/trainers in free-contact with wild animals;
- Poor exhibit conditions (bars versus naturalistic habitats); and
- Animal deaths and what happens to the animals after they die.

Some of the controversial issues zoo/aquarium educators might be asked about are:

- Human overpopulation crisis;
- Hunting animals;
- Animal deaths in zoos/aquariums;
- Climate change; and
- Evolution.

Know Your Subject

Preparation is essential to handling a controversial topic. Learn as much as you can about the issue, and understand that there are different points of view. Separate facts from opinions. If someone disputes factual information, you can share your sources of information. This may diffuse the situation, or the person may continue to hold fast to his or her opinion. Agree to disagree and move on. Always remain calm and be respectful of others' beliefs.

Know Your Institution's Position

Does your zoo/aquarium have an official position on keeping animals in the care of people? (Why are they there? How does having individual animals in the zoo/aquarium contribute to the larger purpose of saving species in the wild?).

Know How *You* Feel About It

Think through potentially controversial issues and explore your own feelings and opinions toward them. Remember that as a zoo/aquarium educator, you are a representative of your institution and therefore must be able to comfortably interpret that position.

Practice Your Response

Envision being challenged by audience members about various controversial issues. Practice your response to them so that you become comfortable with calmly responding, but don't expect to change people's minds—this may or may not happen.

When you receive a challenging question or statement from an audience member, first allow them to express their views - don't cut them off. Then briefly re-state their question in order to clarify if needed and to let them know you understand their question. Then address the question based on what you know as well as your organization's philosophy on the subject. If you do not know the answer to the question, say "I don't know" but that you would be happy to try & find out the answer for the audience member after the program.

Some examples of audience questions and suggested responses are:

Audience Question: If you all are so concerned about animal welfare, why are you keeping animals in captivity?

Suggested Response: Animals are kept in zoos/aquariums for several reasons. First, the animals help us teach the public about their species, habitat, and related environmental concerns. Second, zoos/aquariums often conduct research, such as behavioral observations, to better understand species' needs in order to best protect them in the wild. Third, zoos/aquariums often are involved in breeding and/or reintroduction programs to help conserve particular species. Some species are so rare that breeding in zoos/aquariums is their last hope for survival. (Also, to ease public concern about the welfare of animals in zoos/aquariums, you can also express to the audience that animals in the care of people, often live longer than their wild counterparts due to veterinary care, healthy and regular meals, and freedom from predation.)

Audience Question: We have too many people in this country. Shouldn't we do something about that to save our environment?

Suggested Response: For industrialized nations like the US, the amount of consumption of resources per person is more of a concern than the amount of people in the country. For example, the industrialized countries like the US, China, Great Britain, only have ¼ of the world's population, but they use ¾ of the world's resources (according to World Wildlife Fund). So, reducing our consumption - of energy, water, etc. - is the easiest way to lessen our impact on the environment.

Audience Question: Do YOU eat meat or wear leather?

Suggested Response: I do/don't (say which) eat meat/wear leather but eating meat or wearing leather is a personal choice. Most animals from which we make meat or leather products are not endangered, so there is not a current risk of these species disappearing. The zoo/aquarium is just recommending that you do not purchase products made from threatened or endangered species, because these species are being used faster than they can reproduce themselves and so we are in jeopardy of losing these species forever.

Audience Question: There are many people in this country that are poor. Isn't helping these people more important than saving animals?

Suggested Response: I understand your concern about the needs of the poor. Actually protecting the needs of humans often benefits animals and vice versa - both need clean air and water, for instance. We believe that everyone can work together to help meet the needs of both people and wild animals - let's help them both!

Audience Question: Why can't we feed the animals?

Suggested Response: The zoo/aquarium staff research both the type of food each species needs and how often each species should be fed and they carefully monitor the animal's feedings after they arrive at the zoo/aquarium. Like your pets at home, given the opportunity, zoo/aquarium animals may eat too much or eat food unhealthy for them if it's offered to them. So, we ask that visitors not feed the animals so that our animals will not overeat or eat the wrong foods. (If applicable, you can also add: Our zoo/aquarium also does not offer supervised opportunities to feed the animals, even though we could monitor the amount and type of food given to the animal, because this causes the animal to negatively alter its behavior (begging) around people which could be dangerous for the animal and people. We want the public to observe these species' normal behaviors in the wild.)

Keep control of the program. If someone is taking over, try to respectfully regain control of the discussion and move on. Again, thank the audience members for their attention and voicing their concerns, but explain that you do need to stay on schedule, since the program time is limited. State that you would be happy to discuss the topic further with anyone one-on-one after the program.

Program and Exhibit Design: Part 1 (Front-end Evaluation/Goals and Objectives)

Introduction

The purpose of this section is to describe front-end evaluation and give participants an overview on the importance of conducting front-end evaluations before a program or exhibit is created in order to ensure they are effective. Participants will understand that information gathered in evaluation should serve as the foundation for all program development and that they should collect this data and use it for every program or exhibit design. This section will give participants an example evaluation tool and empower participants to use front-end evaluation at their own institutions. Participants will work in small groups to practice developing front-end evaluation methods and questions. Copies of the activities used in this section are included in the manual. Participants will begin to plan goals, objectives and outcomes based on evaluation results and the mission of their organization.

Key Points

- Collecting data to guide the development of programs and exhibits is critical to develop an effective program; this is called evaluation.
- Front-end evaluation of what your audience knows and wants to know before developing programs or exhibits is the first step; this is called front-end evaluation.
- There are tools available for designing a front-end evaluation or you can build your own.
- Front-end evaluation does not have to take a lot of time.
- Front end evaluation (needs assessment) should guide your development of program goals, objectives and outcomes.
- Appropriate use of evaluation and goals, objectives, and outcomes, ensures program success, which ultimately supports organizational mission.

Three Phases of Evaluation

Evaluation is essential to creating effective education programs and exhibits. We commonly refer to three types of evaluation that are useful at different stages of planning a program or exhibit: front-end evaluation (analysis, needs assessment), formative evaluation, and summative evaluation. In a later session, we will examine formative and summative evaluation. This section will focus on the initial phase, front-end evaluation and the next step in program design, writing goals, objectives and outcomes. As you begin planning a program or exhibit, you will first want to understand what your visitors already know, what they think they know, and what they would like to learn about. You can gather this information through front-end evaluation.

Front-end Evaluation (Needs Assessment)

This is conducted to determine what your audience already knows about the subject, or to identify their misconceptions. What are audiences' current attitudes? What would they like to learn more about? How likely are they now to take the action you are advocating?

Why is it Important to Conduct Front-end Evaluation?

Evaluation is a process that begins at the *start* of planning for a program or exhibit—not at the end. What we learn at the beginning informs all the next steps. Front-end evaluation allows us to learn what an audience thinks and feels about a subject before we create a program or exhibit about it. With this information, we can create the program or exhibit to meet audience needs, address their questions, and create an experience that is designed to motivate our visitors. We will know what content to emphasize and what we can leave out.

We know from our earlier discussion that we cannot rely on our own assumptions about what other people think. Front-end evaluation enables us to approach planning the program or exhibit with the confidence that we understand what our visitors need. Spending this time at the beginning of planning will save a lot of staff time and resources later, and will help us to be more effective in terms of our conservation impact.

Planning Front-end Evaluation

First, you should ask yourself, what do you want to know, and from whom? Has anyone else conducted other research or evaluation that could be helpful? It is important at the start of this process to think about how you plan to use the results, and who will collect, analyze and interpret the data.

Front-end evaluation can be relatively simple (e.g., reviewing existing literature, informally talking to visitors) or more complex (e.g., conducting formal interviews with your target audience to understand what they know, feel, or do regarding a particular exhibit topic). The practical consideration is to determine what specifically you need to know, and then whether you have the time and resources needed to conduct this front-end evaluation. If not, how could you divert some current work to enable you to have the time to do this? Once you have determined what questions you need to answer with your front-end evaluation, you need to decide which tools you will use.

Begin with Research

A review of the existing literature (published or non-published) may reveal that the answers to your evaluation questions are already known. For example, if you are planning a new tiger exhibit, you may find that there are published studies on what your target audience knows about tigers, and what they're interested in. Alternatively, you may determine that no such study exists, and that you need to talk to your visitors.

Observations

One method of front-end evaluation or analysis is to conduct observations of people on zoo/aquarium grounds as they look at animals and converse with other members of their group. For example, if you were planning a new program for elephants, you could observe visitors as they watch elephants in their exhibit and read the current signs. What do people notice about elephants that they discuss with children or other family members? What questions do they have? How do visitors' interpret the elephants' behavior to children? Do they have misconceptions about elephants? Do people read the signs? If so, what comments do they make?

If you observe at the same time of the day and only on weekdays, you may only observe a certain segment of your visitors. Therefore, you will want to conduct your observations at

different times of the day and on different times of the week, so that you get a good sampling of visitors, including adults and children. Record your observations on paper, and then analyze your results by sorting observations into categories. Record the observer's name, the date and the time the observations were made. It is also helpful to note weather conditions. Cold, rainy or very hot weather may cause visitors to behave differently at an exhibit—they may hurry past, while at other times they might stay longer, and that might influence your results. You will be making your observations anonymously, so you will want to be as unobtrusive as possible. Here is a sample visitor observation tool:

Sample Visitor Observation Form

Name of observer: _____ Date: _____

Location of observation: _____ Time: _____

Weather: _____

Group composition: (what can you observe?)

_____ # adult males,

_____ # adult females

_____ # boys, estimated age(s) _____

_____ # girls, estimated age(s) _____

Amount of time this group spent at the exhibit: _____

Observed behavior and comments watching pandas:

Observed behavior and comments reading signs:

Other notes:

Using Surveys to ask Subject Matter Questions

Using a variety of methods, you can ask questions to learn about visitors' knowledge, attitudes/emotions and behaviors about your topic. These questions identify popular misconceptions and misinformation. While open-ended questions are harder to analyze, sometimes they are the most useful. Here are some examples:

To determine what visitors already know (knowledge), or not know, you can ask:

- What countries are home to elephants?
- What threatens elephants in the wild?
- What do elephants eat in the wild?
- How would you describe an elephant to a friend who has never seen one before?

To learn what visitors already believe or not believe about elephants (attitudes), you can ask:

- Elephants are important (scale of 1-5).
- Elephants are dangerous.
- Elephants need our help.

To learn what visitors already do to help elephants, you can ask:

- Do you buy ivory?
- Do you contribute to wildlife organizations that help conserve elephants?
- Do you watch T.V. shows or read articles about elephants?

Review the front-end evaluation survey example at the end of this section. To analyze the results of this kind of survey, tally the number of responses to each of the questions, and then rank the responses. The results could reveal that most people want to learn more about the story of Rama, the story of Rama's mahout, and the unique reproduction of elephants. From these data, you will be able to plan your program or exhibit to interpret the perspectives that most of your visitors care about. In this way, you can more effectively convey your messages than you could if you had only guessed what visitors wanted to learn more about. This also helps to ensure that people will attend your program.

Using Survey Results to Begin Program (or Exhibit) Design

Use the information gathered from your front-end evaluation or needs assessment to select your target audience. Will this program be for an audience of mixed ages or if it will be specifically for children? You can determine your target audience in different ways. You can use your evaluation to determine your target audience, or you can choose an audience, for example toddlers, and use your evaluation to get information on toddlers.

Once you have defined your target age, you are ready to move on to defining your program's goals, objectives and outcomes.

It is very important to establish written goals and objectives that can be communicated to others (including colleagues, your staff, your supervisor, your director and sponsors). Clearly articulating your goals helps you and others understand what you are trying to achieve. Writing down your goals is the first step toward achieving them!

Goals: Mission-oriented Achievement for the Program

- Are very broad statements in pursuit of your institution's mission.
- Are the reason you are doing the program.
- Articulate what it is that you hope to achieve.
- Describe *what* will be accomplished; not *how* it will be accomplished.
- Are abstract.

Sometimes, it may seem challenging to find the right words to write your goals. It is helpful to begin writing goals by thinking about how you would describe success in your program. Then, start writing your ideas and continue to refine these until you have statements that describe in very broad terms about what you want to accomplish.

Examples of Goals

For the Conservation Education Course:

- To provide AZA educators the training and tools they need to design, implement and evaluate engaging and effective conservation education programs for key audiences.
- To continue the legacy of a professional network of AZA zoo/aquarium educators.

For a Kids Camp Summer Program:

- To create model programs that, through experiential learning, increase participants' knowledge and connections with wildlife and the natural world, resulting in better stewardship choices.

For a zoo/aquarium education department's initiative to inspire conservation action:

- To encourage a conservation ethic to preserve our regional wildlife heritage.
- To model and communicate our institution's conservation practices.

For an education program about elephants:

- To promote the preservation of wild habitat for elephants.
- To increase student awareness of the role of zoos in elephant conservation.

Objectives: What You will do to Achieve Your Goal

Now that you have established goals, the next step is to determine what you will do to reach those goals. Objectives are the action steps needed to achieve the goals. Objectives indicate the measurable steps to be taken toward accomplishing the goal. They should be reasonable and achievable.

Objectives:

- Are action statements.
- Are specific, indicating:
 - Target audience (who),
 - Level of achievement (what), and
 - Completion date (when).
- Are measurable.
- Describe methods: who will do what by when.

Example of Program Objectives:

Participants in this section of the Conservation Education Course will:

- Examine the elements and importance of front-end evaluation design.
- Explore a front-end evaluation example and its impact on program design.
- Work in small groups to practice writing goals, objectives, and outcomes.

Notice how each of these is an action step that begins with a verb. In this situation, the objectives are written from the perspective of what participants will do—they are steps of instruction, rather than intended learning results.

Planning Objectives

Objectives written as action steps can also be used for planning.

Planning Objective Example:

By April 15th, Sheila Smith will send a follow-up email to CEC participants to invite them to provide feedback on the Conservation Education Course.

Learning Objectives

Objectives may also be written to describe what you want learners to be able to do as a result of your experience or program (they describe results).

Learning Objective Example:

At the conclusion of the program about elephants, participants will be able to:

- Describe three adaptations of elephants for survival.
- Compare the similarities and differences between Asian elephants and African elephants.

Notice how specific these objectives are. They use action verbs that can be measured. Avoid words that are more difficult to measure such as “understand.” When writing objectives, it is important to know how you will measure success. You will design evaluation tools to measure whether objectives have been met.

Outcomes: What the Participant Will Know or do as a Result of the Program

Notice that learning *objectives* described above are *intended results*—they indicate what skills, knowledge or attitudes you want participants to have as a result of participating in the experience or program. You can measure or test to determine whether participants actually did achieve these intended results. When objectives are written from the *point of view of the learner*, they are called outcomes. Outcomes describe measurable results for the target audience. What will change for the participants as a result of participating in your program?

Types of Program Outcomes

- Cognitive (knowledge gain)
- Affective (feelings, attitudes)
- Behavioral (action, behavioral change)

Outcome Examples

"By participating in this session, students in the Conservation Education Course will define goals and measurable objectives for their programs."

The outcomes of this Course may also be realized after your program, as indicated by this example:

"After participating in the Conservation Education Course, participants will:

- Design and develop interactive education experiences that incorporate hands-on activities and experiential learning.
- Implement programs that connect children to nature and how to interact with animals appropriately.
- Design and use tools to evaluate program and exhibit effectiveness."

When considering outcomes, you may want visitors to gain more than knowledge. Perhaps you also hope to influence their attitudes. For example, you may want to encourage empathy for animals. You will then create a visitor experience or program that has, as an outcome, that participants will demonstrate an increased appreciation and respect for that animal. Ultimately, conservation education aspires to influence people's behavior: to take action in support of wildlife and resource conservation. Not all zoo/aquarium education experiences and programs are designed to do this—we are still learning about what

influences visitor behavior change. However, if you want visitors to take a specific action as a result of participating in your experience or program, you will need to create the experience that will result in an outcome that states that participants will take that specific action

Summary

Front-end evaluation allows us to learn about who our audience is, what they already know (or do not know) about a subject, their misconceptions, their values or feelings toward a subject, and what they would like to learn more about. Taking the time to conduct front-end evaluation enables you to base your decisions on data. Eventually, front-end evaluation saves time, resources, and ensures that you will be as effective as possible in making a conservation impact. While some specialized methods of front-end evaluation such as interviews and focus groups require experience, most can be done simply, provided you plan carefully. Evaluation takes practice—just try it!

Results from front-end evaluations should be used to guide all aspects of program design and exhibit design. Use your results to write your program's goals, objectives, and outcomes. Taking the time to articulate written goals, objectives, and outcomes for the participants will help you to shape the program, as well as to clearly communicate your ideas to others. By using front-end evaluation to define our goals, objectives and outcomes, we ensure program success! Program success supports your organization's mission!

Resources

Evaluation Handbook. W.K. Kellogg Foundation. (www.wkkf.org)

Program and Exhibit Design: Part 1

Front-end Evaluation Survey Example

We need your opinions to help the Zoo design a new giant panda program (or exhibit), by filling out this brief survey:

Our new panda program (or exhibit) will have different components where people can learn about our individual pandas and the work we do with pandas. Please check off three of the following ideas that would interest you the most. *****Remember! You don't necessarily have to agree with a value to be interested in learning more about it!** Please read through all options before ranking them. Thank you!

In a Giant Panda program (or exhibit), I would be most interested in learning more about (check 3):

- The story of the current status of pandas in the wild and the challenges in ensuring they don't go extinct.
- The story of Tin Tin, our male giant panda who has had the most offspring.
- What our institution is doing to help save giant pandas.
- The story of Mr. Hu, a farmer who has observed a male panda living in his area for the past 15 years.
- Ms. Wah, who quit her job as a reporter to work with panda cubs at the Zoo.
- The unique reproduction of giant pandas and how it impacts the # in the wild.

Program and Exhibit Design: Part 2 (Program Development ADDIE/Themes)

Purpose

The purpose of this section is to introduce participants to planning and design of informal visitor education experiences. Topics include program design, following an example throughout the planning process, and planning for program evaluation. Lecture, a small group exercise, and whole group discussion will be used.

Key Points

- Focus is the key to success for any exhibit or program.
- The steps to designing a program are: A- Analysis, D-Design, D-Development, I-Implementation, and E-Evaluation.
- Utilize evaluation tools and pre-determined goals, objectives and outcomes, to ensure program success.

Designing an Informal Education Experience for Visitors

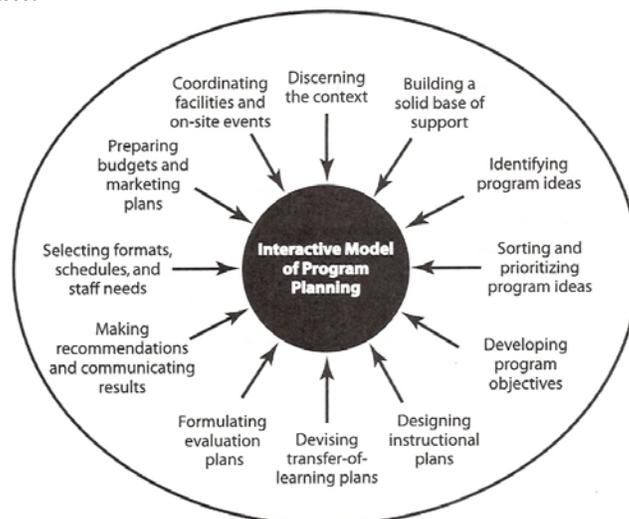
There is so much you could convey in an exhibit or program. For example, if you were planning a program at your zoo about giant pandas, you could engage your audience in learning about the natural history of the giant panda, their physical adaptations for survival, panda behavior, why they are endangered, why we have pandas at the zoo, how they are cared for, saving habitat for giant pandas, and many other topics. That is a lot of information! Realistically, you cannot teach everything there is to know about giant pandas—what are the most important points that you want visitors to know or feel about these animals? Utilizing a program design process will help you to develop a more focused program so that visitors will take away the most important messages.

Program Design Models

Several models are available to assist you in designing a program. By starting with the program design template we provided, as well as the Caffarella's and ADDIE models included here, you will eventually come up with your own personal program design model that works best for you.

Example 1: Caffarella's Interactive Model for Program Planning

Caffarella's Model includes twelve steps that can be used in any order or some steps can be eliminated. It is up to your discretion to decide which steps you will use and how each step pertains to your program.



Caffarella also has a program-planning checklist, included below; that coincides with the use of her model. By breaking down each step for ease of use and understanding, this checklist serves to guide you through the steps of the model.

The first step to creating a program is to identify your audience's needs by conducting a needs assessment or front-end evaluation. Front-end evaluation helps you determine not only who your audience is, but also what they want from your zoo/aquarium and, more specifically, from a program. This information will guide your program design and ensure you are creating a successful program visitors will want to attend.

For the purposes of this workshop, we will follow the model example 2: ADDIE.

Example 2: ADDIE Model

Another model found useful for zoo/aquarium educators is the ADDIE model, which is outlined in the form of an acronym.

Step 1: A- Analysis: What is the problem? What information do you need to make progress? Who is your audience? Evaluate your progress.

Step 2: D- Design: What are your goals, objectives, outcomes, and audience needs? What is the appropriate media for this project? Do you have the resources (budget, expertise, and staff) to accomplish the project? Evaluate your progress.

Step 3: D- Development: Create your project. Evaluate your progress.

Step 4: I- Implementation: Present your project. Self-evaluate your progress.

Step 5: E- Evaluation: Receive evaluation from peers and instructors.

**Source: Bradshaw, Louise. (2003). Excerpt from "Development of a Strategic Action Plan" and "ADDIE: A Model for Instructional Design." AZA Conservation Education School.*

As noted above, ADDIE is broken down into five phases. These five phases work together to help you design an effective program or exhibit.

A-Analysis

In the Analysis phase, you will gather information and conduct your front-end evaluation to define the topic or problem you want to address. Refer to the Program and Exhibit Design: Part 1 for further instruction on this step.

D-Design

Once you have conducted a *needs assessment (front-end evaluation)*, you are ready to begin designing your experience or program. In the Design phase, you will outline your goals, objectives, outcomes, theme, and resources.

When selecting the subject of your experience or program, think about how it will connect to your institution's mission and to your collection. For example, as a zoo/aquarium educator, you could create a program about whales. However, it would be less effective

than choosing a subject that relates to your institution, such as giant pandas. At this point the subject of your program or experience, it is a broad topic. Later, you will narrow that focus when you pick a theme.

Next, use the information gathered from your needs assessment to select your target audience. Determine if this program or experience will be for an audience of mixed ages or if it will be specifically for children.

Once you have answered those questions, you are ready to move on to:

- Define goals, objectives and outcomes. Refer to the Program and Exhibit Design: Part 1 for further instruction on goals, objectives, and outcomes.
- Establish a theme to narrow your focus.
- Consider the resources you have and what you will need.

Establish a Theme

You have established your goals, objectives and outcomes—now it is time to choose a theme. Establishing a theme for your experience helps you to think about what you would like people to remember from the experience. Selecting a theme means that you will not convey everything you know about a subject; instead, you will focus on the most important points. Participants remember themes, not facts. This is why themes are so important.

Three Steps in Writing Themes

1. Select a general topic (such as giant pandas) and use it to complete the following sentence: "*Generally, this experience or program is about...*"
_____ (topic here)
2. State your topic in more specific terms and complete the following sentence: "*Specifically, however, I want to tell my audience about...*"
_____ (more specific)
3. Now, express your theme by completing the following sentence: "*After participating in this experience or program, I want my audience to understand that...*"
_____ (very specific)

Resources

The next step in program design is to consider which resources you already have to create your visitor experience or program, and what you will need. For example, you may need only a gathering place on the zoo grounds/aquarium gallery, a sign to announce your program time to visitors (that you can create on a computer), and three props that you already have (a map, a stalk of bamboo, and an illustration of a giant panda's paw). However, you may need other resources to create your exhibit or program. *All* the following are important to consider—they are not presented in order of priority.

- People: Who will present the program? Assess the talents, expertise and enthusiasm of staff and volunteers. Consider outside advisors, such as someone from the local university, who could be a guest speaker.
- Materials: What resources do you (or other departments in your institution) have on hand? What do you need to acquire or create?

- Time: Do you have sufficient staff time for the program? What can be shifted to make room for a new project? Which projects need to be accomplished first? What are key deadlines?
- Space: What space do you have available at your institution? How soon do you need to reserve the space? Are there competing needs for space? If so, how are priorities set?
- Financial resources: What is your budget? Identify possible sources of funding.
- Collaboration: Can a partnership with another institution benefit your program?

Can you think of other resources to consider?

D-Development

In the Development phase, you will plan the content and flow of your program or exhibit. You will complete your lesson plan, including every last detail and logistics to complete your program.

Outline Visitor Experience Content

You have already established a theme for your program or experience. At this time, you will use that theme to determine the program content. What will be included in the program? What will not be included because it does not fit the theme you have chosen? If the program is designed for children, consider what is appropriate for their age level.

Determine the sequence of the program content. How will you convey the theme to your audience? Determine how you will transition from one part of the program to the next, and how your program will conclude. Consider how the content of your experience or program will result in the intended outcomes for the audience.

Activity Planning

In this step of program development, you will identify which steps of instruction are appropriate for the participant, the situation, and the subject matter. For example, will your program be exclusively outdoors or will you use an indoor space, too? There are considerations about what is logistically feasible to do in either location. This is the step where you will plan delivery methods. In order to achieve the outcomes you defined, which activities are the most appropriate? You will also want to include activities that address the varied learning styles of your audience.

I-Implementation

Once the program is ready, it is time for Implementation—doing the program with your audience or opening the exhibit. Deliver the program to your target audience, exactly as you had planned it in the Design and Development phases.

E-Evaluation

The final phase is Evaluation, where you will assess how the program went, and whether or not it accomplished your objectives. Did the experience or program result in the intended outcomes for the participants? The analysis of program evaluation (discussed in a later

section) will provide valuable information that you can use to improve your program as you offer it again. Overall, how did it go? Did things happen that you didn't expect? What worked well? What might still need adjustments? Did the timing flow as you had planned? Did your activities work with your audience? Obtaining feedback on your program for various sources- your audience, your peers, your funding sources, etc., will provide invaluable information.

ADDIE is very specific when it comes to evaluation. You want to conduct evaluation during every phase of ADDIE and implement what you learn from each evaluation. This ensures the quality and effectiveness of your program. When designing an exhibit or program with multiple components, you can evaluate each component individually before you incorporate it as part of your program. Gathering participants to practice, or pilot, your program help you gauge how successful the program will be and make adjustments to the program before you introduce it officially to a wider audience. Expect portions of your program to not go as planned. Timing might be off or a craft might be too challenging for the audience you have chosen. Make adjustments as you learn what you need to change and don't be discouraged.

Evaluation will help you determine if your program met its stated goals, objectives, and outcomes. Once you have received your feedback, revise the program as necessary. Then conduct it again and evaluate it again. This revision and evaluation process is the feedback loop in ADDIE, which ensures program success from the standpoint of your funding sources and your audience. This feedback loop should never end. Always evaluate.

Summary

There are several steps involved in the design of effective informal education experiences and programs for visitors, and it is important to begin with an understanding of what you want to accomplish. Taking the time to articulate written goals, objectives, outcomes, and themes for the participants will help you to shape the program, as well as to clearly communicate your ideas to others. Think about program evaluation from the very beginning—you will create your evaluation tools to measure how well you have met your objectives, and whether you have achieved the intended outcomes.

Establishing a program theme will help you to focus an experience or program so that audiences can remember the most important parts, and so that the experience can achieve its intended result. Remember, participants remember themes, not facts.

The Development phase begins to outline the program content (what to include and what not to include), and to identify the types of activities that are appropriate to the subject, the age and learning styles of the audience, and to the setting. Implementation lets you try out all your hard work and see the end product. Evaluation further helps you determine program effectiveness and effective evaluation ensures program success.

Use a program design model to guide you through the design of programs or exhibits. There are many models available to help you in the program design process. As you gain experience in program design, you will come up with your own model that works best for you and your institution.

Program and Exhibit Design: Part 2

Program Design Template: ADDIE

Program Subject (broad topic):

A- Analysis (Front-end Evaluation):

D-Design (Audience):

Goals:

Objectives:

Outcomes:

Program Theme (specific):

Resources

People: _____

Materials: _____

Time: _____

Space: _____

Financial: _____

Collaboration: _____

Others: _____

D-Design

Outline Content:

Activity Planning:

I-Implementation:

E-Evaluation:

Program and Exhibit Design: Part 2

Caffarella's Checklist for Planning Programs

Discerning the Context

- Be knowledgeable about the people, the organization, and the wider environmental context factors.
- Be well informed about the issue of power dynamics in planning.
- Cultivate and/or enhance negotiation skills required to navigate situations in which power is a central issue.
- Ensure that beliefs and actions being displayed in one's practice are ethical.
- Know and be able to access sources of information about the context of planning situations.

Building a Solid Base of Support

- Ensure support from key constituent groups and other stakeholders.
- Cultivate continuous organizational support by establishing structural processes that work.
- Promote an organizational culture in which formal, job-embedded, and self-directed learning activities and continuous learning are valued.
- Obtain and maintain support from the wider community through formal and ad hoc groups and boards.
- Build and sustain collaborative partnerships with other organizations and groups.

Identifying Program Ideas

- Decide what sources to use in identifying ideas for education and training programs.
- Generate ideas through a variety of techniques.
- Be aware that highly structured needs assessments are not the only way to identify ideas for education and training programs.
- Ensure you can defend why a highly structured needs assessment is warranted, and choose and/or develop a model for conducting this assessment that is appropriate to the situation.
- Consider contextual issues that are or might affect how ideas for programs are generated.
- Be aware that in most planning situations program planners cannot use all of the program ideas that have been identified.

Sorting and Prioritizing Program Ideas

- Be knowledgeable about how priority ideas are defined, and what typical issues and problems are that call for interventions other than education and training programs.
- Analyze and sort the program ideas into two piles—those appropriate for educational activities and those that require alternative interventions.
- Select people who will do the actual prioritization process.
- Be well-informed about two qualitative and quantitative approaches for prioritizing ideas.
- Use systematic methods for prioritizing program ideas.

- Be familiar with alternative interventions and how they are selected and implemented.

Developing Program Objectives

- Write program objectives that reflect what participants will learn, the resulting changes from that learning, and the operational aspects of the program.
- Ensure that both measurable and non-measurable program outcomes are included.
- Check to see whether the program objectives are written clearly so they can be understood by all parties involved.
- Use the program objectives as an internal consistency and “do-ability” checkpoint.
- Negotiate changes in program objectives among the parties involved with the planning process.

Designing Instructional Plans

- Develop clear and understandable learning objectives for each instructional session and ensure they match the proposed learning outcomes.
- Select and organize the content based on what participants “must learn.”
- Choose instructional techniques that match the focus of the proposed learning outcomes, that the instructor is capable of using, and that take into account the backgrounds and experiences of the learners and the learning context.
- Select and/or develop instructional resources that enhance the learning effort.
- Choose an assessment component for each instructional segment.
- Use instructional assessment data in formative and summative ways for both instructional and program evaluation.
- Prepare clear and concise instructional plans.
- Make the instructional process work by ensuring instructors are competent and caring.

Devising Transfer-of-Learning Plans

- Be knowledgeable about the major factors that influence transfer of learning.
- Decide whether transfer-of-learning strategies should be employed before, during and/or after a program.
- Determine the key players who should be a part of the transfer-of-learning process.
- Teach learners, supervisors, and other interested parties about transfer-of-learning strategies and techniques.
- Choose transfer strategies that are the most useful in assisting participants to apply what they have learned.
- Select and/or assist learners and others to opt for transfer-of-learning techniques that are the most useful to them in applying what they have learned.
- Negotiate and change the content, skills, and/or beliefs that are to be transferred.

Formulating Evaluation Plans

- Develop, as warranted, systematic program evaluation procedures.
- Use informal and unplanned evaluation opportunities to collect formative and summative evaluation data.

- Specify the evaluation approach or approaches to be used.
- Determine how evaluation data are to be collected.
- Think through how the data are to be analyzed.
- Describe how judgments are made about the program.

Making Recommendations and Communicating Results

- Examine program successes and failures, and formulate program recommendations.
- Tell the story well through carefully crafted program reports.
- Select the format for the report.
- Time the release of the report when the audience is most likely to review it.
- Follow up with appropriate individuals and groups.

Selecting Formats, Schedules, and Staff Needs

- Choose the most appropriate format or combination of formats for the learning activity.
- Take into account the desire to build a community of learners.
- Devise a program schedule.
- Identify staff requirements.
- Determine whether internal staff and/or whether external consultants are needed.
- Make careful choices about instructors and/or learning facilitators.

Preparing Budgets and Marketing Plans

- Estimate the expense for the program, including costs for the development, delivery, and evaluation of the program.
- Determine how the program is financed, and estimate the program income.
- Manage the program budget, and keep accurate budget records.
- Develop contingency budget plans for programs that are scaled back or cancelled.
- Be able to pay the bills for the program by managing the income side of the budget.
- Build and maintain program credibility, success, and market niches when marketing programs.
- Conduct a target audience analysis.
- Use already existing data or generate contextual information to help frame the marketing plan.
- Select and prepare promotional materials for the program.
- Prepare a targeted and lively promotional campaign.
- Ascertain and strengthen your promotional assets and capabilities.

Coordinating Facilities and On-Site Events

- Obtain suitable facilities, and arrange for instructional materials and equipment.
- Oversee all of the on-site program arrangements.
- Create a positive climate for learning from the moment the participants arrive.
- Provide systems for monitoring programs.
- Gather data for program evaluations.
- Give recognition to program participants, and thank both staff members and participants for being a part of the program.

- Tie up all loose ends after the program is finished.

Section 3: How do we Implement Programs for Groups?

Purpose

This purpose of this section is to identify the types of groups that commonly visit zoos/aquariums and to provide program ideas zoos/aquariums can offer to meet these groups' needs. The in-class session will incorporate a presentation with examples as well as whole group and small group discussion.

Key Points

- Informal education opportunities offered in zoos/aquariums should be designed to correlate with formal education standards in the classroom.
- Many types of groups visit zoos/aquariums.
- A variety of programs should be offered to best meet the needs of different groups visiting the zoo/aquarium.
- Considering the needs of each group when creating each program will ensure program success.
- Programs can occur any time of day - depending on the audience served—and some programs even include an overnight stay at the zoo/aquarium.

What are Informal Visitor Education Experiences?

Formal education refers to classroom-based learning provided by certified teachers.

Informal education happens outside the classroom, in after-school programs, community-based organizations, museums, libraries, or at home. It may include programs offered on site at your zoo/aquarium that visitors may choose to join if they wish, or community outreach programs conducted off site. Some on-grounds programs may be casual; for example, visitors may encounter a demonstration or program on zoo/aquarium grounds, and choose to join in or not. Informal education also includes exhibit interpretation, which will be discussed in another section. Other types of informal education are those group programs for which people register, and may pay a fee (such as camps or overnight programs).

Types of Groups Visiting Zoo/Aquariums

Many types of groups visit zoos/aquariums - senior groups, religious groups, schools on field trips, etc. These groups have different needs based on their age level, interests, group size, budget, visit time, and other factors. To best meet the needs of different groups, as well as to increase revenue, zoos/aquariums should offer specialized programs, designed with these factors in mind. Zoos/aquariums can also provide additional materials to support groups, such as pre- and post-program materials for teachers/leaders to use to prepare their groups for, or follow up after, their zoo/aquarium visit.

Education Program Types

To meet visiting groups' needs, programs can vary by topic, age level, time frame, format/activities, cost, and other parameters. The following is a list of group programs that have been successfully implemented by US zoos/aquariums, but other possibilities exist. We encourage you try any of the program types listed, as well as create your own, in accordance with your zoo/aquarium's mission and the needs of your particular zoo/aquarium's visitors.

Daytime On-site Programs

Self-guided Field Experience

Many groups prefer to explore the zoo/aquarium at their own leisure rather than attending a structured program. These groups would purchase group rate tickets ahead of time, which could be timed entry, if necessary. Zoos/aquariums could still provide educational information and activities groups could elect to use either before, during, or after their visit.

Classroom Programs

Classroom programs are usually indoor programs designed for small groups who would like to explore a topic more in depth and in a more personal setting. Classroom programs could include: crafts, experiments, small animal encounters, discussion, and opportunities to touch biofacts. The program content and activities would depend on the group's age level and should be designed to correlate with formal education standards in the classroom.

Auditorium Programs

Auditorium programs can occur indoors or outdoors and are designed to meet the needs of large groups who would like to learn more about specific topics. Some auditorium programs feature: large animal encounters, training demonstrations, storytelling, slide shows, etc. Again, different activities and topics could be offered depending on the age level of the group.

Tours

Groups that book tours often do so because they desire an experienced guide to tell them about exhibits of their group's interest and to answer their specific questions. Tours can show the public exhibit areas of the zoo/aquarium and/or behind-the-scenes areas. Some behind-the-scenes areas that zoo/aquariums have offered for tours include: the commissary, nighttime animal holding areas, and veterinary facilities.

Overnight On-site Programs

Some zoos/aquariums offer the opportunity for groups to sleep at the zoo/aquarium. This provides groups with a unique experience since the regular zoo/aquarium visitors are gone and animal noises and behavior often change at night. Overnight programs could offer the following activities: nocturnal animal encounters, activities only possible at night, and tours of areas that are not available or too crowded during public zoo/aquarium hours. Besides activity space, zoos/aquariums must also provide sleeping quarters and often meals for program participants.

Daytime Off-site Programs

Many zoos/aquariums offer outreach programs for groups unable to visit the zoo/aquarium for transportation, budget or other reasons. Some zoos/aquariums have relationships with particular schools, recreation centers or other facilities to regularly conduct programs at their sites. Outreach programs often feature animal encounters, training demonstrations, skits and large group activities. Zoos/aquariums should consider auto insurance issues, staff liability concerns, as well as program animal health requirements (temperature, time, and transport), when establishing guidelines for their off-site programs.

Teacher Resources

Professional Development

Schools often require that their teachers attend continuing education classes. Some teachers are interested in attending such courses for personal or professional enrichment. As conservation education organizations, zoos/aquariums can be a source of accurate information and engaging activities for teachers to use both in and out of the classroom. Professional Development courses can offer teachers keeper/researcher talks, specialized tours, curriculum packets, and up-close animal experiences.

Educator Loan Boxes

Since it is often difficult for teachers to obtain educational materials, especially animal items, some zoos/aquariums have created boxes for teachers to borrow on different topics such as Biodiversity, Habitats, and Endangered Species. Loan boxes can include: curriculum, biofacts, visual aids, and other educational materials for use in classrooms. Whenever possible, zoos/aquariums should select durable items that can be replaced with identical or similar items if items become damaged or disappear. Zoos/aquariums may also consider a requiring a deposit from teachers to use the boxes.

Teacher Advisory Council

To best meet teachers' needs, some schools recruit educators to meet regularly with zoo/aquarium staff to discuss both current and potential programming. As an incentive to participate, zoos/aquariums can offer discounted admission, programming, or educational materials to the teachers.

Educator Memberships/Annual Passes

Many zoos/aquariums offer discounted membership or annual passes to teachers to both encourage them to support their local zoo/aquarium, as well as to show the zoo/aquarium's appreciation for their efforts as educators.

Family Programs

Camps

Many zoos/aquariums offer camps for children during breaks in the school year. Camps can be half-day, full-day, or multi-day. Some zoos/aquariums even offer residential camps where children spend one or more nights at the zoo/aquarium after a full day of activity. Camps are often focused on a specific topic such as rainforest animals, for the day or the week, depending on the duration of the camp.

Parent-Child Programs

Parents of young children often seek educational opportunities to help prepare them for their school years. However, parents are often hesitant to leave their children at the zoo/aquarium for an activity. Zoos/aquariums can serve as a valuable resource for these parents by offering programs where parents and children can learn together about animals and their habitats. Such parent-child programs are usually no more than 2 hours and are very interactive (given the short attention span of young children), including such activities as crafts, story time, dress-up and exploration stations.

Kids' Clubs and After School Programs:

Some parents look for extra-curricular activities for their children that are both engaging and educational. For this reason, many zoos/aquariums have created weekend kids' clubs or after-school programs that meet regularly and focus on a particular topic each session. Topics may support what children are learning in school or simply be those that interest a certain age group. Children can even be active decision-makers in the program - deciding on future topics or activities they want to explore - since the program is less formal and meets multiple days. Further, children can conduct long-term projects, given the extended time they are spending at the zoo/aquarium.

Again, the above list of programs is by no means exhaustive. Zoo/aquarium educators can modify or create entirely new programs to meet their visiting groups' needs by surveying groups, brainstorming with other staff, and inquiring about other zoo/aquariums' programming. Be sure programs meet the needs of your groups and your zoo/aquarium's mission. This will ensure success and enjoyment for you and your participants.

Age-Appropriate Instruction

Purpose

This section gives participants a brief overview of child development stages and their implications for educational activities in zoos/aquariums. In addition to lecture and discussion, participants are given the opportunity to practice designing age-appropriate questions for use in their programs and identifying conservation topics that are appropriate for specific age groups.

Key Points

- As children grow, they progress through several stages of cognitive development.
- Some environmental topics are not appropriate for children under 10 years old, because the concepts are either too abstract and/or too upsetting for a young audience to handle.
- To be most effective, educational activities in zoos/aquariums should be developmentally appropriate for the audience.

Stages of Cognitive Development: How a Child Comes to Understand the World

After years of society viewing children as little adults - with the same brain capabilities as adults, only in need of training - in the mid 1900's Swiss psychologist Jean Piaget proposed a radical theory: that intellectual development occurs in stages, as the brain develops and as an individual experiences the world. Studies by other psychologists later supported and refined this theory of stages of cognitive development. Zoo/aquarium educators should consider the stage of development of their audience when creating, conducting, and evaluating a program, as the group's age level affects what they can comprehend and retain from the program. The following is a summary of the cognitive characteristics of children at different age levels.

Sensimotor Stage (0-1½ years old)

The child learns that objects continue to exist even when they are no longer in view (e.g. "Peek-a-boo" game.) The child progresses from just reacting to environment to performing goal-directed actions.

Pre-Operational Stage (1½-7 years old)

Egocentric—Children 1 ½ -7 years old are charmingly egocentric. They believe everyone thinks exactly as they do and knows exactly what they mean. They love to tell long stories about their experiences. *Zoo/aquarium example: children raising their hands to tell personal stories instead of to ask or answer questions.*

Experience Dependent— Instead of random trial and error, children in this stage form their beliefs and actions based on past experiences in the same situations. However, it is difficult for them to predict what will happen if a situation is different.

Problems with Constancy—Children in the pre-operational stage are often confused by "conservation of mass" problems. In other words, if an object or substance is changed by moving it around, dividing it into parts or otherwise changing its appearance, children at this level often will not understand that the amount of the object or substance did not change. For example, if a ball of clay is rolled into a hot dog shape or separated into smaller balls, many children will then believe there is more or less clay than before. *Zoo/aquarium*

example: A child not understanding a skull is from the same animal when the skull is taken apart.

Concrete Operational Stage (7-12 years old)

Constancy Understood—Children in this stage can now understand what does and doesn't change when altering an object or substance. They also come to realize which actions can be reversed.

Advanced Classification Skills—In the concrete operational stage, children develop the ability to classify objects not only in specific groups but also in more general categories. For example, while younger children can only separate a collection of toys into 4 groups - toy chairs, tables, cars, and trucks - children at this stage can also reclassify these items into two more general groups - furniture and vehicles. Further, children in the concrete operational stage can do these separations mentally, without having to move the objects around. *Zoo/aquarium example: children at this age are not only able to name specific animals, but also able to classify them as mammals, reptiles, birds, etc.*

Series Skills—Another major development associated with children in the concrete operational stage is their ability to put objects in order using various criteria - length, weight, etc - without having to compare each object to every other one. *Zoo/aquarium example: children are now able to comprehend and explain different species' life cycles.*

Logic Based on Experience—Children at this stage are able to think logically and predict results as adults do; however, they still rely heavily on experience. If scientific content does not include concrete examples from "real life", it will be difficult for children at this stage to understand it.

Formal Operation Stage (12-Adult)

Abstract Thinking—Individuals at this stage become capable of understanding content without needing physical objects or even imagining past experiences with such objects. *Zoo/aquarium example: students are able to understand intangible concepts like climate change.*

Advanced Predicting Skills—In science, people at the formal operational level cannot only logically predict outcomes of an experiment; they can also recognize and manipulate the many variables involved, both physically and mentally. They can develop ways to best test their theories.

Social Consciousness—During this stage, individuals progress from focusing on how others view them to being concerned with the welfare of others as well as themselves. They can then recognize societal problems, identify the factors involved, and propose solutions, realizing the limitations of these ideas.

No Gloom and Doom before Age 10

These stages of development are especially important for zoo/aquarium educators to consider when addressing conservation issues. Education specialist David Sobel and others have expressed concern that children today are less connected with nature than children in previous generations. Children now have fewer opportunities to directly experience nature

as more and more natural areas are cleared for housing, farms, and other uses. At the same time, as the use of technology for recreational purposes increases (television, videos, and computer games), children are also less inclined to venture outdoors. And while this separation from the natural world is becoming more commonplace, today's children are also being increasingly bombarded - on TV and sometimes in schools - with information about the deteriorating condition of the planet. Sobel has found that instead of instilling a conservation ethic in young children, introducing conservation issues too early in a child's development often frightens and confuses them, causing them to close themselves off to the issues, as they feel helpless to change the situation. Not only are conservation issues overwhelming to young children, but children are being asked to protect something with which fewer and fewer of them feel emotionally connected to.

If our goal is to effectively inspire children to conservation action, we must first help them connect with nature and wildlife before we highlight environmental problems and ask students to help solve them. We need to get children excited at a young age - to turn them on to nature and science. A good rule of thumb is no gloom and doom before the age of 10, meaning it is best not to bring up conservation issues in an inappropriate manner before this age. The following chart details appropriate and inappropriate environmental topics by age group as well as activity suggestions for each age range.

Note: If a child brings up a serious conservation issue, it is important to address their concern. This should be done carefully, acknowledging the child's feelings and conveying a sense of hope. Some examples are listed below:

For Ages 7 and under

- Answer questions briefly and honestly: "Yes, tigers are endangered and that's not good. People are working to protect them but it's a tough situation."
- *Lift the burden from the child without making him/her feel powerless:* "I know you are concerned about animals. There are grown-ups working hard on this problem. Maybe when you grow up, you can help out, too."
- Reassure the child that not all animals are endangered. "Some animals have problems finding homes, but many don't." Point out other animals both in their neighborhood and far way that are doing fine.

For 8 to 11 year olds

- Acknowledge the child's feelings: "Where did you hear about elephant poaching? How did you feel when you heard about the problem? I know it's a sad story but people are trying to help."
- Redirect to something more local and concrete: "I know it's hard to think of what to do to help elephants. What can we do to help animals around here? That's important too--and it's probably going to be easier for us!" Suggest an action they can take to help the environment: picking up litter in natural areas, maintaining bat houses and birdbaths, planting native shrubs and flowers, and asking friends to help.

For Ages 11 to 14 and up

- Kids in this age group are ready for action! You can discuss ways to get involved locally such as adopting an animal at a nearby zoo/aquarium or volunteering at an

animal shelter. Suggest initiating or helping with recycling programs at school or in the community.

- Put kids in touch with their government representatives.
- Discuss supporting conservation groups such as World Wildlife Fund.
- Be a model - share conservation actions you've taken or would like to take.

Age-Appropriate Topic Suggestions for Educational Programs

Ages	Appropriate Topics	Inappropriate Topics	Same Topic Across Age Levels	Activity Ideas per Age Level
Birth to 3 · Sensory	<ul style="list-style-type: none"> • Animals are cool • Sensory experiences • Animals that are close to home and familiar (rabbit, squirrel) • Families (moms, dads, babies) 	<ul style="list-style-type: none"> • Ecosystems (<i>too abstract</i>) • Life cycles (birth, death, etc.) • Endangered species • Environmental problems/issues 	<ul style="list-style-type: none"> • Look at pictures of pandas • Touch fur • Pretend to eat bamboo like a panda • Pretend to crawl like a panda 	<ul style="list-style-type: none"> • Stories • Songs • Coloring • Take crayons on nature walk and find items of the same color (2-3) • Collect leaves and grass on a nature walk to make collage they can touch (20 months-3)
4 to 7 · Sensory · Empathy	<ul style="list-style-type: none"> • Animal homes • Farm/domestic animals • Predators/prey • Compare/contrast animals to self (build connection to animals) • Animal groups • Life cycles (birth, death, etc.) • Introduce to good environmental manners (recycling, reusing, turning off lights, etc.) • Animals that are close to home and immediate surrounding 	<ul style="list-style-type: none"> • Ecosystems (<i>too abstract</i>) • Endangered species • Environmental problems/issues • Dire consequences of not using good environmental manners (habitat loss, pollution, endangered species, etc.) 	<ul style="list-style-type: none"> • Discuss what baby panda needs from mother panda: milk, shelter, protection, warmth, love, guidance • Compare self to panda: movements, behaviors, body size (baby to mother, baby to self, mother to self), colors, needs 	<ul style="list-style-type: none"> • Stories • Songs • Moving like animals • Celebrating seasons • Fostering curiosity • Role play to impersonate an animal: eat like your animal, make sounds like your animal, move like your animal, sleep like your animal • Make recycled art or collage projects
8 to 11 · Sensory · Empathy · Exploration	<ul style="list-style-type: none"> • All of the above • Ecosystems • Physical adaptations • Animal habitats and needs • Site-specific investigations • Cycles (life, water, etc.) • Introduce direct, simple (not overwhelming) consequences of <i>not</i> using good 	<ul style="list-style-type: none"> • Endangered species • Dire consequences of not using good environmental manners (habitat loss, pollution, endangered species, etc.) 	<ul style="list-style-type: none"> • Provide information about bamboo forest • Discuss physical adaptations: pseudo thumb, climbing, digestive system, classification) • Allow them to research location, life span, panda 	<ul style="list-style-type: none"> • Making forts • Imaginary worlds • Searching for treasures • Following streams and pathways • Taking care of animals • Go on a night hike: test your night vision • Use binoculars and magnifying glasses to investigate nature • Draw or write stories about your observations in nature

	<p>environmental manners, such as: "If we don't recycle, we will need more landfill space."</p> <ul style="list-style-type: none"> • Wise product consumption • Animals that are found in neighborhood and community 		<p>range, elevation</p> <ul style="list-style-type: none"> • Compare giant panda habitat and life cycle with Asiatic black bear or red panda habitat and life cycles 	<ul style="list-style-type: none"> • Create/build a healthy panda habitat replica in a box • Water cycle • Make recycled art or collage projects.
<p>12 and up</p> <ul style="list-style-type: none"> • Sensory • Empathy • Exploration • Action 	<ul style="list-style-type: none"> • All of the above • Behavioral adaptations • Consequences of not using good environmental manners • Ecosystem investigation with concrete experiences • Endangered species • Product consumption • Animals that are found locally and globally 	<ul style="list-style-type: none"> • Most topics are appropriate if presented in a sensitive manner • Focus on those daily community issues that students have some hope of influencing • Consider avoiding topics children can do nothing about (affecting the bush meat crisis in Africa) 	<ul style="list-style-type: none"> • Discuss reasons pandas are an endangered species (bamboo die-off, habitat destruction, short reproductive cycle) • Discuss and research the history of the giant panda in China • Discuss other animals that have a similar fate (golden monkey, takin) 	<ul style="list-style-type: none"> • Managing school recycling programs • Joining after school nature or environmental clubs • Planning and going on school expeditions • Encouraging friends and family to be stewards • Make a list of environmental problems and a list of animals. Ask students to pick one from each list and research if that problem affects that animal. • Make recycled art or collage projects • Volunteer at a local animal shelter or adopt an animal • Get involved with conservation groups (WWF, WCS, TNC)

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Effective Instruction: Teaching Outdoors

Purpose

The purpose of this section is to provide participants with strategies for preventing student misbehavior as well as with strategies on how to handle situations when students misbehave. This section includes a group discussion and an outdoor role-play activity. Classroom management tips are included for participants' future reference.

Key Points

- Student misbehavior can often be prevented through effective classroom management.
- Praise of specific behaviors should be used throughout a program to encourage students to follow directions.
- Minor misbehaviors can be handled with minimal interruption to program activities.
- More severe misbehaviors should be referred to the teacher who brought the field trip group to the facility.

Classroom Management Tips (Ages 3-12)

If you consistently use good management techniques throughout the program, you will be rewarded with a smooth, educational and enjoyable experience! Here are some suggestions:

Beginning of the Program

If you have 1 school group, ask the teacher what he/she uses as a quiet signal. If not, explain to the group your quiet signal (quiet hand signal, snapping, word chant, etc) and *practice it with them.*

State your expectations clearly. Examples include:

- Be respectful of others— *discuss what this means such as not talking when others are talking, no running, keeping your hands to yourself, etc.*
- Be respectful of animals—*discuss what this means such as being quiet and gentle with the animals.*
- Raise your hand when you have something to say.
- Stay with your instructor or chaperones at all times.
- Follow any other instructor directions.

Start praising students immediately for following your expectations and be specific. This serves to reward those that are behaving and reminds others of what you're looking for. For instance, instead of just saying "very good", you can say:

- "I love the way Mary is raising her hand." (For children 3-7)
- "Ms. Smith's class is doing a great job of staying quiet." (For students aged 7-12)

During the Program

Most crucial—*try your best NOT to acknowledge kids that call out answers*, the minute you do, other kids will start calling out to get attention. If you do want the whole class to answer at certain points in the lesson, you can teach the kids to all answer on a specific signal or word, such as when you say "everyone." For example, "Everyone, is this a reptile?"

Continue to use the power of praise. “Bobby, you’re raising your hand nicely; what’s your question?” Also, when you need helpers for an activity, choose a student who has been behaving well and state that this is why you chose him/her. Others will behave better in hopes of getting noticed, too.

Order and phrase information wisely to reduce commotion and misbehavior.

- *Order Example*— Tell them how and where you want them to sit *before* they enter classroom.
- *Phrasing Example*— Instead of saying “What is this”, say “Raise your hand if you know what this animal is.”

Call on different students. This encourages more children to listen and participate.

Use hand signals to get the whole group involved and to SHOW you they understand. For instance, have everyone show you snake tongues (two fingers wiggling under their chins)!

What to do if Things Start to go Awry - Ways to Minimize Interruption to Instruction

- If specific children are causing the problem, move close to them. First make eye contact, but say nothing. If problem still continues, tell them what you need - for them to get quiet, sit, etc. *Please do not choose a child who is misbehaving to be your helper for an activity just to give him/her something else to do - your attention rewards them for their poor behavior and can encourage others to misbehave.*
- If most of the class is misbehaving:
 - Stop talking—the students may wonder what’s wrong and stop their misbehavior.
 - Remind them what you’re looking for before they can continue the activity, e.g. “I’m waiting for *everybody* to sit down flat on the floor before I show you the animal.”
- Wait for improvement and immediately compliment good behavior, e.g. “I like the way this group over here is sitting on their bottoms quietly.”
- If the problem still continues, ask the teacher(s) that brought the group to your facility to help you. Your job is to make sure the group is safe and can learn without interruption, not to spend most of your time managing a few students that are misbehaving.

End of Program

Find something that this group did especially well and tell them it. Ideas: raising their hands, listening quietly, asking good questions, answering tough questions, working on the activity sheet, etc.

Congratulate yourself on your patience and caring!

Assessing Group Needs

Purpose

The section emphasizes the importance of considering group needs when developing programs and structuring group visits. It also provides a Field Trip Needs Assessment Case Study as an example of how to assess group needs when developing a specific program. This section includes a facilitated discussion and group work.

Key Points

- The needs of targeted groups differ from those of a general visitor.
- A front-end evaluation can be used to measure audience needs prior to creating group programs.
- Accommodating visitor needs results in increased program participation and repeat visitation.

Overview

The needs of targeted groups, such as schools, can differ from those of a general visitor. A front-end evaluation is essential for determining and addressing the preferences and requirements of visiting groups. The following needs of group visits were measured. We recommend considering these needs to best accommodate groups at your zoo/aquarium and encourage repeat visitation.

Logistics

Transportation and parking—Some groups will arrive by bus while others utilize individual or public transportation. It is important that the zoo/aquarium provides sufficient parking accommodations to both groups and general visitors. This includes parking for multiple groups during peak hours.

Scheduling—Educational programs should be scheduled when most convenient for visiting groups. Group leaders may prefer certain times of the year, days of the week or times of day. It is also important to consider national holidays, school calendar and testing schedules when determining program times. In addition, if groups visit more than once a year, they may prefer to attend an alternate program during their second visit.

Dining facilities—Depending on the time and duration of the visit, groups may need a place to purchase food or eat their own packed meals. To accommodate large groups, boxed lunches at a discounted rate may be considered. For visitors who choose to purchase their meals, affordability, variety and quantity of food available are all factors that should be considered.

Registration

Group size—Zoos/aquariums should consider the size of a typical school group in order to determine the capacity for each program offered. A variety of programs should be offered to accommodate various group sizes. For example, large groups may prefer an auditorium program, whereas a small group may opt for a smaller classroom setting.

To avoid overcrowding during peak group visit season, set a capacity for the total number of group and general visitors allotted per day.

Age range—Plan a variety of programs to meet the needs of different age groups. Offer more group programs for the age range that attends your zoo/aquarium most frequently.

Time frame—Some groups may be able to stay at the zoo/aquarium all day, whereas others may only have a few hours to visit. Programs of differing durations should be available to meet various groups' schedules.

Pricing—To encourage group visits, zoos/aquariums can offer discounted rates for groups of a minimum size. In addition, zoos/aquariums can provide a variety of programs at different prices to accommodate different group budgets. When setting program costs, consider program prices of other venues, as well as what group leaders are willing to pay for particular programs.

Awareness

Access to information—Determine the best method of informing teachers about your zoo/aquarium and its group programs. This will determine the focus of your marketing and communications strategy.

Selecting site—Assess the priorities of groups visiting. Is entertainment value, educational experience, or another factor most important in deciding their field trip site? Then determine what makes your zoo/aquarium unique in comparison to other field trip or group program sites and communicate this information to group leaders.

Accountability

Curriculum correlation—To encourage school visitation, create programs that align with national and regional curriculum standards. Illustrate these correlations in program advertising material. In addition, you may want to consider offering pre and post visit activities to support teachers in the classroom.

Administrative support— Connect with local school administrators to access their priorities and communicate how informal zoo/aquarium programs can support their formal education efforts. To establish these relationships, zoos/aquariums may offer special events and discounts to school administrators.

Safety—Parents and school personnel are often concerned about the safety of field trip sites. Assess what concerns they have about your facility and determine what modifications can be made to address them.

Assessing Group Needs

Field Trip Needs Assessment

Section One: Field Trips

1. How many field trips do you take your students on per year? _____
2. How many students do you take on each trip? _____
3. When you go on a field trip, how many teachers per number of students go on the trip? _____teachers to _____students
4. When you go on a field trip, how do you get to the site?
 - a. We take a city bus
 - b. We walk
 - c. We have parents take their students to the site and take them home
 - d. We rent a bus
 - e. Other _____
5. When you go on a field trip, how do you choose where to go?
 - a. Based on the educational value of the site
 - b. Based on the cultural value of the site
 - c. Based on how fun the site is
 - d. To help my students develop their social skills
 - e. So the students can have a free day
6. In association with a field trip do you:
 - a. Do activities prior to the visit to prepare your students?
___Yes ___No
 - b. Do activities with my students on field trips?
___Yes ___No
 - c. Do activities associated with the field trip afterwards in my classroom?
___Yes ___No
7. How do you find out about the field trip sites that you visit?
 - a. Other teachers
 - b. My principal
 - c. The newspaper
 - d. Workshops for teachers
 - e. Other _____
8. Field trips at my school are seen by the principal as:
 - a. Educational days
 - b. Cultural appreciation days
 - c. Fun days
 - d. Community days
 - e. Other _____

Section 2: Field Trip to a Zoo/aquarium

9. I would choose a visit to the zoo/aquarium to:
- Allow students to see animals
 - Allow students to learn about animals
 - Allow the students to have fun
 - Other _____
10. I would find out what to expect from a visit to the zoo/aquarium by:
- Calling the zoo/aquarium
 - The zoo/aquarium's website
 - Visit with my family or friends to find out
 - Other _____
11. On a trip to the zoo/aquarium with my students, I would expect my students to learn:
- The natural history of the animals
 - What animals look like
 - How to care for animals
 - How to behave when around animals
 - How to conserve animals
 - Other _____
12. Challenges I would face if I tried to take my students to the zoo/aquarium are:
- My principal may not approve
 - Travel to the zoo/aquarium
 - Parents worry about safety
 - Other _____
13. If you have never taken your students to the zoo/aquarium for a field trip, why?
14. What benefits do you think going to the zoo/aquarium would have over other field trip sites?
15. What about animals at a zoo/aquarium do you connect with?
- Their rarity
 - Their adaptations
 - Their appearance
 - Their cultural significance
 - Their behavior
 - Other _____
16. What do your students already know about animals?

Section 3: Field Trip Sites

- 17. To what other sites do you regularly take your students on field trips?

- 18. Why do you choose to go to those sites?
 - a. My students like going there.
 - b. I like going there
 - c. We are required by my school to go there
 - d. The site teaches them things that they need to know for school
 - e. The site allows the students to relax and have fun
 - f. It is convenient to get my students to the site
 - g. Other _____

- 19. What are the benefits to visiting those sites over visiting your local zoo/aquarium?
 - a. Students learn more
 - b. Students have more fun
 - c. My principal approves of us going there
 - d. It is easy to get there
 - e. Other _____

- 20. The places most used for field trip destinations at my school are:

Section 4: Logistics

- 21. What days of the week would be best for you to bring your students/your child? (Please circle all that apply)
Monday Tuesday Wednesday Thursday Friday Saturday Sunday

- 22. What time of day would be best for you to bring your students/your child? (Please circle all that apply)
Morning Afternoon Evening

- 23. What time of year would be best for you to bring your students/your child to a zoological park/aquarium? (Please circle all that apply)
Spring Summer Fall Winter Holidays

- 24. How much extra (over general admission) would you be willing to spend for your students/your child to participate in a one day special field trip program at a zoological park/aquarium? _____

- 25. What age and grade of students do you teach? _____

26. How do you find meals for students when on a field trip?

a. A restaurant at or near the site

b. Students bring their lunch

c. Other _____

27. How much time do you usually spend at a field trip site?

a. 1-2 hours

b. 2-3 hours

c. 3-4 hours

d. 4-5 hours

e. 5-6 hours

f. 6-7 hours

g. Other _____

28. Do you get parental permission for students to attend field trips? If yes, how?

Anything else we need to ask? Thank you for your time!

Assessing Group Needs

Case Study: Field Trip Needs Assessment Results

Preliminary results of a Needs Assessment might look like this:

Respondents

- Kindergarten Teachers: 34
- Primary Teachers: 40
- Middle School Teachers: 46

When you go on a field trip, how do you get to the site?

- We take a city bus
- We walk
- We have parents take their students to the site and take them home
- We rent a bus
- Other _____

When you go on a field trip, how do you choose where to go?

- Based on the educational value of the site: 1
- Based on the cultural value of the site: 3
- Based on how fun the site is
- To help my students develop their social skills: 2
- So the students can have a free day

In association with a field trip do you:

- Do activities prior to the visit to prepare your students?
__Yes __No
- Do activities with my students on field trips?
__Yes __No
- Do activities associated with the field trip afterwards in my classroom?
__Yes __No
- All stated that they do activities prior, during, and after their trips

How do you find out about the field trip sites that you visit?

- Other teachers
- My principal
- The newspaper
- Workshops for teachers
- Other _____

Field trips at my school are seen by the principal as:

- Educational days
- Cultural appreciation days
- Fun days (*no one said fun*)
- Community days
- Other _____

About half of the respondents had taken classes to the zoo/aquarium and half had not.

On a trip to the zoo/aquarium teachers most want their students to learn 1) about the animals, 2) learn how to protect/save them

Concerns/barriers to taking a trip to the zoo/aquarium are 1) safety; 2) cost

Not interested in self-guided tour or pre/post packets, almost no one responded that they were interested in a self-guided tour; most were interested in guided field trip.

What do they like most about animals? 1) Animal behavior, 2) Uniqueness, 3) Adaptations, 4) Exciting, 5) Cultural significance

Why would they most be interested in sending kids to a zoo/aquarium? 1) Educational, 2) Cultural experience, 3) Enhance students social skills, 4) Fun time

Time allotment for a field trip: 1) 4-6 hour long experience, 2) 7-10 hours

Section 4: How do we Initiate Field Conservation Involvement?

Introduction

The purpose of this section is to provide guidelines for involvement in Field Conservation Education projects. The first step is to identify the level of involvement of your institution and second develop the conservation education component of the project.

Key Points

- Support of conservation projects is a requirement of AZA.
- Selecting a project should follow your institution's criteria and ensure a creditable project through AZA and/or a university approval.
- Determine the level of involvement your institution can fund.
- Based on the level of involvement, you may need a plan that includes identifying impact on the species/ecosystem, developing a needs assessment, culturally appropriate educational materials, training of in-country educators, and conservation impact evaluation.

Why Get Involved in a Field Conservation Education Project?

According to AZA's requirements, all accredited zoos/aquariums must support field conservation projects that benefit species and ecosystems in the wild. If we justify the existence of zoos/aquariums by saying that animals in the care of humans act as ambassadors to their wild counterparts and inspire visitors to take conservation action that helps species, then we need to "walk the talk" by ensuring a percentage of every institution's gate admissions fund field or *in situ* conservation initiatives. Since conservation is a multi-disciplinary field involving many fields of studies including biology, animal behavior, statistics, economics, education, etc., a conservation education component is one way an institution can support conservation.

Another great reason to get involved in field conservation education projects is that many zoo/aquarium educators are inspired in their roles as a result of their involvement in field conservation projects which strengthens and broadens their experience in conservation education. These experiences can be shared with visitors through on site interpretive programs that include this positive conservation work.

How Do You Select a Field Conservation Education Project?

AZA provides support for conservation projects through its Conservation Endowment Fund (CEF). Also, many of the TAG/SSPs identify conservation projects that they have approved. A review of these projects with your institution's leadership may be the best way to select a creditable project for support. If your institution has a scientist, or you know one from another zoo/aquarium/university, he/she might be able to direct you to a conservation project that meets your criteria.

In all cases, if you want to support the education aspect of a field conservation project, you will have to review the proposal to be sure education is included, to what extent and direct your funds to that aspect of the project. Reviewing the budget of a proposal is the best

way to see how the projects funds support education. Many proposals express the need for education, but if no funds are being allocated to it, then it may only be lip-service.

What is the Level of Involvement Your Institution Can Support in a Field Conservation Project?

There are different levels of support an institution can offer a field conservation education project. Advancing levels reflect an increase in cost and staff time.

- Level 1: A check that is directed to the conservation education component of the project.
- Level 2: Sending materials or equipment that supports the education component of the project such as biofacts, paper, pencils, puppets, games, audio/visual equipment, etc.
- Level 3: In partnership with local organizations, travel to the field site for training workshops. This could include workshop materials, venue costs, food, transport of local educators and travel for zoo/aquarium educators.
- Level 4: In partnership with local organizations, developing culturally appropriate lesson plans that identify how the education program will impact the species, includes a needs assessment, conservation actions and an evaluation component for a specific target audience with accompanying materials. A training workshop is usually needed to instruct local educators in how to conduct the lessons, use of inquiry approach and hands-on methods of instruction, delivery of conservation actions and instruction on how to conduct an evaluation.

Level 4 includes the greatest commitment of resources both financial and staff time. This level involves a longer-term commitment to the project in order to gather enough data on species and educational impact through evaluation. This could be as long as 3-5 years. It certainly means travel to the field site and a greater level of partnering with the conservation organization and local people.

Four case studies are included on the following pages to provide educators with the levels of commitment and process involved in field conservation education projects.

Case Study (*International*): Kalinzu Forest Reserve Conservation Education Project Purpose

The purpose of the Kalinzu Forest Reserve Conservation Education project was to positively impact the knowledge, attitudes and behaviors of local Primary 5 students living around Kalinzu Forest Reserve about the wild chimpanzee population found inside the reserve.

Partners

The Jane Goodall Institute (JGI), Uganda; The National Forest Authority (NFA), Uganda; Wildlife Authority (UWA); Ministry of Education in the Kalinzu district; Japanese researcher team working in Kalinzu Forest Reserve.

Impact on Species/Ecosystem

JGI initiated a snare removal project in Kalinzu as a result of researcher observations that 25% of the chimpanzees had snare injuries (missing fingers, toes, hands, feet). The number of snares removed each year was a measurement used to assess the program's effect on the chimpanzee population.

Needs Assessment

In order to establish a program that met the needs of the Primary 5 students, a workshop was held at the Kalinzu Forest Reserve Education Center and included teachers from the surrounding schools, and representatives from NFA, UWA, Ministry of Education District, and conservation educators from JGI. At the workshop, input was gathered on what content to include in the program, what was special about Kalinzu Forest Reserve, what conservation actions Primary 5 students could take to help wildlife and the forest and logistics in transporting children to the Forest Reserve. This workshop provided us with the culturally appropriate information to include in the program and what actions were realistic from the children's perspective.

Development of Educational Materials

Based on the information provided in the Needs Assessment workshop, five lessons were developed by zoo educators to fill the 3 hours children would be spending at the Reserve. They included: What lives in the Kalinzu Forest Reserve? What adaptations do chimpanzees have to live in the forest? What are the threats to chimpanzees? A Forest Walk (children were taken into the forest with an expert guide to see the forest first-hand with accompanying activities), and What Can You Do to Help Wildlife? Conservation statements about Kalinzu Forest Reserve were printed on banners to hang in the education center, interpretive signs were hung in the center that accompany each of the lessons, colorful African fabrics were purchased and decorated the center and a local artist was hired to paint the diversity of species found in the Kalinzu Forest Reserve on the outside front walls of the center. The vision was to create a beautiful and culturally appropriate education center that was conducive to student learning.

Training/Capacity Building

Once lesson plans were developed and materials created, a training workshop was conducted with the on-site educators who would be teaching the program. The zoo educators conducted the entire program for the on-site educators on the first day of the workshop and answered any questions they had. The next day, the on-site educators conducted the entire program for the zoo educators. In this way, zoo educators were able to guide and coach the on-site educators teaching methods and content information. An evaluation training session provided the on-site educators with the reasons for evaluation and a step-by-step process on how to conduct a pre-post evaluation with students.

Evaluation of Conservation Impact

Using the objectives from the lesson plans, the Science Team and Education Team at the zoo developed an evaluation questionnaire for the Primary 5 students. Based on experience, these questionnaires were kept to 5 questions that focused on the most important elements we wanted children to remember. They included knowledge, attitude and behavior questions. With literacy and English being a challenge for the students, the questionnaires were kept short. After the first year, we added a 3 month follow-up visit to the school with an assessment component to see if students retained the information. The next year we added a one year follow-up and the last year we added a second year follow-up all using the original questionnaire with minor questions. Partnering with the zoo's Science Team on evaluation data analysis, in the short term, the data showed a significant increase in knowledge after the program. Attitudes and behaviors were harder to show impact. Longitudinally, the students retained the program information over time and self-reported

behaviors that they had completed. From a species biological perspective, the snare removal team reported a reduction in the number of snares removed over the course of the four year program. Although we do not have data that demonstrates this reduction was caused solely by the education programs in the area, we certainly believe they could have contributed to it.

Level of Commitment

This program was a Level Four commitment.

Cost

Over four years, the cost for this program was about \$80,000.

Case Study (*National*): Lincoln Park Zoo and Northern Cheyenne Reservation—Partnership for Black-footed Ferret Recovery

Purpose

Once ranging from the plains of Canada through North America and into northern Mexico, the endangered black-footed ferret (BFF; *Mustela nigripes*) was almost driven to extinction as a result of lost habitat and eradication of its primary food source, the prairie dog (PD; *Cynomys spp.*). To conserve this species, the last remaining 18 individuals were removed from the wild to initiate an ex situ breeding program, headed by the U.S. Fish and Wildlife Service (USFWS). Several AZA facilities participate in the BFF recovery effort, including housing and breeding animals for release, as well as exhibiting BFFs and supporting the education objectives of the recovery effort. Since 1991, this program has successfully reintroduced BFFs to 19 sites in 8 states, Canada and Mexico.

Several attempts to reintroduce BFFs into Montana (MT) have failed due to recurring Sylvatic plague (*Yersinia pestis*) outbreaks, changes in PD populations and lack of suitable habitat. However, south-central MT has higher quality habitat that may allow for the establishment of a self sustaining population. Hence, the Northern Cheyenne Reservation (NCR; Lame Deer, MT) became the 17th BFF reintroduction site in 2008. NCR has 444,000 acres of which the tribe has maintained >90% ownership. NCR initiated the restoration of the native prairie ecosystem with its first action being to establish a self-sustaining BFF population through careful management and planning.

Lincoln Park Zoo (LPZ; Chicago, IL) provides educational and inspirational wildlife experiences to more than 3 million visitors each year. Because of LPZ's belief that basic and applied research is essential to the mission of modern zoos, it initiated one of the country's largest scientific research programs encompassing several scientific disciplines. LPZ's mission emphasizes the importance of conservation through capacity-building, encouraging its scientists travel to developing countries and communities in transition to help conserve wildlife by providing scientific expertise, infrastructure, jobs, education and training to the local people.

As a leader in wildlife conservation and education, USFWS approached LPZ in 2009 to create a partnership with the NCR to provide support, expertise and resources needed for a successful BFF recovery in MT, while also connecting to the zoo's conservation, science and education programs. A series of face-to-face meetings and ongoing email correspondence (beginning October 2009) between LPZ staff and key NCR community leaders revealed the

various challenges, opportunities and needs that exist on the reservation. Together, LPZ and NCR leaders identified capacity building and community engagement as the most critical needs among key stakeholders including the NCR's natural resource (NR) professionals, classroom educators and participants in the "Work & Learn" summer youth program.

To support NCR's needs our objectives are to: 1) provide essential training and equipment to NR personnel for BFF monitoring; 2) train classroom educators in inquiry-based science education and make connections between curriculum and prairie ecosystem; 3) enhance the "Work & Learn" summer youth program by providing teens with pre-professional training in authentic wildlife research; 4) develop a comprehensive evaluation plan to assess the impacts of the "Work & Learn" program; and 5) provide ongoing support from LPZ staff experts to NR personnel and classroom educators.

Our expected outcomes include: 1) providing professional development for NR personnel focused on BFF monitoring and recovery; 2) providing professional development for NCR educators and materials necessary to be successful; 3) providing pre-professional development for teens in wildlife research and evaluating program success; and 4) forming a long-lasting partnership between LPZ and NCR.

Partners

U.S. Fish and Wildlife Services, Northern Cheyenne Tribe, Lame Deer Elementary, Middle and High Schools, Chief Dull Knife Community College and other AZA facilities supporting the BFF recover effort

Impact on Species/Ecosystem

This project will improve site management and monitoring activities at the Northern Cheyenne Reservation BFF release site, by providing essential equipment and necessary training to individuals directly responsible for the site. In addition, this project will positively influence opinions and actions of NC tribal members and community leaders to take positive action on behalf of the prairie ecosystem, including prairie dogs and black-footed ferrets. As a result, the NCR site will show reduced incidence of plague and healthier and more abundant prairie dog populations, with the eventual result of a self-sustaining BFF reintroduction site.

Needs Assessment

The goal of the BFF recovery plan (1988) is to establish 10 self-sustaining reintroduction sites with 1500 BFFs in the wild by 2010. This goal has not been accomplished; only 3 sites are considered self sustaining. NCR is an ideal location to release BFFs because of its high quality PD colonies (126 colonies totaling 5,682 acres). To date, 65 BFFs have been released, but an outbreak of plague in 2008 reduced PD colonies and setback progress. Future success requires expanded PD colonies, which must remain plague-free. According to USFWS, site management and monitoring activities vary greatly between reintroduction sites and are dependent upon the resources and expertise available. Furthermore, every site has equipment needs essential to BFF monitoring that are not yet being met, including spotlights, traps, transponder units, dusting equipment and vaccination supplies. Although, the NR department has committed significant resources, they need support, training and

increased capacity to ensure the long-term success of this ambitious project. This project directly addresses these needs for the NCR reintroduction site.

In addition to technical training and equipment, it is important to have community support for these efforts in order for them to be successful. Starting with the youth in the community is a great way to build that support. LPZ and Lame Deer educators agree that this project offers a valuable opportunity to strengthen the schools' science curriculum by making connections to relevant topics, such as the prairie ecosystem and the BFF recovery effort, and through professional development programs for teachers and access to educationally sound teaching materials.

Personal communication with administrators and educators indicates a need and desire to improve science education within Lame Deer schools. The 2009 data from the MT Office of Public Instruction (OPI) state that 81% of districts on Native American reservations did not meet federally mandated annual progress measures during the previous school year. Lame Deer School District is among these underperforming districts.

Furthermore, data from the MT OPI indicate that only 33% of 4th grade Native American students are proficient or advanced in science compared to 66% of 4th grade Caucasian students. By the 10th grade, this achievement gap increases with only 16% of Native American students being proficient or advanced in science, versus 46% of Caucasian students. NCR community leaders, including representatives from Lame Deer Elementary and High schools and Chief Dull Knife Community College (CDKC), indicate that enrollment in elective high school and community college science courses is minimal. The Dean of Student Affairs at CDKC, reported that relatively few graduates pursue advanced degrees in the sciences, especially in environmental and/or biological sciences [4]. This is consistent with national trends which show that Native American undergraduate and graduate students are more likely to enroll in programs in the social sciences and psychology.

Low interest and enrollment in science courses may stem from scarce opportunities and under-exposure to related content and activities. To address this hurdle, this partnership will build on an existing service-learning opportunity available to NCR youth, the "Work & Learn" Summer Youth Program. "Work & Learn" provides eight tribal youth participants with paid summer jobs. Participants work alongside NR personnel to complete seasonal projects throughout the reservation, such as grounds keeping, painting, invasive plant removal and habitat restoration.

We will strengthen the program by providing participants with pre-professional training in authentic wildlife research activities, including PD colony studies and habitat assessments. In addition, we will develop and implement a comprehensive evaluation plan to assess the impact of program participation for youth participants.

Training/Capacity Building and Resource Development *Essential Training and Resources for Natural Resources Personnel*

We hypothesize that with proper training and resources, the NR department can independently monitor and determine the success of the BFF reintroduction program. Two NR personnel will be trained in immobilization techniques by USFWS personnel in Fort Collins, CO. Currently, NCR borrows equipment and relies on the expertise of fellow MT

wildlife biologists. LPZ staff will assist with BFF seasonal spotlighting, trapping and immobilizing [8] for vaccination of plague and Passive Identification Transmitter (PIT) tagging. Spotlighting is the universal technique used for locating BFFs on PD towns. Briefly, a researcher continuously surveys each town section from dusk until dawn for 3 consecutive nights, sweeping a spotlight beam along the ground in search of the BFF's characteristic eye shine and movements.

Professional Development for NCR Educators

We hypothesize that providing professional development and resources will increase the comfort level of educators with inquiry-based science methods and content related to the prairie ecosystem. Because research indicates that sustained professional development experiences are the most effective, we will offer a week-long, full day professional development opportunity to provide 20 educators extensive experience with inquiry-based science methods. Stipends, meals and materials will be provided to create the professional atmosphere which research has shown to be most effective. Sample activities include discussions with research professionals, ecological surveys of natural areas, data collection, interdisciplinary activities focused on the prairie ecosystem, review of resource kits, as well as assessment ideas and strategies.

Resources for NCR Educators

Lame Deer Elementary School will receive 9 resource kits (one per grade level K-6, plus 2 for Special Education classrooms), which include curricular materials and developmentally appropriate teaching artifacts. Lame Deer High School will also receive 1 resource kit, which will be accessible to both science classrooms. Additionally, Lame Deer High Elementary and High Schools will each receive 2 camera traps and 1 GPS unit. Faculty and students will explore wildlife activity in the school yards, applying techniques used by wildlife researchers and engaging students in the integrated fields of science, math and computer science. The camera traps, which are activated by movement in both day and night time, will be secured to a tree, with locations recorded via GPS. Students will check the cameras every two days by removing and replacing the digital memory card and downloading images into a computerized database. Students will enter these data into a datasheet and learn how to summarize the results.

Authentic Research Experience for "Work and Learn" Youth Participants

We hypothesize that through research experiences, teens will develop an understanding and appreciation of the prairie ecosystem, as well as a desire to assist in conservation efforts. Eight "Work & Learn" youth will participate in research activities guided by NR and LPZ staff. Participants will be trained to conduct PD visual counts. In addition, students will monitor PD behavior using an ethogram. These data will assess PD population size and health.

Evaluating the "Work and Learn" Program

Develop a comprehensive evaluation plan to assess the impacts of the "Work & Learn" summer youth program. We hypothesize that an evaluation plan will help identify potential improvements, leading to a more fulfilling experience for youth participants and program administrators. An evaluation plan may lead to increased funding opportunities by strengthening future grant proposals.

We will develop a mixed-methods evaluation plan including surveys and formative tools, gathering both qualitative and quantitative data. An introductory letter will be sent to past participants requesting completion of a questionnaire made available in hard copy form or online via Survey Monkey. The questionnaire will examine education/career tracks of past participants and impressions, opinions and memories created as a result of participating in the program. Responses will guide future program development. Secondly, incoming participants will receive a pre-questionnaire, which will examine expectations, personal interests and long-term career goals. Throughout the summer, participants will keep a journal in which they will complete reflective writing assignments, which will be reviewed periodically to assess engagement level, learning and personal growth, as well as opportunities for program improvement. In addition, participants will complete a post-participation questionnaire which will assess how well the program aligned with expectations, as well as evaluating overall impressions and identifying specific opportunities for improvement. Finally, participants will be asked to participate in a longitudinal study (with parental consent), which will include completing a written or electronic questionnaire annually, as well as participating in a face-to-face (or telephone) interview facilitated by LPZ staff in collaboration with NR personnel. This interview will provide in depth follow-up to survey questions and foster long-term personal connections between program participants and administrators

Evaluation of Conservation Impact:

With proper training and resources, the NR department will independently monitor and determine the success of the BFF reintroduction program. LPZ staff will arrange for immobilization training. We will confirm with USFWS and NR personnel that they satisfactorily complete the training and demonstrate proficiency in independently performing necessary techniques. LPZ staff will work alongside NR personnel during the 2011 spotlighting season, ensuring proficiency in field techniques and comfort using and maintaining equipment.

Providing professional development and resources will increase educators' comfort with inquiry-based science methods and prairie ecosystem content. The evaluation plan for the summer 2011 program will utilize summative participant surveys, analysis of teacher-created activities, follow-up interviews (face-to-face and email/phone) and review of student work samples. One pilot classroom resource kit will be developed in 2010 and made available to educators at Lane Deer Elementary during the 2010-2011 school year. Educators that utilize the pilot kit will complete a formative survey, which will inform development of additional grade-specific resource kits to be delivered in 2011. Grade-specific kits will be evaluated using summative surveys completed by teachers utilizing the kits.

Through research experiences, "Work and Learn" participants will develop an understanding and appreciation of the prairie ecosystem and a desire to assist in conservation efforts. We will utilize pre-participation surveys, reflective writing exercises, post-participation surveys and follow-up interviews (face-to-face or phone) to assess how well the program aligns with participant expectations, examine changes in conservation knowledge, attitude and behavior and identify specific opportunities for improvement.

A comprehensive evaluation plan for the “Work and Learn” program will help program administrators identify opportunities for improvement, leading to a more fulfilling experience for participants and program administrators. An evaluation plan will strengthen future grant proposals and may lead to increased funding opportunities. A database and longitudinal tracking system will be developed, to equip administrators with a mechanism to follow-up with former participants to examine education/career choices, changes in conservation knowledge, attitude and behavior, and the enduring impact of program participation.

Level of Commitment

This program was a Level Four commitment.

Cost

~\$25,000/year

Case Study (Regional): *WolfQuest*

Purpose

The *WolfQuest* project’s primary task is to apply the immersive action and cognitive challenge of video games to conservation education while creating a national model for collaboration and distribution. The direct outcome is a global network of young people engaged in science and conservation learning through technology and inspired to take action on behalf of wildlife and wild lands.

- Goal #1: Develop a scientifically accurate 3D wolf simulation game that appeals to game playing youth (ages 9-15) at home.
- Goal #2: Create a vibrant *WolfQuest* online community for the purpose of creating social learning about wolves and wolf conservation.
- Goal #3: Create a national network of zoos and wildlife centers to promote and distribute *WolfQuest* and provide supplemental wolf education programming.
- Goal #4: Assess the effectiveness of *WolfQuest* in changing the wolf-related knowledge, attitudes and behavior of *WolfQuest* players.

Partners

Eduweb, educational game developer; Dr. L. David Mech and Dr. Dan MacNulty, University of Minnesota Wolf Researchers/Biologists; Jack Grisham, chair of the AZA Canid Taxon Advisory Group; International Wolf Center; Yellowstone National Park. In addition, a national network of conservation education institutions: International Wolf Center, Ely, Minnesota; National Zoo, Washington, D.C.; Yellowstone National Park, Wyoming; California Wolf Center, San Diego, California; Phoenix Zoo, Phoenix, Arizona; Rosamond Gifford Zoo, Syracuse, New York; Knoxville Zoo, Knoxville, Tennessee; Wild Canid Survival and Research Center, St. Louis, Missouri; Oregon Zoo, Portland, Oregon; Lincoln Park Zoo, Chicago, Illinois.

Impact on Species/Ecosystem

- Increased knowledge of wolf behaviors and ecology.
- Increased interest and positive attitude towards wolves and their habitats.
- Increase intended or actual wolf-related conservation behaviors.
- Supported or reinforced scientific habits of mind.

Needs Assessment

The Minnesota Zoo's mission is to *connect people, animals and the natural world*. In an age where youth are increasingly disconnected with nature in part because of computers and video games, it is only fitting that we use the same technology to reach out and help them discover the animal world. Today's young people are increasingly removed from nature (Louv 2005). Saturated with media from infancy, few young people have more than an occasional encounter with natural environments or wildlife. They will, however, eventually be responsible for the remaining wild spaces in the United States and will be confronted with complex environmental issues such as habitat loss and attendant loss of biodiversity. If they are to respond meaningfully to these issues as adults, they need to develop a scientific understanding of, and an emotional empathy for, the natural world. Environmental education programs at zoos do important work connecting youth with wildlife, but as profound as these experiences can be, they are usually brief and infrequent. We must create new kinds of quality environmental education experiences for young people that connect with their existing interests and activities.

Videogames are just such a means. They increasingly capture the time and attention of young people, with 59% of young people playing videogames for over an hour each day (Rideout et al. 2005). Videogame usage spans many demographic groups, including race, gender, geography, and family income. The separation from nature of today's young people makes it difficult for them to appreciate the function of an ecosystem, or to understand the interactions between the human-built and natural environments.

Development of Educational Materials

WolfQuest has three components that work together to reach and engage our primary audience of 9-15 year old game-playing youth.

Game— In an immersive 3D game environment, players take on the role of a lone dispersal wolf in Yellowstone National Park trying to find a mate, or in multiplayer mode, join a wolf pack made up of friends or other players. Through trial and error, instinct, and experience, players must learn how to hunt elk, cooperate with packmates, interact with stranger wolves, and compete with scavengers. The recent release of episode 2 - *WolfQuest: Survival of the Pack* in January of 2010 expanded the original gameplay to allow players to establish territories, raise pups and face the temptation of a cattle ranch on the edge of Yellowstone National Park. Gameplay is designed to encourage players to exercise critical thinking and inquiry skills as they develop successful strategies, and develop a strong emotional connection with wolves, influencing their attitudes toward wolves and habitat conservation in the real world.

Online Community— The *WolfQuest* game serves as a catalyst for a self-sustaining community of learners. Discussion forums, a standard feature of videogame sites, foster social learning amongst players as they share their experiences with wolves and nature inside and outside of the game, strategies and tips for playing the game, game-inspired art and stories, and tangential discussions typical of any affinity group. The discussion forums also connect players with wolf experts, allowing for exchange of information and questions outside of the game. The *WolfQuest* web site also offers background information about wolf ecology and conservation. While teachers and schools are a secondary audience, materials

for classroom use have been developed by a team of partner teachers and are available for download on the website.

National Network— *WolfQuest*'s impact is greatly expanded by a network of zoos and similar institutions involved in wolf education and conservation. Each of these promotes the game on their web site and in local marketing efforts to extend the reach of the project. Each also offers on-site wolf-related programming to entice players to visit and experience wolves in the real world.

Training/Capacity Building

The *WolfQuest* game and website represent a new model for conservation education. Using the attractiveness of videogames as a –hook, teenage players are exposed to a wide spectrum of scientifically accurate information about wolves, wolf ecology and conservation that they selectively sort through to help them solve problems in the game. With an engaging forum and user-generated content including wolf art, stories, photos and videos being hosted on the site, *WolfQuest* has created a safe and engaging arena where youth interested in wolves and wolf issues can dialogue directly with wolf researchers, scientists and educators. Removing the formal barriers typically found between scientists and students, the *WolfQuest* forum allows youth to see conservation science as approachable and interesting and provides direct role models for them to emulate. The peer-group of players in the *WolfQuest* community encourages players to further develop their interest in wolves and get involved with other wolf education and conservation efforts. This educational model, while informal, is having a strong impact on the knowledge, attitudes and behaviors of players.

Evaluation of Conservation Impact

WolfQuest provides players (ages 9-15) with a connection between the virtual and natural world and presents complex conservation and environmental issues that they may not otherwise encounter. Evaluation of the impact of playing *WolfQuest* has shown a significant positive impact on conservation learning, attitudes and behaviors among players.

Though the debate over learning games continues in the popular press, this evaluation presents evidence that a game can impact STEM learning. The *WolfQuest* game, website, and community forums have a strong demonstrated ability to achieve the sought-after outcomes for the targeted audience:

- Increased knowledge of wolf behaviors and ecology;
- Increased interest and positive attitude towards wolves and their habitats;
- Increase intended or actual wolf-related conservation behaviors; and
- Supported or reinforced scientific habits of mind.

Level of Commitment

This program was a Level Three commitment.

Cost

\$609,000+

Case Study (*Local*): Indian River Lagoon—Lagoon Quest

Purpose

The purpose of Lagoon Quest is to positively impact the knowledge, attitudes, and behaviors of local 4th grade students in Brevard County about the Indian River Lagoon and how to protect it.

Partners

Brevard County Public Schools, St. Johns River Water Management District, Brevard County Parks, and Recreation

Impact on Species/Ecosystem

Seining gives students an understanding of biodiversity in the Indian River Lagoon. During a scavenger hunt student's clean trash around the park during the program, and are encouraged to do so on their own time. By using an Enviroscape (portable interactive environmental education model), the students are taught about the negative impacts that affect the lagoon, and what they can do to prevent them.

Needs Assessment

Using an already existing Lagoon program the Brevard Zoo had developed, 4th grade teachers and zoo staff using the Sunshine State standards developed the Lagoon Quest Teacher Guide and student logbook. They also enhanced the Lagoon Program by adding more information and an environmental implement, the Enviroscape, to meet the needs of the 4th grade students.

Development of Educational Materials

The guide book was developed to teach students about the Indian River lagoon ecosystem before their scheduled Lagoon Quest field trip. In class activities include: Brainstorming the Lagoon, How Healthy is the Lagoon, What's For Super, and more. Family activities include: Building a Plankton Net, Salt Matters, Monofilament activity, and What Happens When it Rains. During their field trip at the lagoon the students learn about the Indian River lagoon and conduct hands on activities like seining, and a scavenger hunt.

Training/Capacity Buildings

Teacher workshops are provided every year by the Brevard Zoo. The core curriculum writing teachers along with Brevard Zoo staff show teachers how to conduct activities in the teacher guide book and go over what to expect during their 4 hour trip to the Indian River Lagoon. Teachers are also taken to the lagoon and taught how to seine and identify mangroves.

Evaluation of Conservation Impact

University of Florida conducted an evaluation of the effectiveness of lagoon Quest. They used pre and post tests from the students and surveys they conducted on teachers, students, and chaperones, to determine short, medium and long term outcomes. Short term outcomes being student's and teacher's knowledge, experience and skill enhancement, medium term outcomes being students environmental attitudes and long term being the enhancement of conservation behaviors and interest in conservation careers along with the improvement of the biophysical environment. The evaluation showed there was a significant increase in knowledge about the Indian River lagoon based on the results of the pre-test verses the post-test.

Level of Commitment

This program was a Level Three commitment.

Cost

\$35,000/yr

Section 5: How do we Ensure Success?

Introduction

The purpose of this section is to give participants an overview of evaluation and how it relates to the success of programs and exhibits. This information serves as a starting point for measuring program and exhibit effectiveness. This section is designed as reference material to support the in-class session, which incorporates team activities, lecture and whole-group discussion.

Key Points

- Evaluation is one component that makes programs and exhibits successful.
- Some key messages in this section are:
 - Evaluation saves time and money.
 - Defining clear goals, objectives and outcomes allows you to measure (evaluate) effectiveness of programs and exhibits.
 - Evaluation can be done before or after an exhibit or program is created.

Why is it Important to Evaluate Your Program or Exhibit?

Resources are always limited. Therefore, a program or exhibit needs to be designed to make the most efficient use of your time, as well as to utilize financial resources in a way that will yield the greatest impact.

Evaluation is not limited to the conclusion of a program; rather, a successful program or exhibit uses various analyses along the way to assess needs, monitor progress and “fine-tune” the program. If we do not evaluate, how will we know whether all the work we put into creating a program or exhibit was effective? Evaluation results don’t point out “what we did wrong”; instead, using the results of evaluation analysis allows us to continually improve what we do! This saves time and money.

In order to yield information that will be meaningful, several types of analysis can be useful. It is important for you to have a clear understanding of the purpose and intended result of your program or exhibit; it is also essential that others (such as your colleagues, institutional leaders, and sponsors) understand it, too. That is why it is so critical to have clearly stated, written goals, objectives and outcomes. Once those are defined, then you can measure your progress against them.

Evaluation Takes Practice!

Sometimes we avoid evaluation because we feel we do not know enough about it, or we think it requires an evaluation expert to collect data. Not so! Start where you are, and begin evaluating so that you can make data-driven decisions. This section is designed to encourage you to begin evaluating your programs and exhibits. Your first attempts will not be perfect, but we encourage you to try it! The more often you do evaluation, the better you get at doing it.

Types of Evaluation

Whether evaluating a visitor experience, program or exhibit, in order to derive meaningful results, you must develop good evaluation questions. What is it you want to find out and

why? How will you use the information you gather? An earlier section of this manual described front-end evaluation or analysis. Other types of evaluation are:

- Formative evaluation— This evaluation is conducted during program and exhibit development as a testing or prototyping phase. Formative evaluation is used to test elements of a project *before* it is fully implemented. The resulting data then can be used to adjust the program or exhibit as needed.
- Summative evaluation— This type of evaluation occurs at the conclusion of program. This can occur right after the respondent experiences the program or the exhibit, or even several months after, to assess the longitudinal impact of the experience. Summative evaluation often is conducted for purposes of accountability, to demonstrate results. What do visitors think of the program or exhibit? Did you meet your objectives? Did the program or exhibit result in the intended outcomes for participants/visitors? This phase of evaluation draws summary conclusions from the analysis of data collected. The conclusions suggest the next course of action, and should be fed back into the exhibit or program re-design, for fine-tuning

Front-end Evaluation (Analysis)

Much of the work of evaluation is actually done at the beginning of a program or exhibit. This is the research phase in which all the preparatory work is done to inform the process and develop your plan. Examples of front-end evaluation are discussed in the “Assessing Group Needs” section in this manual.

Formative Evaluation “Prototyping”

Formative evaluation may be conducted before a program or exhibit is fully implemented in order to test one or more approaches. This involves developing a prototype and testing it. Conducting formative evaluation for an exhibit can provide immediate answers about specific exhibit components or approaches. Results can identify what works and what does not work. Examples of formative evaluation may include: interviews in person, by written survey, via telephone; questionnaires; and through observations.

Examples of Formative Evaluation

Program Formative Evaluation

Formative evaluation of a program could include testing or “prototyping” an activity or other program element with a test audience before you actually offer the program. If you are teaching a new activity, try it out with a sample group of people on zoo/aquarium grounds. If the activity is for children, try it out on a group of children who are approximately the same age as your program audience. Observe how the activity works logistically, and whether people understand the purpose. Prototyping a program element allows you to adjust it as needed before you offer the program.

You may also consider the first time you offer a program as a pilot test. Your formative evaluation could include a pre- and post-program brief questionnaire to assess participants’ knowledge and attitudes before and after the program; participant feedback during and at the conclusion of the program; and your own observations and those of other instructors. You will use the results of all of these methods of assessment to evaluate your program and make changes to the program as needed to make it even more effective.

Exhibit Formative Evaluation

If you are creating interpretive signs for an exhibit, you can create a simple and inexpensive prototype of the sign and install it. To assess the effectiveness of the sign, you could measure:

- The length of time visitors spend reading the sign;
- What people learn from, or feel about the signs; or
- Whether they find anything on the sign confusing

The question: Do the sign templates work? What would improve them? Answer the question by tracking visitors through observation:

- Did they stop to read the sign?
- How long did they spend reading the sign?
- Did they touch or otherwise interact with the sign?

Or, you can answer the question by conducting a brief survey. Take the inexpensive prototype sign, and talk to visitors on zoo/aquarium grounds.

- What did you learn from reading the sign?
- What was the message?
- Was there anything that was unclear about the sign?
- Was there anything you would change about the sign to make it clearer?
- Was there anything you would change to make the sign more engaging?

Summative Evaluation

Summative evaluation provides final feedback on how well the program or exhibit objectives were met. As we discussed in a previous section, evaluation is based on objectives and outcomes. Evaluative data and observations are collected at the conclusion, and the results are measured against the stated objectives. Valid methods may include collecting quantitative or qualitative data, and preferably, both. Most evaluations use more than one method.

Quantitative studies are numbers based. How many visitor education programs were conducted and how many people participated? What do the data show about the results of the programs on participants' knowledge, awareness, attitudinal shift and willingness to take action, when pre- and post-test results are compared? Use quantitative methods when precision is needed, or when you want to be able to generalize results. Quantitative methods generally include tracking studies, interviews or survey techniques.

While quantitative data are more precise and perhaps easier to interpret, *qualitative studies* can also yield extremely valuable information. Like quantitative studies, qualitative analysis is also a rigorous and systematic process. Qualitative methods may include personal observations, focus groups, children's journals and drawings, or a video documentary. Use *qualitative* methods to get detailed feedback and impressions that provide depth. Attitudinal and behavioral change may also be assessed through qualitative measurements. As they often provide individual quotes, or visual representations, these results may be particularly compelling to stakeholders, including your Zoo/Aquarium Director or exhibit sponsors.

Examples of Summative Evaluation

Ask questions in your evaluation to get responses that indicate how well participants enjoyed the program (satisfaction survey) and, how well you met your objectives.

Program Evaluation Example

Please rate your experience in this program about reptiles. Check the box that best describes your response to each of the following statements.

	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
Registration was convenient					
The program was the right length					
The program provided good value for the cost					
The program had a good balance of presentation, discussion, and hands-on practice					
Instructors were well prepared					
Instructors kept children involved					
Instructors answered my questions					
This program met my expectations					
I understand how the Zoo works to conserve reptiles					
This program showed me how I can help save reptiles					
I will recommend this program to a friend					

If you responded Strongly Disagree, Disagree, or Neither Agree nor Disagree to any of the above statements, please tell us how we can improve the workshop (use the back of the page if you need more space):

Please rate the following sections of the program by circling the number after each activity that best describes your experience:

1= Poor; 2= Adequate; 3= Good; 4= Very Good; 5 = Excellent

	Poor		Good		Excellent	
Introductory presentation	1	2	3	4	5	
Hands-on activity	1	2	3	4	5	
Reptile exhibit tour	1	2	3	4	5	
Keeper talk	1	2	3	4	5	
Food activity/diets	1	2	3	4	5	
Reptile research talk	1	2	3	4	5	
Conservation presentation	1	2	3	4	5	

What part of the program did you like best and why?

Before participating in this program, I never knew that...

Please tell us your suggestions for how any of these sections could be improved (use the back of the page if you need more space):

Additional comments for any of the instructors (use the back of the page if you need more space):

Thank you so much for your time in completing this survey!

Example of a Summative Evaluation for an Exhibit (Accountability to Stakeholders)

This evaluation is conducted to assess how effectively the reptile exhibit is communicating main messages and resulting in desired outcomes

Possible methods:

- You could track visitors and observe what they use in the exhibit and how long they stay.
- You could ask visitors what messages they took away.

Example: Summative Post-Test Only (for visitors to the reptile exhibit)

- You just visited the reptile exhibit. What do you think was the message that the zoo wants you to take away from visiting this exhibit?

- What did you learn about reptiles during this visit?
- How did visiting the reptile exhibit make you feel about conserving wild habitat?
- Did you learn any particular ways that you personally can help conserve reptiles? If yes, what are they?

Example: Summative Pre/Post Test (for visitors to the reptile exhibit)

Pre-test: ask visitors *before* they see the reptile exhibit

- Please tell us what you know about reptiles.
- How do you feel about reptiles?
- Do you think that reptiles are in danger in the wild? If so, why?
- What can you do to help reptiles?
- Which actions (name them) would you be willing to take to help conserve reptiles?

Post-test: ask visitors after they exit the reptile exhibit

- Please tell us what you know about reptiles.
- How do you feel about reptiles?
- Do you think reptiles are in danger in the wild? If so, why?
- What can you do to help reptiles?
- Which actions (name them) would you be willing to take to help conserve reptiles?

Reporting Evaluation Results

Now that you have conducted evaluation, have analyzed the results, and have drawn some conclusions, you have a very powerful tool! Now you can make decisions about programs and exhibits that are based on convincing data. Prepare a summary report of the results, what you learned, and what actions must now be taken to improve the program or exhibit. Summarize these in an “Executive Summary” of 1-2 pages and share this with your director. Evaluation data can be extremely effective in demonstrating how the zoo/aquarium’s resources were used effectively and how money was saved by doing formative evaluation. Evaluation data also demonstrate the importance of your programs, and the significance of education to the zoo/aquarium.

Summary

Evaluation is important to ensuring success—gathering information and the resulting analysis leads to refining and improving the program or exhibit. A good evaluation plan is developed at the beginning of the program or exhibit, as objectives are developed—not at the end. It is necessary first to have a clear understanding of what you are trying to achieve, and then to ask the right questions.

Formative evaluation is conducted initially to prototype a part of the program or exhibit. Evaluation during the course of the project is used to learn and adapt the program or exhibit as needed. Summative evaluation is used at the conclusion of a program or after the exhibit has been open and initial adjustments have been made.

Resources

Evaluation Handbook. W.K. Kellogg Foundation. www.wkkf.org

Program Animals

Purpose

The purpose of this section is to give participants an overview of why it is important to incorporate live animals in zoo/aquarium education programs, and how to work with program animals in order to convey effective conservation messages. This section also incorporates protocols for best practices in the care and handling of animals used in education programs.

Key Points

- Incorporating animals as part of a zoo/aquarium education experience can establish an important emotional connection with your audience, making them receptive to conservation messages.
- Program animals increase affective learning and attitudinal change.
- Use these important program opportunities to model and encourage empathy toward animals.
- The way in which animals are portrayed, handled, treated and interpreted is critical to the message.
- Choose the setting carefully—protection of the animal and safety are our most important considerations.
- Deciding to work with animals in education programs means that we must dedicate ourselves to the highest professional ethics in care of these animals.
- Always treat animals with care and respect, and portray them with dignity.

Introduction: Why Should We Incorporate Animals in our Programs?

“The appropriate use of program animals is an important and powerful educational tool that provides a variety of benefits to zoo educators seeking to convey cognitive and affective (emotional) messages about conservation and wildlife.”

-AZA Position Statement on Program Animals

One of the important goals of zoo/aquarium education is to foster an appreciation for animals and nature. Zoos/aquariums are ideal venues for developing emotional ties to wildlife. The educational experiences and programs that we provide for our visitors encourage an appreciation for the natural world. Research in zoos/aquariums has shown that when animals are part of these programs, visitors spend more time, retain knowledge better, develop positive perceptions of zoo/aquarium animals, and show enhanced environmental attitudes.

Visitors come to the zoo/aquarium with different backgrounds and experiences, and they visit for different reasons. Close-up experiences with animals engage visitors of all ages, regardless of their motivation for visiting. These animal experiences enhance learning and provide a connection with nature that is increasingly rare for our urban audiences.

Close-up animal experiences, interpreted by staff or volunteers are more effective in engaging visitors than are graphic panels. In one study, only 25% of visitors to an animal exhibit read the accompanying graphic but 45% of visitors watching the same animal handled in an educational presentation asked one or more questions. Additional research revealed that visitors observing animals in the context of an informal program were much more likely

to correctly answer questions about the animal, when compared with those people who observed the animals on exhibit.

Program animals increase affective learning and attitudinal change. At U.S. zoos/aquariums, the effect of animal presentations was demonstrated to successfully influenced attitudes about conservation and stewardship.

Our Responsibilities in Working with Program Animals

When we decide to incorporate live animals in our education programs, our responsibilities are to:

- Meet the highest standards of animal care; to ensure the animals are healthy, active, comfortable and safe.
- Practice care and handling that demonstrate concern for animal welfare and model empathy.
- Ensure that all the staff and the program participants practice care and handling and are respectful of the animals.
- Meet our education goals.
- Address the species' conservation needs.

In order for a program animal experience to be effective, several factors must be considered:

- Choosing an appropriate setting for the experience;
- Selecting suitable species and individual animals;
- Animal welfare and human safety are of primary importance;
- Animal handling and treatment conveys empathy;
- All visitors, staff and participants treat the animal with respect;
- Interpretation portrays the animal in a respectful and dignified manner; and
- The presentation includes meaningful conservation messages.

Appropriate Settings for the Program

Consider where and how the animal will be presented. The animal must be protected from situations that are too noisy, too crowded, too warm or too cold. If visitors are permitted to touch the animal, this contact must be regulated so that the animal does not become stressed. Visitors may not be allowed to eat or to smoke around the animal. Animal contact with visitors must be closely monitored and supervised at all times. If the situation compromises the animal's welfare or poses a safety hazard for participants, withdraw the animal and return it to its carrying case.

Select Suitable Species and Individuals

Program animals should be appropriately conditioned to being close to people or being touched. Choose individual animals based on their health, whether they have had appropriate rest, and when they have eaten. Appropriate animals are those that are easily taken care of, do not have high needs and connect with the visitors.

Human Safety

Visitors must be protected from animals' defensive behavior. Visitors should keep an appropriate distance from the animal, touch it (only if appropriate) in the gentle manner that you demonstrate, and be encouraged to wash their hands or use anti-bacterial hand wipes or foam after any animal contact.

Animal Handling Conveys Empathy

Remember that what you do sends a message that is as important as what you say. Transport animals in a secure carrying case that is spacious enough for their needs and provides proper ventilation, heating and cooling. Handle animals gently, carefully and with respect.

Interpretation

Your actions and your words should reinforce one another. Consider the mixed message if you continue to stroke the animal while telling visitors not to keep these animals as pets. Animals should never be portrayed in a manner that is degrading to them, or that compromises their dignity. Animals should not be laughed at or treated like babies. They should not be dressed up in clothes or made to do things that are unnatural to them. They should be presented in ways that are natural to the animal and appropriate to the habitat from which they come. Use age-appropriate messages when interpreting with animals.

Conservation Messages

Consider how you can connect your audience to the animal's wild counterparts, conserving wild habitat, or conservation issues (for example, the pet trade). Present positive and reinforcing conservation messages wherever you can.

Selecting and Caring for Program Animals

Select program animals based on their temperament and suitability for participation in situations where they will be in contact with other people and with your ability to care for their needs in the highest manner. You will need to have a full understanding of the animal's husbandry requirements, and be able to provide for all of those needs. Who on your zoo/aquarium staff will care for the animals? That person must be properly trained and have experience in animal husbandry. Program animals should have the same standards of health care and access to veterinary staff as any other animal in the zoo/aquarium's collection.

Where and how will you obtain animals for education programs? Keep in mind your institution's mission statement and program animal position statement. Know your zoo/aquarium's institutional policy for program animals:

- Acquire only from AZA accredited facilities?
- Acquire from licensed re-habilitation facilities?
- Acquire from donations of unwanted pets?

Where will they be housed at your institution? If animals will be part of off-site outreach programs, quarantine facilities must be available on its return to the zoo/aquarium if it will come in contact with other collection animals. What will happen when an animal becomes too old or whose temperament proves unsuitable for education programs? You have an obligation to care for these animals their entire life; so you should think of these things.

Maintain accurate and update records on each animal, including procedures for documenting animal usage, animal behavior, and any other concerns that arise. Ensure regular care and visits to a veterinarian.

Staff Training

You will want to ensure that all staff and volunteers who will care for and handle animals or who will present an education experience with animals are carefully trained and evaluated. Training should include the protocol for animal husbandry including how to clean and disinfect enclosures and carrying cases. Training should specify medical testing and vaccinations required for handlers (e.g., TB testing, tetanus shots, rabies vaccinations, routine fecal cultures, physical exams, etc.). The training should address protocols to reduce disease transmission (e.g., zoonotic disease transmission and proper hygiene and hand washing requirements) as well as procedures for reporting injuries to the animals, staff, volunteers or program participants. The training should also cover safety issues related to personal attire and behavior. Those handling animals should not wear long earrings or bracelets in which animals could become caught. People should not wear perfume or cologne when around animals, and may not smoke, eat or drink around them.

Program presenters should be trained on program content including natural history, relevant conservation education messages, presentation techniques and interpretive techniques. Anyone receiving the training should be observed and successfully certified before being permitted to work with an animal. Re-training and certification should be scheduled on a regular basis (usually annually).

Reference

AZA Program Animals Position Statement and Policy Development

Measuring and Reporting Education Impact

Purpose

The purpose of this section is to provide participants with strategies for reporting the success of their educational efforts in order to build support and measure impact in their organization. This section includes both lecture and whole group discussion.

Key Points

- Reporting the impact of your education programs to your leaders is important to build support.
- Reporting should be done throughout the year and you should highlight your department's accomplishments.
- Reporting the financial success of your programs as well as the number of visitors your programs impacts are two key ways to report your impact.
- Education programs can generate revenue for zoos/aquariums by charging participants, getting grants to cover participant costs, and through sponsorships.

Overview

Education should be the foundation of what a zoo/aquarium does after animal care. Education functions as the connection between the animals and the public and the most important thing we do every day is provide appropriate, engaging experiences for our audiences.

Generally, education programs can be divided into two major groups of programs- those where participants are charged a fee, and public programs (those that are available at no charge to general visitors). While many directors focus on the actual fee generation of education programs, it is the educational experiences and messaging provided through graphics and on grounds interpretation to general visitors that have the potential to impact the most people.

For all of your programs, the educational content and appropriately connecting your public and participants to your animals is the primary goal. You measure your effectiveness in each of these through the formal evaluation process you learned about in this training.

How to Report

Because education is so important to the mission of a zoo/aquarium, it is important that the director and other departments are informed about all that the education department and educators do. There are a number of ways to measure the impact of your programs. For example, for a public program you could report:

- The number of people your programs impact. You can gather this information by having your staff keep tallies of the number of people they talk to and the number of people at presentations each day.
- The number of shows you offer each day and the number of staff hours dedicated to interacting with the public.
- Create surveys to measure if people had an educational experience at your zoo/aquarium, the number of people who read a particular graphic and understood the content of it, or how they felt about their experience at the zoo/aquarium.

Below is an example of how to report visitor impact for your institution's public programs:

Activity	# of Visitors Reached
Elephant Interpretation	35,437
Giant Panda Interpretation	70,139
Animal Encounters	65,521
Docent Interpretation	127,706
Special Events Interpretation	66,698
Bird Show	53,086
Bird Encounters	53,369
	471,956

For a fee program, you can report many different types of metrics, such as:

- The number of people who attended your program and the revenue generated.
- The net revenue (contribution) after program costs.
- The revenue or in-kind donations generated through sponsorship of your programs.
- The revenue generated through grants for your programs.

Below is an example of how to report annual revenue and attendance numbers for an institution's fee-based programs:

2005 Participants and Revenue

Program	Adults	Children	Total	Revenue
Spring Camp	0	228	228	\$34,251
Summer Camp	0	1,328	1,328	\$205,507
Winter Camp	0	191	191	\$23,712
Family Overnight	214	283	497	\$22,283
Pre-K Programs	125	195	320	\$979
Toddler Programs	1,347	1,419	2,766	\$10,313
TOTALS	1,686	3,644	5,330	\$297,045

In addition to reporting attendance and revenue numbers, quotes are an excellent way to convey program success from the view of a participant. Handing out surveys at the conclusion of a program is one way to capture quotes from participants, as well as evaluating the success of your program. These quotes can also be used to market your programs to future participants through your website or collateral materials.

Maximizing your impact in both types of programs should be your ultimate goal and you should continually report your progress to your leaders and your zoo/aquarium colleagues. You can do this by:

- Providing your Director with a monthly update reporting your numbers.
- Creating an end of year report that highlights your successes. For example, Zoo Atlanta produces a glossy report complete with plenty of photos of kids to show their success each year. These include individual staff members' successes as well.

- Presenting your department's activities to the staff at your zoo/aquarium through e-mail, presentations at staff meetings, or newsletters. Always be sure to thank everyone for all of their help in making the zoo/aquarium's programs a success.
- Work with your Marketing and Development departments to create glossy brochures or posters that highlight all of the great work you do. These are also very good to send to teachers, families and parents in your community to get support of your programs. Additionally, these types of materials are wonderful way to gain financial support from individual and corporate donors.

Summary

Conservation educators work very hard at the jobs they are passionate about. As a conservation educator, it is important that you communicate this work with your Director, your zoo/aquarium staff and your zoo/aquarium public. This will help gain support of your hard work, as well as ensuring that everyone understands the important role the Conservation Education department plays in fulfilling the mission of your zoo/aquarium. Effective conservation education is the key to connect the public to the animals we keep at our zoos/aquariums; and if we do not connect the public, they will not visit our institutions. The best way you can get your zoo/aquarium to understand and appreciate your role as a conservation educator is to educate them about what you do.

Influencing Skills and Team Work

Purpose

This section is designed to assist participants in developing their skills to influence others at their institutions. The purpose of this session is to advance the profession of zoo/aquarium education by influencing the perception of education as vital to the missions of zoos/aquariums.

Key Points

- Education is critical to the success of the zoo/aquarium's mission.
- Communication and collaboration are effective means to influence peers and other colleagues.
- Directors are influenced by thinking and planning strategically; meeting institutional goals; increasing attendance; and revenue generation.
- Influencing colleagues and your director is an art than can be learned, and skill develops with practice.
- Professionalism and networking are important ways to influence colleagues.

Introduction

Education and the visitor experience are critical to the success of your zoo/aquarium. Engaging and educational visitor experiences build empathy for animals and nature; communicate the role of your institution in conservation, and influence visitors' knowledge and attitudes. These opportunities enhance visitors' enjoyment of their zoo/aquarium experience. They are likely to return, and also likely to share their comments with others. Thus, education contributes to the zoo/aquarium's attendance and helps generate revenue. At the heart of what we do, education communicates the zoo/aquarium's message and therefore should be explicitly recognized as integral to the zoo/aquarium's mission.

Whether you want to gain recognition for the importance of education, get a new program budget approved, or convince colleagues to adopt your imaginative idea, or inspire others to action, persuasion is an extremely important skill. Since each person is different and has a different style, there is no one way or right way to influence people. However, there are many proven techniques that you can practice develop to develop your leadership and influence at your zoo/aquarium.

Influencing Other People

Excellent influencing skills include interpersonal, communication, presentation and assertiveness skills. Truly acknowledging and appreciating others, and making a sincere effort to understand their point of view goes a long way to win their support. Influencing skills requires understanding yourself and how others perceive you (it also may involve having the courage to ask others for feedback on how they perceive you). Influencing others depends on being perceptive, and being fluid enough to change your behavior if needed to influence others' perceptions of you. Note that this is *not* changing who you are, but adapting your behavior with others. Influencing people is also the ability to *create* an impact, through your communication style, enthusiasm, and body language.

If you have ever had the experience of teaching a program and observing that you are "losing" your audience, you probably adjusted your presentation or style to better meet

audience needs. Part of influencing others is having the ability to assess others' reactions, and to adjust your communication as you need to match the style of others. This technique, called "pacing," enables you to establish a rapport with the other person, essential to open communication.

The most important communication skill you can practice is to listen carefully to what others are saying, and to ask questions to ensure that you understand. It is always a good idea to summarize points of a discussion, so that each person has the same idea of where you are in the current discussion. Draw out the good ideas of others by presenting situations in a way that enables people to discuss possible solutions.

Two Dimensions of Influence

Two variables are important when we define our relationship to others and when we influence them—agreement and trust. Levels of *agreement* may be on goals, on direction or on big issues. Levels of *trust* relate to credibility (do they do what they say they will do?); predictability (will they behave the same way or act differently?); and reliability (can they be counted on to do what they say?). *Practice* applying your influencing skills in all of these situations. How will your approaches differ?

Improving your influencing skills requires these characteristics:

- Be flexible and adjust your style to suit the situation and people.
- Try different ways of thinking through difficult situations when your usual approaches getting the results you need.
- Be committed to "win-win" solutions where everyone gets some of what they want or need.
- Be consistent and clear with others.
- Use simple, more precise and appropriate language.

To be more influential:

- Really listen to others. Seek first to understand, and then to be understood.
- Express yourself clearly in simple language.
- Be seen as a problem solver not someone who constantly brings up problems.
- Be positive about your abilities and strengths and those of your staff—sell yourself.
- Never complain about how busy you are without giving people confidence that you can handle it.
- Look for ways to strategically get more resources by proving your worth and aptitude to your boss and coworkers instead of complaining about what you don't have.
- Garner support for your programs and your activities by ensuring that everyone knows what your department does and how it fits in with the zoo/aquarium's mission.
- Report on your success—give your director and your boss regular written updates on your successes in ways he or she will relate to.
- Before you go into any meeting, think about the outcomes you and others want to achieve.
- Build rapport with others and be empathetic to their needs.
- Seek and consider others' viewpoints.

- Be open to different ways of thinking about situations and issues.
- Practice! Plan your approach, and what you will say and do, for any important influencing situation.
- Take an active role in promoting organizational change through designing, developing, implementing, or facilitating new systems, processes, or policies.
- Seek out opportunities for change—look for new and more effective ways of working, managing, and leading.

Influencing Your Zoo/Aquarium Director

You have the opportunity to influence how education is perceived at your institution, by your staff, peers, other zoo/aquarium colleagues, and by your Zoo/Aquarium Director. To do this successfully, you will need to do three things:

- Understand the mission and goals of your institution, and how education can support them.
- Spend time with people at your institution, learning about what is important to them.
- Practice your influencing skills so you are seen as a positive supporter of the organization and his goals.

In order to be influential in working with your Zoo/Aquarium Director, it is important to understand what motivates this person, and what his or her preferred style of communication is when working with staff. Zoo/Aquarium Directors are charged with implementing the zoo/aquarium's mission and achieving annual goals. Building reputation for the institution and community support is extremely important to success. Zoo/Aquarium Directors seek strategies that increase attendance, generate revenue to support the institution, and use the institution's staff and financial resources in the most effective and efficient way possible. Knowing this, how can you approach your director to demonstrate how education helps the institution meet its mission and achieve these goals.

It is also helpful to remember that Zoo/Aquarium Directors are busy people who must give their attention to many priorities simultaneously. Therefore, any communication, whether written or in person, should be summarized, concise, clear and brief. Think and plan strategically, so that you present the "big picture" first, and fill only as many details as necessary to ensure that your Director understands the implications.

Networking

Networking *is* about cultivating relationships with others in a meaningful way so that you have people to turn to when you need information and support, and people you can help when they need someone to turn to. It helps you professionally and helps develop the profession of which you are the future leaders.

Networking is meeting people that can help you in your career, help you do your job better, help you learn to deal effectively with challenges, and help you to have fun. You have specific talents and interests that this conservation education profession needs, and networking with your colleagues is the way to make those talents known. And by becoming known as a resource, your time and talents will be sought out, which amounts to the easiest kind of networking.

You already have a network within which to work. Your colleagues back at the zoo/aquarium, your family, your college friends, your neighbors; and all of those people on the list serves you are on—all of these people constitute your core network and are people you can communicate with effectively.

References

www.impactfactory.com

www.solutions4training.com

www.aimmconsulting.com

www.teammanagementsystems.com

Tryon, Lisa. Networking. AZA Conservation Education professional development program

Management Tools and Techniques: Grant Writing

Introduction

For many people, applying for a grant is a mysterious process. You may have the feeling that those who are successful and receive grants are either lucky or have “inside connections.” But grant writing does not have to be mysterious. In most cases, grants are awarded based on a careful review process with criteria that everyone has access to.

In this section, we help you break down the mystery of preparing a more competitive grant application. Conservation educators are universally involved in grant writing to extend and support their core education goals. With limited resources and funds, education departments can enhance their strategic plans through granting success. So, it is no wonder that The Conservation Education Course uses a grant proposal format for its Group Project. You will surely use this process again at your facility in the future.

Objectives

- To recognize why grant writing is important to conservation education departments.
- To identify essential criteria to include in writing grant proposals.
- To use the Grant Writing Checklist as a tool to guide educators through the process.

Make Sure It's a Good Fit

Whether you're applying to a state or federal government source or private companies and foundations, all of these agencies scrutinize proposals and applications for appropriate fit with their goals. Make sure your goals are consistent with the agency's goals by looking over the grant objectives.

Carefully examine the call for proposals, because the goals and objectives of the specific grant are often explicitly listed there. Pay attention to what the granting agency is doing and what they are saying publicly. Take a look at recent press releases from the funding agency. Review recent speeches or public presentations given by leaders from that agency. You will gain important insight about their priorities. If you have to adjust your proposal so much that you sacrifice your core goals and objectives, you will not only have tarnished your institution's integrity, but you may not be successful in the long run.

When you have a clear sense of what the agency values, you can adapt your proposal accordingly. Nearly every funder will ask what your institutional mission is -- and how the grant request fits within that mission. This fit is an excellent barometer of the likelihood that a grant will be funded.

Securing Institutional Commitment

Garner the support of your Education Department Leader, the Board of Directors and/or your Zoo/Aquarium Director, before you write the proposal. Most funding agencies will want to see a contact name and sometimes a written endorsement of the project by your institutional leadership.

Many funders now look for collaborative proposals that can show tangible impact. This collaboration will surely include internal partners such as animal care or research departments, but also may include external partners such as school systems, other AZA zoos/aquariums, and/or other conservation organizations such as The Ocean Conservancy, National Audubon Society, etc. This collaborative approach ensures a wide breadth of impact to the funder and also provides you with additional resources to carry out the project. Be sure to bring these partners together and discuss the project so that everyone has buy in and can support the project through resources.

Who Funds Conservation Education Projects at Zoos/Aquariums?

Sometimes you will have a funding agency in mind, but if not, conduct a thorough search of funding sources. This research will pay great dividends in the successful outcome of the process. There are many other sources available, especially locally, if you do the research. Sometimes funding comes from unusual places. Here are some agencies that have funded zoo/aquarium conservation education programs in the past:

National Resources:

- National Science Foundation (NSF): www.nsf.gov
- Institute of Museum and Library Services (IMLS): www.imls.gov
- AZA's Conservation Endowment Fund (CEF): www.aza.org
- The Foundation Center: www.fdncenter.org
- The Grantsmanship Center: www.tgic.com
- Trends in Philanthropy: www.philanthropy-journal.org
- Philanthropy Center: <http://philanthropy.com>

Local Resources:

- State Grants
- Eisenhower Grants
- Local Foundations

Proposal Development

Now it is now time to actually write the proposal. Many agree that the actual writing of the proposal is 40-50 % of the actual time to prepare a successful proposal. A top-quality proposal delivers a logical and consistent message that matches the evaluation criteria laid out in the call for proposals, involves a team that is well-qualified for the proposed work, and includes a budget that is appropriate for the work proposed. A top quality proposal contains a message that is easily understood and believable. Well-written proposal text is free from spelling and typographical errors. It flows easily and is a pleasure to read. When the funding agency provides a proposal format, be sure to follow it. Categories often part of a proposal format are:

- Abstract
- Purpose or assessment of need for the project
- Methods/ project design
- Project Resources: budget, personnel and management plan including timeline
- Outcomes and impacts
- Evaluation plan
- Dissemination

- Sustainability

Most funding agencies require the proposal to answer stated questions, and space is typically limited. Therefore, concise writing that quickly answers the question is crucial. Be sure to do what the funder asks you to do. When a funder asks for a one page response, adhere to the format. If the funder provides grant funding for a certain dollars amount, adhere to the format. Be sure not to short-change yourself on the budget. Calculate overhead ahead of time and carefully match the budget with the budget narrative

Cover letters are always important to include and show your institutional support of the project. Other letters of support are equally important, particularly with projects that are multi-institutional. When all of the writing is complete, the final form is prepared and signatures and appendices are gathered. The final step is mailing to ensure delivery before the stated deadline.

Evaluation

All education funders want to know that you will evaluate the impact of your program and be able to prove quantitatively and qualitatively that your program has made a difference in the lives of your audience and for wildlife conservation. Make sure your evaluation reflects your program objectives. If you are planning a complex evaluation, you may need to hire an outside evaluator to help write the grant.

Remember to Follow-up!

Once the proposal is e-mailed, be sure to follow up with your personal contact to make sure that the proposal has been received. Establish a relationship with the funder if possible.

Acknowledgments

Once the award letter is received, thank the donor. Write an acknowledgment letter and send it no later than 48 hours after receipt of the award notice. Then celebrate with your project team! Make sure to communicate to the extent that the donor wants you to about the award and publicity surrounding the grant. Many donors expect naming opportunities, press conferences, mention in agency newsletters, in addition to written acknowledgement. Be sure to call with updates or send reports using a variety of media including videos, pictures, children's work, etc.

Conclusion

Writing a successful grant is not easy. It takes time, collaboration and persistence on the part of the conservation educator to accomplish all the tasks needed in the granting-cycle timeframe. Use the Checklist below to remind you of the steps involved in writing a successful grant proposal.

Grant Writing Checklist

Step 1: Brainstorming and Analysis

- Assess the grant opportunity and match your conservation education project/program with the funder's goals and objectives.
- Check with your leaders to garner the institutions' support for the proposal.
- Recruit partners, both internal and external, that will bring needed skills or resources to the project thus ensuring its success.
- Meet with your partners to brainstorm ideas for the project and gather their ideas on how to make the project successful?
- Research the funding agency to better understand its mission and philosophy.

Step 2: Design

- Decide on a topic/concept for your project.
- Design a strategy to address goals, e.g. conduct a needs assessment to find out what your audience already knows about the topic, research your topic to gather the most accurate and current information available.
- Identify a target audience.
- Write project goals & objectives.
- Identify the conservation messages and actions your project will address.
- Draft a basic budget (not detailed yet, but be realistic with funds).

Step 3: Development

- Integrate the use of skills and methods discussed during the Conservation Education Course, e.g. involve program animals where appropriate, think about novel audiences, include a variety of learning styles, ensure the use of innovative interpretive techniques, create activities that are fun and support peer learning, hands-on techniques and small group interactions, etc.
- Continue to include partners at each step along the way.
- Begin a draft of an evaluation plan based on your project's objectives.
- Suggest ways to provide for the program's sustainability after the granting period is over (if possible).

Step 4: Implementation and Evaluation

- Based on your objectives, finalize an evaluation plan that shows impact on your target audience.
- Describe how the program will work logistically.
- *Draft, Review, Edit, and Repeat!* Evaluate what you've done thus far for strengths, weaknesses, and what's missing. Ask for lots of input from your project team and others, like your development specialist.
- Finalize the budget. Ask your zoo/aquarium's financial officer to review and comment.

Management Tools and Techniques: Creating and Managing a Budget

Introduction

The purpose of this section is to provide suggestions on managing a budget for a zoo/aquarium education department. Although each facility may have its own customized process, all budgets have some common goals.

Key Points

When creating an education budget:

- Ensure it reflects your mission, has clear merit and includes the department's priorities.
- Stay within your annual budget allowance.
- Review the helpful tips section for a comprehensive approach.
- Become familiar with budget terminology and budget spreadsheet.

"Your budget is more than numbers. It's a tool you can use to motivate employees, control expenses, increase revenues, make effective plans, and fulfill your organization's goals."

—Ann M. Rotondi

To have a positive impact, budgets must be realistic, accurate, and—most of all—tracked and controlled. Everyone in the organization should be familiar with the budget, because to understand the budget is to understand your department's goals. The budget is first and foremost a planning tool. Without a budget, an organization may not be able to make the best decisions.

Mission, Money and Merit

A strong budget reflects an organization's mission. Mission, money and merit all play key roles in developing an effective budget. When a line item seems extravagant or without clear merit, it may lack support from directors and other departments.

Typically, all programs should contribute to the institution's mission. The strongest programs will also contribute to revenue. Revenue is powerful for people in zoo/aquarium organizations. Program merit is another way to value a program. Although there may be differences of opinions among leaders, this approach may help you justify your programs and allow you to articulate your thoughts using a mission-driven argument.

Budget Terminology

Become proficient in your organization's financial terminology to effectively communicate budget issues across all departments. Here are terms to know:

- Operating budget: Reoccurring annual expenses.
- Restricted items: Funds used for a specific purpose and may require a detailed annual report to funder.
- Capital expenses: These are costly items that may not appear in your education budget. These big ticket items might include vehicles, equipment, exhibits, or in-house exhibit shops.
- Revenue centers: Programs that bring in dollars.
- The profit and loss program is an income statement for a specific program to measure your expenses as they relate to revenue.

- A balance statement includes accounts receivable, balancing your assets and liabilities.
- Cash flow or availability, is critical for businesses with a busy season (such as from Memorial Day to Labor Day). Your CFO can help identify when dollars will be available. The prior year history can be helpful to see the cash flow big picture.
- Net profit (total revenues less total expenses), may not be a true cost for the whole program, but it's provides a close estimation of your expenses and revenues.
- A pro forma includes projections into the future based on budgetary assumptions such as attendance.
- Return on investment (net profit divided by net worth, or your total assets) is often used as a reflection on your return on your expenses, often used interchangeably with profit margin, though it's a little bit different.
- Fixed costs is a thing that's important considerations such as utilities, state mandates, specific requirements, annual budgets for gas, or animal diets.
- Cash Based Accounting is an accounting method that enters income and expenses into the books at the time when payment is received or expenses incurred.
- Accrual Based Accounting is an accounting method that enters income and expenses into the books at the time of contract versus when payment is received or expenses incurred.
- Variable Costs fluctuate based on participation of your guests and visitors, like ordering lunches. And also just in terms of numbers matching, cash-based accounting (putting money in the ledger when you get the check) versus when you sell the program, so you know it's coming, but you book the program before you get the check in the mail.

Helpful Tips in Managing a Budget

Step 1: Begin by reviewing last year's budget to identify critical line items. Show actual income and actual expenditures. Add up the subtotals of these costs to arrive at your administrative budget figures.

Step 2: Anticipate changes for the upcoming budget year. Will you need to develop new programs to meet changing school curriculums? Will school program evaluations cost added dollars? Will you need to add/reduce staff? Make additions/reductions in the budget based on this information.

Step 3: Determine your priorities – Check with other departments to ensure you're all working together and not duplicating expenditures. This is a time to use your influencing skills to garner support for new programs and to share your passion for a project. This will reap great benefits during department head budget meetings.

Step 4: Involve your staff at all levels of budgeting. Include them in a budget session so that they can offer input. Your staff knows the most about your business. Someone else may be able to think of things you hadn't included, or to suggest a different, more effective way of delivering a service. Including others is a great way to increase staff accountability, expand financial understanding and enhance buy-in.

Step 5: Budget for contingency, or with some cushion, which allows you to absorb some unexpected demands or cost increases without upsetting the entire budget.

Step 6: Meet with your organization's CFO to review income and expenditures for the upcoming year. Often, finance directors see budgets from a different perspective. She/he will offer the organizational view and governing directives.

Step 7: Keep notes to document the assumptions you've made in developing your budget or the source of an estimate. You can use the "comment" feature of a spreadsheet, or type your notes in text or keep them in a file. Your budget will almost certainly change between now and the end of the year. It's helpful to be able to refer back to the assumptions on which you based your budget.

Step 8: Track your budget regularly. Check-in on a quarterly basis or when a line item gets added or deleted. Redistribute funds if necessary.

Section 6: Appendices

Appendix 1: Resources

Websites:

- Committee for Audience Research and Evaluation: American Association of Museums (AAM)
<http://www.care-aam.org/>
This website has presentations on evaluation from annual meetings as well as other resources available free of charge.
- National Center for Educational Statistics
<http://nces.ed.gov/about/>
This website can provide helpful information about students within your area- from test performance to district demographics. This information is especially helpful in procuring funding.
- Informal Science
www.informalscience.org
This website contains full text evaluation reports, an annotated bibliography of publications related to informal science education, and serves as an online community hub for professionals within informal science education.
- US Census Bureau
<http://www.census.gov/>
Can provide helpful statistics about residents of different geographic areas, information that can be helpful within grants and funder reports.
- Institute of Museum and Library Services: Resources Site
<http://www.ims.gov/resources/resources.shtm>
More than just a granting agency, IMLS strives to serve as a repository of information. There are a number of free documents focused on improving informal education practices. Many of their documents regarding collections can pertain to living collections with minor modifications.
- Center for the Advancement of Informal Science Education
<http://caise.insci.org/>
This NSF supported site includes news, program reviews, resources and other information pertinent to informal science learning institutions.
- Visitor Studies Association
www.visitorstudies.org
This professional organization provides a number of resources free of charge on their website in addition to the offerings that come with membership.
- NSF Project Evaluation Guide
<https://www.nsf-proj-eval-guide.org/html/home.htm>

While designed to strengthen NSF proposals and projects, the tenets will be helpful to non NSF projects.

- Center for the Future of Museums
<http://www.futureofmuseums.org/>
Affiliated with AAM, this site provides encouragement to consider new and novel approaches to informal learning.
- National Association for Interpretation
<http://www.interpnet.com/>
- World Future Society
<http://www.wfs.org/>
- My Environmental Evaluation Research Assistant
<http://meera.snre.umich.edu/>
- Evaluation Springboard
<http://www.evaluationspringboard.org/>
- American Association for the Advancement of Science
www.aaas.org
<http://www.aaas.org/programs/education/>
- Partnership for 21st Century Skills
<http://www.p21.org/index.php>
- International Zoo Educators Association
www.izea.net
- Science and Engineering Indicators, published by the National Science Board, provides a broad base of quantitative information on the U.S. and international science and engineering enterprise.
<http://www.nsf.gov/statistics/seind10/>

Publications available online:

- Museums and Society 2034: Trends and Potential Futures
<http://www.futureofmuseums.org/reading/publications/upload/MuseumsSociety2034.pdf>
- Demographic Transformation and the Future of Museums
http://www.futureofmuseums.org/reading/publications/upload/2DemoFoM_AAM2010.pdf

Journals:

- Curator
Focused on all elements of museums including exhibit design, visitor studies, and education programs.

<http://www.curatorjournal.org/issues/534-october-2010>

- Visitor Studies
Focused on the visitor experience and research in this area.
<http://www.tandf.co.uk/journals/titles/10645578.asp>
- Museum Management and Curatorship
Broad focus that also includes administrative concerns.
<http://www.tandf.co.uk/journals/RMMC>

Journal Articles:

- DeWitt, J & J. Osborne (2007). Supporting Teachers on Science-Focused School Trips: Towards an Integrated Framework of Theory and Practice. *International Journal of Science Education*, 29, 685-710.
- From grant proposals to board meetings, we are often asked to provide research that supports our program design and departmental direction. For many of us, that means a long list of citations to remember and keep track of- doable, but time consuming. The Framework for Museum Practice assimilates all this research into a single model of effective student programming.

Books:

- The Participatory Museum
Nina Simon (2010)
<http://www.participatorymuseum.org/>
- Unbound by Place or Time: Museums and Online Learning
William Crow and Herminia Din (AAM: 2009)
http://iweb.aam-us.org/Purchase/ProductDetail.aspx?Product_code=I254
- Life Stages of the Museum Visitor: Building Engagement over a Lifetime
Susie Wilkening and James Chung (AAM 2009)
http://iweb.aam-us.org/Purchase/ProductDetail.aspx?Product_code=I255
- Adult Museum Programs: Designing Meaningful Experiences
Bonnie Sachatello-Sawyer, et al.
http://iweb.aam-us.org/Purchase/ProductDetail.aspx?Product_code=I3298
- Learning Science in Informal Environments: People, Places and Pursuits
National Research Council (2009)
http://www.nap.edu/catalog.php?record_id=12190
NOTE: The layman's version of this is *Surrounded by Science*
- Exhibit Labels: An Interpretive Approach
Beverly Serrell (1996)
<http://www.amazon.com/Exhibit-Labels-Interpretive-Beverly-Serrell/dp/0761991069>
- Framework for Evaluating Impacts of Informal Science Education Projects
<https://www.nsf-proj-eval-guide.org/html/home.htm>

Provides background about NSF's requirements and advice on measuring project impacts applicable to non-NSF funded projects.

- Judging Exhibitions: A Framework for Assessing Excellence
http://iweb.aam-us.org/Purchase/ProductDetail.aspx?Product_code=13557
Beverly Serrell (AAM: 2006)
Easy to use framework to assess exhibits based on elements of success outlined in the established literature. Applicable to all types of exhibits, including living collections.
- Practical Evaluation Guide: Tools for Museums and Other Educational Settings by Judy Diamond
- Creating Great Visitor Experiences: A Guide for Museums, Parks, Zoos, Gardens, and Libraries by Stephanie Weaver

More academic edited volumes:

- Perspectives on Object-Centered Learning in Museums
Ed: Scott Paris (2002)
Mostly non-living collections, but pedagogically it will transfer
- Learning Conversations in Museums
Eds: G. Leinhardt, K. Crowley, K. Knutson (2002)
Mostly non-living collections, but pedagogically it will transfer
- Creating Connections: Museums and the Public Understanding of Research
Eds: D. Chittenden, G. Farmelo, B. Lewenstein (2004)

Section 7: Supplemental Lessons

These supplemental lessons were developed for conservation educators new to field. They are critical to understanding conservation education and may be included as part of the regular course work.

Evolution of Conservation Education as Central to Zoo Mission

Introduction

This section provides the background and context for the evolution of modern zoos/aquariums from menageries to conservation centers, where education is an integral part of the zoo/aquarium's mission. The format of the in-class session is a PowerPoint illustrated lecture presentation, followed by a group discussion.

Key Points

- Conservation education inspires audiences to understand and appreciate wildlife, care about the future of the natural world, and make more environmentally responsible decisions.
- A zoo/aquarium's goal is conservation therefore visitor experiences should focus on influencing visitor behavior.
- In the 1990's scientific evaluations determined that knowledge does not necessarily lead to behavior change.
- As we came to understand the significance of affect in learning, zoo/aquariums began to focus on fostering feelings of personal connection, appreciation and caring.
- Zoos/aquariums' greatest conservation asset is the millions of visitors to our institutions.
- This course serves to establish a Conservation Education profession in the United States and beyond.

The Earliest Menageries

Collections of wild animals were first documented around 3000 B.C. Between 3000 and 1500 B.C. as urbanized, literate societies evolved, royalty and wealthy classes flourished. The urban lifestyle and stable social conditions that prevailed were conducive to collecting. Foreign trade exposed the upper classes to exotic new lands, and wild animals were actively sought for small, private collections. Animals were also acquired through confiscations from conquered lands and as tributes from other societies. Animal collections became symbols of power, wealth and authority.

After the decline of the Roman Empire, European monarchs, monasteries and municipalities continued the tradition and maintained animal collections. Europeans set out to explore, trade with, and colonize new lands, and brought exotic animals back to Europe. These collections were for the privileged; common people saw exotic animals only at medieval fairs. These small animal collections became known as menageries. Royal and formerly private collections first became public menageries in the late 1700's. By the 1800's animal collections first began calling themselves zoological gardens or parks. Menageries proliferated, but lack of knowledge of animal needs meant that conditions were poor and

animals died. As our knowledge about animals and their requirements increased, and new technology was developed, higher standards of animal care became possible. Some zoological gardens began to emphasize science and education rather than mere public entertainment. The first modern zoo, London Zoological Gardens, opened in 1828.

Characteristics of a Modern Zoo

- Focus on animal husbandry and enrichment.
- Provides animals with excellent medical care and facilities.
- Manages animals and populations scientifically and ethically.
- Active research and conservation programs.
- Effective, trained conservation educators and Education Department.
- Inspires visitors through engaging and effective conservation programs and exhibits.

Historic Exhibit Design

The earliest zoos maintained animals in barred cages to contain them—there was no consideration to the context in which animals were viewed. In 1874, animal dealer Carl Hagenbeck opened his new zoo in Hamburg, Germany, which began a new era in zoo exhibit design. In the 1890's he pioneered "panorama" exhibits, exhibiting different species from the same environment. Exhibits were divided by hidden moats, and landscaped with rocks and plants. Hagenbeck's Tierpark opened in Stellingen, Germany in 1907, a major departure from the traditional taxonomic approach to exhibition. Although not recognized as having an education purpose at the time, this design fostered appreciation for wildlife and natural habitats. Hagenbeck's innovative, barless exhibit design drew worldwide attention.

U.S. Zoos

In the United States, the Philadelphia Zoo (Pennsylvania) first opened to the public in 1874. Other zoos followed in the late 1800's, influenced by the popularity of large, landscaped urban parks and European zoo design. The National Zoo in Washington D.C. opened in 1891, with spacious grounds designed by Frederic Law Olmsted. Carl Hagenbeck's exhibits continued to influence U.S. exhibit design through the 1930's. In the early 1900's Philadelphia Zoo began a research program. The Bronx Zoo (now part of New York's Wildlife Conservation Society) opened its first veterinary clinic and began its first field research program in 1916. Post WWII prosperity resulted in new exhibits, programs and professionalism. The American Association of Zoological Veterinarians (AAZV) was founded in 1946. Animal husbandry improved through advances in veterinary medicine: treatment of exotic diseases, reproductive biology, nutrition, surgery, pathology, and propagation success and control. Zoos became known as important educational resources for learning about animals and nature. The desire to organize a professional association resulted in the American Association of Zoological Parks and Aquariums (AAZPA), which was founded in 1924.

Summary of the History of Modern Zoos

- 1794: The first zoo founded primarily for scientific purposes, the Ménagerie du Jardin des Plantes, opens in Paris.
- 1874: Hamburg Zoo opened pioneered “panorama” exhibits (Hagenbeck) that exhibited different species from the same environment. Exhibits divided by hidden moats, and landscaped with rocks and plants.
- 1874: The first US zoo, Philadelphia Zoo, opens in Pennsylvania.
- 1891: National Zoo (Washington D.C.) opened.
- 1899: Bronx Zoo (now Wildlife Conservation Society) opened. Hired first educator in 1929.
- 1907: Tierpark (Stellingen, Germany) opened. Barless exhibits drew worldwide attention, fostered appreciation for wildlife and natural habitats.
- 1924: American Association of Zoological Parks and Aquariums (now AZA) founded; Currently 204 zoo members.

From Zoos to Conservation Centers

In the U.S. renewed national concern for conservation in the 1960's and 1970's influenced zoos/aquariums to intensify their conservation efforts. The first off-site breeding facility was established by the San Diego Zoo in 1972. In the 1980's and 1990's, the AAZPA (now AZA) created Species Survival Plans (SSPs), Taxon Advisory groups (TAGs) and Faunal Interest Groups (FIGs). Most zoo/aquarium animals were no longer taken from the wild, but bred in zoos/aquariums. SSP programs managed animal reproduction to establish genetically viable captive populations. Zoos/aquariums increasingly initiated field research programs, which later expanded to become broader conservation initiatives. Today, many *in situ* conservation programs are working as holistic efforts, focusing on habitat protection, education, and community involvement.

The Change in Zoo/Aquarium Education

In 1929, the first zoo educator was hired at the Bronx Zoo. By the 1970's, some zoos had established Education Departments; some had paid staff while others were staffed by volunteers. At that time, education personnel had no formal training in informal education. Since some staff came from a classroom teaching background, and most education programs focused on groups of visiting students, the style of zoo/aquarium education was typical of formal classroom instruction.

The 1980's saw the expansion of zoo/aquarium Education Departments. Programming expanded beyond school groups, and a new emphasis began on the visitor experience. With this change in audience, teaching shifted to an informal education style, to fit the zoo/aquarium setting. Program content focused on scientific and basic biological knowledge of animals and ecosystems. Zoo/aquarium education was originally designed to increase factual knowledge, in the hope that increased knowledge would make people better stewards of the natural world.

A Change to Conservation Education

In the 1990's, having a paid education staff member became a requirement for zoo/aquarium accreditation in the U.S. Zoo/aquarium Education Departments continued to expand and diversify their programs, especially due to an increased focus on revenue generation. In 1997, the AZA offered the first Conservation Education professional development training program for zoo/aquarium educators, a program that has now served more than 300 professionals.

Zoo/aquarium education progressed in the 1980's through the 1990's beyond providing factual natural history information to recommending actions our visitors could take to support conservation of species and their wild habitats. We recognized that establishing connections for visitors between the actions they could take and the impact on conservation was important (e.g., by recycling your aluminum soda cans, you can help reduce the need to mine bauxite to make a new can, and therefore help preserve tropical rain forest habitat). Our educational approach was still tied to the idea that providing information would lead to taking action.

But in the 1990's scientific evaluations determined that knowledge does not necessarily lead to behavior change. People could be knowledgeable about the issue and yet not take action; also, people could be inspired to take action without a lot of background knowledge. As a result of these evaluations, zoos/aquariums in the U.S. determined that even though facts are intellectually interesting they are typically not enough to make an "emotional connection." In order for people to make behavior changes, they have to have an experience and experience something on an emotional level" (Ham, 1992). As we came to understand the significance of affect in learning, zoos/aquariums began to shift their focus towards fostering feelings of personal connection, appreciation and caring. Today, zoo/aquarium exhibits engage visitors through storyline, interpretive elements, activities, staff presentations, and close-up experiences with animals.

Conservation Education Today

In the new century, education has evolved to be central to the mission of the modern zoo/aquarium. Education departments now lead exhibit storyline development and help to create the visitor experience. Many U.S. zoos/aquariums are now focusing their efforts on learning which are the most effective means to inspire and measure conservation behavior change. We are working with conservation psychologists to learn new approaches, and collaborating with zoo/aquarium marketing professionals to reach a broader audience. In response to the realities of limited financial resources, Education Departments are based on traditional business models, with an emphasis on revenue-generating programs that help subsidize free visitor programs. As the profession of zoo/aquarium education has grown and developed, pioneering education leaders have now become zoo/aquarium directors, and are leading the industry.

Conservation education is now integral to the mission modern zoos/aquariums and is intrinsically linked to a zoo/aquarium's conservation strategy. If the goal is conservation, then visitor experiences should focus on influencing visitor behavior. Zoos/aquariums can contribute to conservation by helping to shape public values about wildlife. Conservation education inspires audiences to understand and appreciate wildlife, care about the future of

the natural world, and make more environmentally responsible decisions. Our greatest conservation asset is the millions of visitors to zoos/aquariums!

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What Do We Teach? Principles of Ecology

Introduction

The purpose of this section is to give participants an overview of ecological principles and how they relate to their local environment. This information serves as the foundation for all that we teach in zoos/aquariums.

Key Points

There are ecological principles on which our education programs are based. Some key messages in this section are:

- Plants and animals change over time via natural selection and are constantly changing.
- There are many different levels within a community.
- Plants and animals in ecosystems are interdependent.
- People are part of the ecosystem and impact plants and animals.
- People can make choices to protect ecosystems and the plants and animals within them.

Introduction to Ecological Principles

Ecology is the science that studies the interactions among organisms and their environment. As zoo/aquarium educators, one of the most important concepts we teach is the interdependence of all living things. In order to interpret how this works, it is important to understand some of the key concepts of ecology. Some definitions are:

- A single living thing (such as a panda, human, crane, ant, fern, or mushroom) is called an organism.
- A species is a group of organisms with similar characteristics that can interbreed. For example, giant pandas are a species found in limited areas of China.
- Interbreeding groups of individuals of the same species that live in the same area or connected habitat are called populations. The group of wild giant pandas living within the Wolong Nature Reserve is a population. There are other small populations of giant pandas in China, but they are all the same species.
- Communities are populations of different species that interact. For example, the mammals, birds, insects and plants in an area collectively form a community.
- On a larger scale, an ecosystem consists of all the living (biotic) and non-living (abiotic) factors in an area. This includes a complex network of many interrelated parts, including all the species and all the physical processes (soil, weather, water, nutrients and energy flow) that influence that community. These networks control the flow of energy and nutrients within the ecosystem.
- On a global scale, all the biological elements and physical processes that influence life on Earth are collective known as the biosphere.

Natural Selection

Organisms act to maximize their survival and ability to produce viable offspring that will also survive and reproduce. This is called *fitness*. Natural selection means that those traits that are inherited that serve to increase the fitness of an organism have a greater probability of being present in future generations within the population. For example, if an organism displays a genetic mutation that results in its coloration being altered, and it survives longer because the coloration camouflages it from predators, than this organism has increased its

biological fitness. Because the organism lives longer with increased chance for reproduction, this same trait is more likely to show up in the next generation; the trait has been selected to continue in the species. This is the basis of Charles Darwin's theory of evolution. Note that we acknowledge evolution as scientific fact; we describe *Darwin's theory* as opposed to other theories of evolution.

Interdependence

All species living within an ecosystem are dependent on other life forms for their existence. Producers are organisms such as plants that use energy from the sun to make their own food. In turn, plants convert this energy into substances (such as sugar) that can be used by other organisms—called consumers—that eat them. Animals that eat plants are dependent on those plants for survival. Plants depend on microorganisms in the soil and often fungi for their water and nutrients.

An animal that is killed for food by an animal is known as its prey (plants are not considered prey because they are fixed in place). Predators (animals that feed on other animals) depend on their prey for survival. Animal species may be both predator and prey. For example, some predators feed on prey animals, who in turn also feed on other animals further down the food chain. Scavengers (such as vultures and beetles) are animals that feed on dead animals (carrion). Some animals, such as hyenas in Africa, may be both predators as well as scavengers. When prey species are available, these predators hunt and kill their prey. When live prey is scarce, hyenas are opportunistic (meaning they eat what is available) and scavenge on dead animals (that may be stolen from another predator). Decomposers, including bacteria and fungi, break down dead animals into essential nutrients, such as nitrogen and phosphorous, that are returned to be reused in the soil. Nothing is wasted in the food chain—everything becomes part of the nutrient cycle.

Animals that consume plants are called herbivores. Carnivores are animals that eat other animals. Animals that consume both plants and other animals are called omnivores. People are omnivores, too!

Humans are Part of the Interdependence of Life

We often remove ourselves from the equation when we study the interaction of ecosystems, but as we learned in the section on biodiversity, people are part of the ecosystem, too. We depend on plants, animals, natural systems, and other people for our survival. People have the power to manipulate the environment in which they live and we can make changes to ecological systems that may be irreversible in our lifetime. While change is a constant part of ecosystems, humans accelerate that change through our actions. Human activity has caused eradication of species and of genetic variability. It is estimated that the rate of species extinction could be as much as 1000 times greater than the rate of extinction before human intervention. For example, one-fourth of the earth's bird species have been driven to extinction through the human activity in the last two millennia. In addition, human activity has caused the introduction of non-native invasive species to new areas, where they cause tremendous damage to native species. These often have enormous economic as well as biological consequences. These actions can have unfortunate consequences for the survival of plants and animals, and can alter wild places.

But these actions may have consequences for humans, too, because we are all part of the biosphere. Over-hunting of animals to the point where populations cannot survive and become extinct affects many other species in the ecosystem, and may affect us, too. For example, over-fishing of certain species means that we no longer have viable populations of these fish. Once a population is gone, this affects the fishing industry (our livelihood) and our consumption. Some of the consequences of human activity are apparent—such as air and water pollution and habitat destruction. But some consequences are yet unforeseen, since scientists are just now beginning to understand the complex processes of ecosystems and the long-term implications of human activity (such as global climate change). This is why it is so critical to protect biodiversity.

As U.S. scientist Paul Ehrlich said, “The first rule of intelligent tinkering is to save all the parts.”

Summary

Ecology is the science that studies the interactions among organisms and their environment. One of the most important concepts zoo/aquarium educators teach is the interdependence of *all* living things. People are part of the ecosystem, too! We depend on plants, animals, natural systems, and other people for our survival. While change is a constant part of dynamic ecosystems, humans accelerate that change through our actions. These actions can have unfortunate consequences for the survival of plants and animals and can alter wild places. These actions may have consequences for humans, too, because we are all part of the biosphere. Scientists are just now beginning to understand the complex processes of ecosystems and the long-term implications of human activity. This is why it is so critical to protect biodiversity, and why your role as zoo/aquarium educators to engage visitors in learning, connecting with their environment, and caring about biodiversity is so important.

Resources

<http://www.marinebio.org>

<http://www.eetap.org>

<http://www.conbio.org>

References

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Why is Biodiversity Important?

Introduction

The purpose of this section is to provide participants with basic knowledge about biodiversity. Topics include what is biodiversity, why biodiversity is important, loss of biodiversity and consequences, richness of biodiversity, problems and challenges of biodiversity, efforts and progress made conserve biodiversity, and what we can do to help.

Key Points

- Biodiversity is the variety of *all* life on Earth, which include: genetic diversity, species diversity, and ecosystem diversity.
- Biodiversity provides invaluable ecological service to human being and all life forms on earth, biodiversity provides us with food, medicines, and building materials; it is very important to world's economy.
- Many factors cause losses of biodiversity.
- We can help to conserve biodiversity.

The Importance of Biodiversity

Biodiversity is the variety of *all* life on Earth. Biological diversity includes: genetic diversity, species diversity, and ecosystem diversity. *Genetic diversity* is the genetic variability *within* a species; *Species diversity* is the variety and abundance among different types of organisms that inhabit an area; *Ecosystem diversity* encompasses the variety of habitats that occur within a region, and the array of natural communities and ecosystems throughout the world.

Biodiversity is very important to all organisms in the world, including humans. It provides ecological services to all life forms on the earth. This includes transferring energy from sunlight to plants and its distribution throughout food webs; storage, release and distribution of carbon by forests, oceans, and the atmosphere; cycling of nutrients among air, water, soil, and living organisms; water cycle, which purifies and distributes fresh water; and the oxygen cycle, through which plants and animals exchange carbon dioxide and oxygen.

To human beings, biodiversity is the source of our food: almost all of our food is made from plants and animals. According to the Center for Plant Conservation, 90% of the world's food comes from 15-20 species of plants. Three species of grasses--rice, wheat, and corn--are the most important food plants. In total, humans use only about 150 species of plants for food, out of 80,000 potentially edible plants. Because we depend on such a narrow range of plants, our ability to produce and sustain food crops is important for human survival. Wild varieties of these plants have genetic variability and natural disease resistance. Cross-breeding domestic crops with wild relatives can often increase disease resistance. Therefore, losing wild plants means losing genetic diversity, which in turn may cause dramatic decrease of our food productivity.

Biodiversity is very important to our health. In fact, to this date, many of our prescription medicines are derived from nature. For example, the rosy periwinkle from Madagascar is the source of a drug used in the treatment of Hodgkin's disease and leukemia; and the Pacific yew tree is the source of Taxol, a drug used in the treatment of ovarian cancer. Although plants and animals have been exploited for medicinal uses for thousands of years by humans, only 1% of the plant species in rainforests have been tested for their possible

pharmaceutical value. Many more are waiting for us to discover them. If we continue to lose species and habitats, beneficial medicines will be lost forever.

Biodiversity provides resources to build our homes. We use trees and wood to construct our homes and craft furniture. Trees and other plants are widely used to make paper products which are important parts of our daily lives these days.

Biodiversity is very important to the world's economy. A healthy environment is the basis for a healthy economy and community stability. Without the products and services that diverse, natural systems provide, we would not be able to survive or prosper. According to estimates from www.biodiversityproject.org, biodiversity contributes between \$3-\$33 trillion dollars to the global economy.

The beauty of biodiversity adds to the quality of human life. People value the natural world for its beauty and aesthetic appeal. Nature brings pleasure to our lives and enriches the human experience. Access to nature contributes to our quality of life. Loss of biodiversity is the loss of beauty and wonder, both for us and for future generations.

Biodiversity has an intrinsic value beyond its importance to humans. As fellow inhabitants of our planet, biodiversity is worth preserving for its own sake alone. Many people and cultures view responsible stewardship of the Earth as a premise of their religion or beliefs.

The Loss of Biodiversity

Because of rapid expansion of human populations and over-exploitation of natural resources, we are losing biodiversity at alarming rates. The major factors contributing to biodiversity losses are: habitat degradation and loss, invasive exotic species, global climate change, population growth and resource consumption, and over-hunting and commercial exploitation.

Habitat loss

The single greatest threat to biodiversity is the loss of natural communities to development and agriculture. Development also contributes to air and water pollution, both of which degrade environments and further reduce biodiversity. New construction increases erosion of cleared land and erosion increases siltation leaving streams with less capacity to cycle nutrients and compost organic wastes.

Invasive and exotic species

Invasive and exotic species alter natural ecosystems. Non-native plants and animals may out-compete native species for resources and occupy much of the available habitat. Other exotics prey on native species. Some are introduced intentionally by humans while others arrive accidentally through international trade.

Global climate change

Carbon dioxide emissions from vehicles and industry result in trapped greenhouse gasses in the atmosphere. Rising temperatures and increased UV radiation produces habitat changes that affect plants and animals. A warmer climate results in changes in migration patterns—the timing of flowering plants and the pollinating birds they depend on are out of synch.

Over-population and over-consumption of resources

The Earth's population is more than 6 billion people and growing. More and more people need fresh water and fuel, straining our global and local ecosystems and increasing demand throughout the globe for more material goods and services. Industrialized nations consume far more resources per capita than do developing countries.

Wildlife Exploitation

The wildlife pet trade, poaching, and unsustainable hunting for food and traditional medicines have resulted in a tremendous loss of biodiversity. Over-harvesting of regional fisheries has driven several aquatic species to the brink of extinction, and reduced the overall diversity of marine life.

The impact of the loss of biodiversity is devastating. Polluted air and water increase illness. The loss of pollinators affects human food production and species survival. The impact of introduced exotic species on agriculture and fisheries is estimated in the billions of dollars each year. Industrial-scale logging, for wood products and timber, destroys or fragments millions of acres of forests each year, along with the habitat they provide. We have so much to learn about species and ecosystems and losing this biodiversity is like destroying a library. As we know, forests retain moisture in the soil, store CO₂, and produce oxygen. Deforestation results in erosion and landslides, less oxygen and more carbon in the atmosphere. Wetlands filter and absorb water. Loss of wetlands results in pollutants and toxins remaining in water, as well as disastrous flooding during storms.

What We Can do to Conserve Biodiversity

In addition to governmental actions at large scale, as citizens there are many things we can do or choices we can make in our daily life to help to conserve biodiversity. These include:

- Fight against poaching.
- Avoid putting wild animals and plants on your dining table.
- Avoid medicines made from wild animals.
- Select domesticated animals as pets rather than wild animals.
- Boycott products made of endangered species and their parts (such as ivory, musk, turtle shell, wools of Tibetan antelopes). If you find these products, tell police or media.
- Avoid purchasing fur coats and other products made from wild animals.
- Protect wildlife habitats.
- Learn more about biodiversity.
- Share what you learned with others.
- Eat food that is produced by native species (fruits, vegetables).
- Learn about native endangered species.
- Buy organic products.
- Drive less—ride bicycles if possible, and encourage others to do so.
- Take public transportation whenever possible.
- Properly dispose of paint, gas, or other toxic liquids.
- Use rechargeable batteries. If you have to use regular batteries, recycle them.
- Re-use items, rather than buying new ones.
- Try your best to recycle everything you can.
- Plant native trees or plants.
- Avoid using pesticides and herbicides.

- Plant flowers or shrubs to attract specific animal species.
- Be a volunteer at local botanical gardens, nurseries, or zoos/aquariums.
- Contact national or local government agencies, learn how you may help to preserve biodiversity.
- Act and think with foresight.

Summary

Biodiversity is the diversity of all life on earth. It is very important to human beings as well as all other life forms on the planet. Biodiversity provides ecological services to us and enriches our daily lives. Without it, we may hardly survive in this world. Sadly, human activities have caused the decline and loss of biodiversity worldwide. Our world is blessed with great biodiversity, but it faces tough challenges of species and ecosystem diversity losses. Although many governments have taken measures to conserve the earth's biodiversity, as citizens, we can do many things to help.

References and Resources

www.biodiversityproject.org

www.centerforplantconservation.org

The Role of Zoos/Aquariums in Addressing Environmental Issues

Introduction

This section provides participants with basic knowledge about the current environmental situation. Discussion topics include current status of the environment, efforts and progress made by governments and citizens to improve the environment, existing problems and challenges, and the unique role zoos/aquariums can play in combating these issues by educating their visitors and providing them with direct ways to help animals and improve the environment.

The Role of Zoos/Aquariums in Addressing Environmental Issues

Zoos/aquariums can play a unique role in bringing to light the environmental situation by educating their visitors on these issues and providing them with direct ways to help animals and the environment. Through programs and exhibits, zoos/aquariums can foster *empathy* and stewardship behaviors in visitors/participants. As defined by the *American Heritage Dictionary*, empathy is an identification with and understanding of another's situation, feelings, and motives. Fostered at a young age, empathy plays an essential role in influencing moral and social behaviors in humans and primates. By building empathy into our programs and exhibits, our visitors will begin to understand that animals have thoughts and feelings and their respect for animals will increase. As visitors/education program participants increase their respect for animals, they will begin to increase their environmental stewardship behaviors, truly making an impact on species survival. You will learn more about how to incorporate empathy into programs and exhibits in a later session.

Always be sure when talking about wildlife threats that you leave visitors on a positive note. Try not to end on the negative doom and gloom, but rather offer a positive action that visitors can take to help correct the situation. Below you will find some environmental issues that you may discuss with visitors.

Habitat Loss

Deforestation

- More than 80 percent of the Earth's natural forests already have been destroyed.
- Up to 90 percent of West Africa's coastal rain forests have disappeared since 1900.
- Brazil and Indonesia, which contain the world's two largest surviving regions of rain forest, are being stripped at an alarming rate by logging, fires, and land-clearing for agriculture and cattle-grazing.
- Loss of forests means loss of living space for wildlife; 70% of the Earth's land animals and plants reside in forests.
- Rain forests help generate rainfall in drought-prone countries elsewhere.
- Forests are natural consumers of carbon dioxide - one of the greenhouse gases whose buildup in the atmosphere contributes to global warming.

Habitat Fragmentation

Habitat fragmentation is the separation of a landscape into various land uses resulting in numerous small, disjunctive habitat patches left for use by wildlife. Fragmentation eliminates habitat for those species requiring large unbroken blocks of habitat. The problems that arise from habitat fragmentation include:

- Smaller populations due to smaller amounts of habitat.

- Isolation of populations in fragmented parts, which allows for greater possibility of extinction.
- The potential increase in predators, competitors and greater human/wildlife conflict.
- Fragments often yield a significantly different physical and biotic environment than existed before.
- Species that need large home ranges have trouble living in the smaller fragmented area.
- Fragmentation increases the likelihood of inbreeding, which leads to a loss of genetic diversity.
- Increased probability of zoonotic diseases and vice versa.

Some causes of habitat fragmentation include:

- Human development;
- Road building;
- Deforestation (logging); and
- Conversion to agriculture, grassland or pasture.

Urban Development

- Development may include: building houses, streets, highways, offices, schools, shopping centers and parks.
- Environmental effects due to urbanization have been observed since early in the 18th century. But not until the 1950's did this seriously begin impacting wildlife habitat.
- Since the 1950's the number of large cities has increased rapidly. Metropolitan areas have grown to form even larger agglomerations and some very large urban areas with populations in the tens of millions have emerged.
- The effects of urban development can be defined by many factors. The most important of these factors relate to air quality, the availability of safe water supplies, and provisions for sanitation and waste management.

Agricultural expansion

- The ultimate cause of biodiversity loss is the burgeoning human population that requires cultivated ecosystems for food productions. Converting wildlife habitat into farmland increases with our need to grow food for greater numbers of people.
- The process of turning natural and semi-natural ecosystems into cultivated ones is probably the most important proximate cause of biodiversity loss as more and more people require cultivated ecosystems for greater food production
- Agricultural production has increased dramatically in the U.S. and worldwide in the past 50 years causing water pollution, soil depletion, and a host of human (and nonhuman) health and safety problems.
- Many farmers are using pesticides that contaminate the environment and their misuse often leads to poor crop yield resulting in more forest that is cut each year for agricultural purposes
- Sustainable agricultural practices have arisen as a result of increased concern to environmental problems. Sustainable agriculture typically is defined as

agricultural practices that ensure long-term productivity with few harmful environmental effects.

Palm Oil

The agricultural crop of palm oil is fueling destruction of the rainforest habitat of Sumatran and Bornean wildlife especially orangutans, pushing endangered species even closer to extinction. It is now the second most widely produced edible oil. Palm oil is found in cookies, crackers, shampoo, skin care and beauty products, in different varieties of pet food, and many other products. It is also found in a wide array of products sold in natural food stores. And now it is being investigated as a possible fuel alternative. (CMZoo) Recent supply and demand pressures for palm oil have driven its production to record highs.

Coffee Growing

One solution to agricultural expansion is to grow crops in the shade of the forest trees rather than cutting the forests down. Shade grown coffee farms support approximately 150 species of birds, second only to undisturbed forests. Shade grown coffee reduces the need for chemical fertilizers and added mulch because fallen leaves from the forest trees create mulch and act as a natural fertilizer. The canopy of trees also provides a shelter for pest eating predators (birds, monkeys, etc). The trees also contribute to an increase in soil quality by holding the soil in place. Coffee experts say that shade grown coffee tastes better because the coffee cherry is allowed a longer time to ripen = a richer flavor!

Guests at Disney's Animal Kingdom can try shade grown coffee when visiting the park! All of their specialty coffee drinks (cappuccinos & espressos) are made with shade grown coffee. Guests can also buy a pound of grounds at Tusker House restaurant for about \$10. When they return home they can look for shade grown coffee at their local grocery store, it will say it on the bag.

Overhunting/Poaching/Bushmeat

Snare hunting

Poaching and the trade in bushmeat are unsustainable and illegal and have been called the most significant threat facing Africa's wildlife today. Poaching is the illegal hunting of wildlife. In many parts of the world, snare hunting is used by poachers and contributes to the loss of biodiversity and injury to many wildlife species. Snares are an indiscriminate method of hunting that traps a host of non-target wildlife and even livestock. As the animal struggles, the wire noose tightens, cutting through flesh. Many animals, such as chimpanzees, are often seen with parts (hands, feet, trunks, etc) of their bodies missing. Meat from ensnared wildlife is often sold as bushmeat, fetching high prices in African markets and cities.

Bushmeat

The illegal and commercial trade in wild meat - or bushmeat - poses one of the most significant threats to wildlife populations and dependent human communities around the world. It has already resulted in widespread local extinctions in Asia and West Africa, and may push the African great apes—chimpanzees, gorillas, and bonobos—toward extinction within the next decade.

Overfishing

- A growing world population relies on fish for food.
- World fleets are impacting the ocean health.
- 90% of the large fish in the oceans are gone.
- Pelagic long-line fishing has incredible amounts of by-catch (unwanted fish).
- Trawlers destroy the ocean floor environment.
- Shrimp trawlers yield approx 5 lbs by-catch (unwanted fish) for every 1 lb of shrimp caught.
- Large fishing fleets are catching fish at an unsustainable rate.
- There are very few "sustainable" fisheries.

Aquaculture

- Fish farming can be positive or negative depending on practices. For example: Salmon farming. Salmon farming practices have a negative impact on the environment through:
 - Escapes;
 - Waste pollution;
 - Antibiotics and other chemicals to treat farmed fish end up in the ocean;
 - Salmon are carnivores. It takes about 3 lbs of other fish to feed every 1 lb of farmed salmon; and
 - Farmed salmon have 10 times the amount of PCBs than wild caught salmon.
- Shellfish farming can be done with little impact to the ocean or coastal waters.
- Shrimp farming in the third world has many negative environmental impacts; shrimp farming is better in the United States.

Seafood consumption

Millions of people eat seafood every day. One way to meet the needs of the human demands for seafood is to fish using sustainable methods. Sustainable seafood can be defined as:

- A species that is abundant and resilient to fishing pressures.
- A species that is well managed with a comprehensive management plan based on current research.
- A species that is well managed with a comprehensive management plan based on current research.
- A species whose method of catch ensures there is limited habitat loss associated with the harvesting method.

You can get a regional seafood guide to learn about smart seafood choices from the Monterey Bay Aquarium. They can be downloaded digitally or you can have copies sent to your home!

Pet trade/Wildlife Products

Illegal trade in wildlife is a \$6 billion-dollar-a-year global industry that is detailed in a report by the Wildlife Conservation Society (WCS). Each year billions of animals of all types are captured from the wild and sold in the wildlife trade. Commercial uses of wildlife can be divided into the trade in wildlife parts and products and the trade in live wildlife.

The trade in wildlife parts and products includes exotic leathers and fur (elephant skin boots, kangaroo skin soccer balls, cat, fox and coyote fur coats, ostrich skin boots, bird feather apparel, snake and lizard skin shoes, crocodile and alligator shoes and purses, eel skin purses and shark skin shoes), ornamental objects (elephant ivory jewelry, sea turtle shell cases, snail shells, matted butterflies), food (monkey and ape bushmeat, turtle soup, frog legs, bear paws, fish, lobsters, crabs, shrimp, clams and oysters), and traditional medicine (tiger bones, rhinoceros horns, deer antlers, bear gall bladders).

The trade in live wildlife includes the exotic pet trade (birds, reptiles, amphibians, primates and fish), biomedical research and teaching (primates, reptiles, amphibians and fish), stocking of public or private game farms and hunting ranches (deer, antelope, rhino and wild sheep), zoos and safari parks (elephants, giraffes, rhinoceros, large cats, monkeys, birds, reptiles) and food (reptiles, amphibians and fish).

Modern transportation methods facilitate delivery of wildlife and wildlife products from all corners of the globe to consumer markets. Increasing wealth makes wildlife and wildlife products that were once off-limits to the majority of people because of their high cost affordable. The wealthiest nations on Earth, including the United States, are the largest consumers of wildlife. Unregulated trade in wildlife has become a major factor in the decline of many species of animals and plants. In 1975 an international convention was established to prevent international trade from threatening species with extinction. This treaty is known as the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES).

Careless Use of Resources

Energy Use

An average American uses more energy than a citizen in almost any other country. We use roughly 70 times the energy used by a Ugandan or Laotian, 20 times that of a person in India, 10 times that of a person in China, and about twice that of a person in Japan, the United Kingdom, France, Sweden or Australia. Try exploring alternative energy sources such as wind power, solar panels, and hydrogen power!

Waste Management

Over a billion pounds of garbage are generated each day in the U.S. Although we have only 5% of the world's population, we generate over 50% of the world's garbage.

Water

The world has enough water if people use it wisely. We need to strive to use water more efficiently. In 1980 the U.S. water withdrawals were substantially greater than withdrawals for nine other major nations.

Over one billion people around the world lack access to safe water near their homes for drinking, cooking, and washing. More than 2.6 billion people, or over 40 percent of the planet's population, lack a safe and effective way to dispose of their bodily waste, and nearly 5000 children in the developing world die every day from disease (diarrhea, parasitic worms) due to unsafe water, sanitation, or hygiene.

Climate Change

Climate change refers to the increase in the average temperature of the Earth's near-surface air and oceans in recent decades and its projected continuation. Most National Governments have signed and ratified the Kyoto Protocol which is an amendment to the international treaty on climate change, assigning mandatory emission limitations for the reduction of greenhouse gas emissions to the signatory nations. Exceptions include the U.S and Australia.

Invasive Species

Invasive species are organisms that have moved beyond their natural habitat and are competing with native species for food and territory. Invasions can be accidental or intentional, but the risk to native species is great in either instance. Invasive species compete with native species, alter habitats, change predator/prey relationships, and transmit foreign diseases and parasites. Invasive species also can cause a myriad of problems, including food chain disruptions, reduced biological diversity and clogging of water intakes (increased weed growth) and cannot be easily eliminated from many biological systems. Prevention, early detection and rapid response are essential elements to preventing major damage to ecosystems and the economies. (FWS)

Summary

The United States' recent fast economic growth is causing severe environmental deterioration. Air, water, and solid waste pollution and ecosystem destruction are all critical factors in our environmental challenges. The government and its citizens are trying very hard to combat the environmental problems and have made remarkable efforts and progress. Zoos/aquariums can play a role in educating the public about these wildlife and human environmental threats and providing opportunities for positive stewardship.

Resources

Habitat Loss

www.biology.duke.edu/bio217/2001/aog/index.html

www.humboldt.edu/~tlg2/publications/what%20is%20habitat%20fragmentation.pdf

www.globalchange.umich.edu

www.oznet.ksu.edu

www.cmzoo.org/conservation/palmOilCrisis/

www.rspo.org/

www.americanpalmoil.com/

www.foe.co.uk/resource/reports/oil_for_ape_summary.pdf

www.savetheorangutan.org/

www.cspinet.org/palm/PalmOilReport.pdf

www.birdday.org

www.atlantaudobon.org

Overhunting/Poaching/Bushmeat

www.bushmeat.org/

Consuming Nature by Dr. Anthony Rose

Eating Apes by Dale Peterson and Karl Ammann.

Overfishing

www.montereybayaquarium.org
www.mbayaq.org/cr/seafoodwatch.asp

Pet Trade/Wildlife Products

www.cites.org/
www.hsus.org/
www.msnbc.msn.com/id/25677681/
Animal Underworld: Inside America's Black Market for Rare and Exotic Species by Alan Green
Black Market: Inside the Endangered Species Trade in Asia by Ben Davies

Careless Use of Resources

Healing the Planet by Paul R. Ehrlich and Anne H. Ehrlich
www.pirg.org/enviro/recycle/index.htm (U.S. Public Interest Research Group, Reduce, Reuse & Recycle Campaign)

Climate Change

www.climatecrisis.or
www.stopglobalwarming.net
www.fightglobalwarming.com
www.environmentaldefense.org
www.nwf.org/globalwarming/
www.realclimate.org/
The movie *The Inconvenient Truth*

Invasive Species

<http://www.invasivespeciesinfo.gov/>
<http://www.fws.gov/midwest/EcosystemConservation/exotic.html>
<http://www.invasiveplants.net/>

Tips for Successful Education Programs

Purpose

This session provides a forum for discussion where participants can share their personal experiences in running education programs in order to learn best practices for success, both as educators and as program administrators.

Key Points

- Careful planning, preparation and attention to detail can help ensure program success.
- “Walk through the program” beforehand to envision how it will go, and develop contingency plans.
- Do not let fear of making mistakes limit you! Accept the fact that you will make mistakes as you develop and teach education programs, and learn from them.
- Incorporate evaluation into every education program, so you can continually strive to improve by meeting the needs and expectations of your program participants.
- Use the network of your zoo/aquarium education colleagues to ask for advice on how others have solved similar problems.

Program Scheduling

- Reserve the room for your program as soon as possible.
 - Establish a room reservation system so that others at your institution know you have reserved the room for your program.
 - Avoid scheduling programs during holidays.
 - Find out what else is happening in your city on the same date you are planning a program so you can avoid conflicts.
 - Learn about local school schedules so that your school programs and teacher training workshops do not conflict with school closures, exam periods, or teacher days.
 - Plan a program schedule that is age-appropriate. For example, 3-year-olds cannot sit through a 3-hour program.
 - Others _____
-

Check for Accuracy

- Proofread any brochures, fliers or Web announcements for accuracy. Make sure times, dates and locations are correct.
 - Verify animal facts and statistics.
 - Others _____
-

Program Registration and Marketing

- Establish an efficient record-keeping system to track program registrations and cancellations.
- Carefully select your maximum number of participants based on your program content and number of instructors.

- Determine in advance how you will register participants if you have more requests than you can accommodate.
 - Define your refund policy and ensure participants understand what it is, include this information in your registration materials.
 - Ask parents to supply the child's date of birth rather than age (that way you will know if the child has just turned 5 or is almost 6 years old).
 - Keep a database of program participants so you can send targeted emails to promote upcoming programs (market to interested people).
 - When you have participants on zoo/aquarium grounds for a program, use that as an opportunity to promote other upcoming programs to them verbally, and hand out applicable promotional education materials at the end of the program.
 - Promote your education programs to "general" visitors through signs in the park, brochures available for pick-up and information printed on zoo/aquarium maps or other materials that are handed out to zoo/aquarium visitors.
 - Others _____
-

Make it Easy for Participants

- Remind people of the time and location of the program by sending a confirmation card or reminder email. For example, you could tell participants that their instructor will meet them outside the front gate of the zoo/aquarium and that the instructor will be wearing a blue zoo/aquarium shirt while holding a sign with the name of their program on it.
 - When participants arrive, meet them at a convenient location that is visible. If you are unable to meet them in person, ensure they know how to find your program on zoo/aquarium grounds.
 - Others _____
-

Attend to People's Basic Needs

- Clearly communicate logistical details, such as how to get lunch during the program, materials that are required and any specific requirements for participation.
- Schedule rest breaks and lunch times to accommodate the needs of your group
- Provide beverages and snacks.
- Make sure the room is neither too hot nor too cold.
- Make sure everyone (especially adults) knows where the bathrooms are.
- Ensure the areas are accessible to people with disabilities.
- To minimize disruptions, make sure everyone knows the rules before you get started (i.e. raise your hand to answer a question).
- Carefully train your staff so they can work with difficult children and communicate clearly with parents.
- Vary program activities so that there is a good balance between lecture, hands-on activities, and outdoor tours to keep people interested and active.
- Learn different techniques for getting and keeping a group's attention and for dealing with children that are misbehaving.

- If your group is not paying attention, maybe they are not interested in what you are talking about or you need to make the program more interactive.
 - In training workshops for teachers, do not schedule long lectures after lunch—participants will be tired.
 - Talk appropriately to your audience. Don't use words like "endothermic" or discuss the intricacies of a Jacobson's organ if you are talking to 5-year-olds.
 - Others_____
-

Safety

- On the registration for children's programs, ask for relevant health information does the child have any allergies?
 - For school programs, make it a requirement that schools provide a sufficient number of adult chaperones to ensure that students are accurately supervised.
 - For children's programs, ask that a parent or guardian accompany the child into the classroom and check in with the instructor, and to specify who will pick up the child at the end of the program.
 - Ensure that the instructor has the phone contact for a parent or guardian in the event of emergency or a child's illness.
 - During the program, children should be supervised at all times, and accompanied to the toilet.
 - In all programs, the participants' safety is your first concern.
 - Others_____
-

Ensure People can Understand What You are Saying

- If you will be using a PowerPoint presentation you may need to darken the room so it will be visible.
 - Create PowerPoint presentations with sufficient contrast between background and text, and with the text point size large enough to be visible from the back of the room.
 - Use PowerPoint as a general outline and not for your entire text.
 - Ensure that your audience can hear you—if you are soft spoken, use a microphone.
 - Others_____
-

Have a Back-up Plan

- Plan for delays by preparing for your program well in advance.
- Assemble handouts well ahead of time, in case the photocopy machine breaks down on the day of your program.
- Know which part of your program you can cut out if you run out of time.
- Plan additional activities in case you have more time than you planned for.
- What will you do if...
 - ...it rains for your outdoor program?
 - ...if you are teaching a program about an animal that is not on exhibit?
 - ...people are late for your program?
 - ...the animal you intended to feature in your program is sick?

- ...the animal does something unpredictable?
- ...a staff member scheduled to teach with you is ill that day?
- ...if several more people arrive for your program than you expected?
- ...if you have to cancel the program?

Ask for Advice

Look around you at your fellow class participants—each of these people is a resource for you. Keep in touch with them and ask for advice!

Be Flexible

Most important—be flexible. Programs never go as planned so know that you are going to have to roll with the punches.

Continuously Work to Improve

Come up with a program evaluation for participants to fill out after they attend the program, so you know what they liked about the program and what you can change to improve for next time.

Summary

Programs can be improved with careful planning of logistics, advance preparation, and attention to detail. However, unexpected situations will arise, so be flexible and believe in your own ability to think creatively and resolve a problem. Do not be afraid to fail—we learn from our mistakes, and we have much to gain by taking the risk of trying new approaches. As in all new skills, creating and implementing education programs takes practice and experience!

Community Partnerships and International Networking

WAZA- World Association of Zoos and Aquariums: <http://www.waza.org>

IZE - International Zoo Educators Association: <http://www.izea.net>

ACOPAZOOA- Columbian Association of Zoos and Aquariums:
<http://www.acopazoa.zoobaq.org/>

AIZA- Iberian Association of Zoos and Aquaria: <http://www.aiza.org.es/>

ALPZA- Latin-American Zoo and Aquarium Association

AMACAZOOA- Mesoamerican & Caribbean Zoos & Aquaria Association:
<http://www.amaczooa.org/>

ANPZ- French Zoo Association: <http://www.anpz.org/>

AZA- Association of Zoos and Aquariums: <http://www.aza.org/>

AZCARM- Association of Zoos, and Aquariums of Mexico

BIAZA- British & Irish Association of Zoos & Aquariums: <http://www.biaza.org.uk/>

DAZA- Danish Association of Zoological Gardens: <http://www.daza.dk/>

DWV- Deutscher Wildgehege Verband: <http://www.wildgehege-verband.de/>

EARAZA- Eurasian Regional Association of Zoos and Aquariums: <http://www.zoo.ru/>

EAZA- European Association of Zoos and Aquaria: <http://www.eaza.net/>

FUNPZA- National Foundation of Zoological Parks and Aquaria, Venezuela:
<http://www.funpza.org.ve/>

JAZGA- Japanese Association of Zoological Gardens and Aquariums:
<http://www.jazga.or.jp/>

PAAZAB- African Association of Zoological Gardens and Aquaria: <http://www.paazab.com/>

SAZARC- South Asian Zoo Association for Regional Cooperation: <http://www.zooreach.org/>

SEAZA- South-East Asian Zoo Association: <http://www.seaza.org/>

SNDPZ- French Zoo Directors' Federation: <http://www.sndpz.fr/>

SAZA (SDF)- Swedish Association of Zoological Parks and Aquaria:

<http://www.svenska-djurparksforeningen.nu/>

SZB- Society of Zoos of Brazil: <http://www.szb.org.br/>

USCZ- Union of Czech and Slovak Zoological Gardens: <http://www.zoopark.cz/ucsz/>

UIZA- Italian Union of Zoos and Aquaria: <http://www.uiza.org/>

VDZ- German Federation of Zoo Directors: <http://www.zoodirektoren.de/>

ZOO - Australian Regional Association of Zoological Parks and Aquaria:
<http://www.zooaquarium.org.au/>

Zooschweiz- Swiss Association of Scientific Zoos