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LEVEL 2
VOLUNTEER
HANDBOOK

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Conservation & Education

A connection that life depends on.

Mesker Park Zoo & Botanic Garden's **mission** is to foster the preservation of diverse species and living systems through active **conservation and education** in our community. In other words, we can adopt and support conservation measures that will reduce our negative impact and rather have a positive impact on these species and systems, but we can make an even bigger positive impact if we educate others on why and how they can do the same.

MPZ must be a leader in this endeavor. We must demonstrate our commitment to doing what it takes to preserve species and their habitats, both locally and globally. We must model environmentally responsible actions and attitudes to set the example for the rest of our community. We accomplish these through direct conservation projects “on the ground”, by using green practices at our Zoo, and through educational outreach and programming for the public.

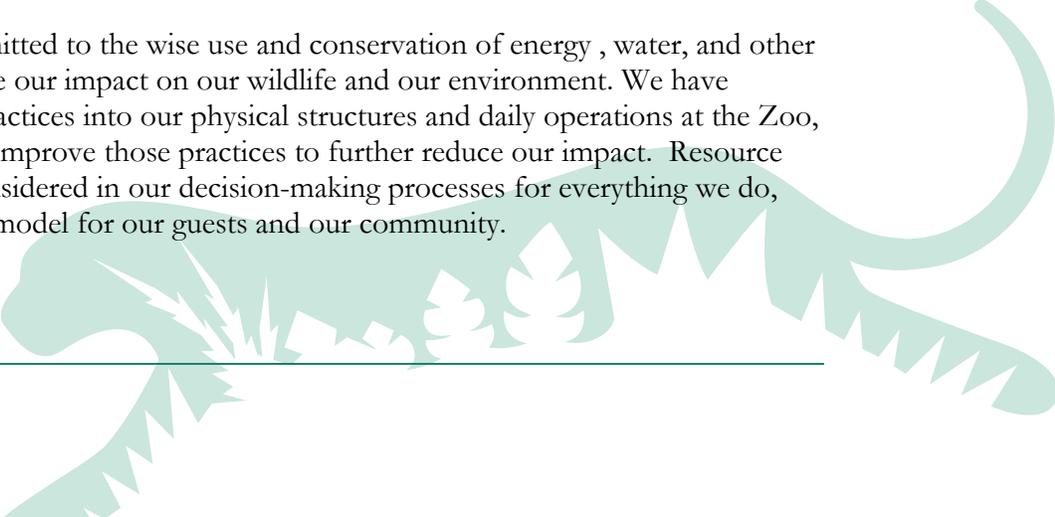
Every day people make choices and take actions that affect our wildlife and our environment. Every day YOU can influence them to choose good ones. As a MPZ Docent, you will need to understand our conservation practices and goals, and you will help us teach others how they can do their part.

Conservation

Conservation - the careful utilization and protection of a natural resource to prevent depletion, exploitation, destruction, or neglect.

Conservation at the Zoo

Mesker Park Zoo is committed to the wise use and conservation of energy, water, and other natural resources to reduce our impact on our wildlife and our environment. We have established many green practices into our physical structures and daily operations at the Zoo, and are always looking to improve those practices to further reduce our impact. Resource conservation goals are considered in our decision-making processes for everything we do, and we strive to be a role model for our guests and our community.



The MPZ Green Team is a small staff committee that monitors our structures and operations for negative impact, recommends conservation measures to reduce impact, and promotes green initiatives to both staff and visitors. The following are some of our current practices.

Habitat & Water Quality

- MPZ has two onsite greenhouses that are used to supply the Zoo with the appropriate plants for projects and landscape maintenance. The greenhouses are also used in the propagation of native plant material for ecosystem restoration partnerships with Howell Wetlands and Prairie Creek Barrens Nature Preserve.
- We have several gardens and plant buffers to reduce soil erosion and nutrients entering our waterways to improve water quality. We maintain a low mow prairie grass demonstration garden, a native plant demonstration garden, a prairie grass filter strip in our Asian Wild Horse exhibit, a small wetland to filter run-off from the Asian Plains area, and over 650 linear feet of lakeshore erosion control plantings on Lake Victoria.

Waste Reduction & Recycling

- We offer beverage container recycling to our visitors.
- MPZ created onsite recyclables collection center for zoo operations and staff. We recycle glass, aluminum, plastic containers, plastic film, cardboard, office paper, batteries, gloves, and much more.
- We reduced the use of single use plastics by discontinuing single use lids and straws for beverage cups. We also provide most animal diets in reusable containers and mesh produce bags – this has eliminated approx. 80% of the plastic bags previously used during daily diet prep.
- We partner with Trex to recycle plastic bags and film and turn them into benches.
- We work with TerraCycle for nitrile glove recycling (these are gloves used daily at the Zoo in animal diet prep, veterinary and animal care procedures, etc.).
- MPZ has a Solid Waste Composting Facility designed and registered with the Indiana Department of Environmental Management. Staff collect animal manure, branches, trees, stumps and other botanical waste for composting, which are then reused on zoo grounds to improve the soil in animal exhibits and flowerbeds.



**Our
recycling
bins are even
made of recycled
plastics!**

Energy and Water Usage

- Staff continually monitors energy and water usage. Our approach is to maintain equipment regularly to keep highest efficiency; to advise and monitor staff on energy usage; and to make capital investments that lower usage on existing and new systems.
 - A program to replace traditional lighting with energy efficient methods has been started. Several areas have been switched to compact fluorescents and LED lighting was used in the Nocturnal exhibit renovation in 2009.
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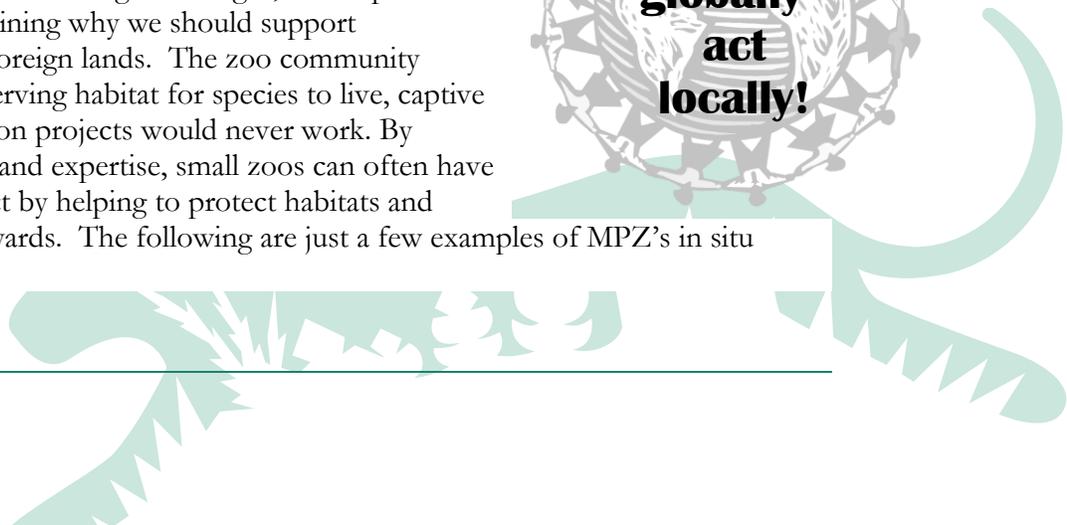
- In 2011, an investment of over \$22,000 was made to replace a small boiler to the Kley Building heating system. This allows the large boiler to be shut down for 8-10 additional weeks a year.
- Amazonia: Forest of Riches, which opened in 2008, has several features that conserve energy. The placement of the building into a south-facing hill allows the building to collect passive solar heat when needed. Return ducts placed high inside the building recirculate heated air. In the summer high vents exhaust heated air which reduces cooling needs. Careful location on supply ducts ensures that the visitor and living collections are maintained within their comfort levels.
- The Penguins of Patagonia habitat, opening in 2021, will have several features that conserve both water and energy. It will include rainwater collection from half of the entry building and the roof of the penguin building, storing that water in a greywater storage tank to be used to clean and makeup water for the penguins. This will result in considerably less usage of domestic water for these functions, reducing potable water consumption by 52-85% and stormwater runoff by 2 mil gallons annually. The penguin habitat will also include a geothermal system using the water from the Zoo's lake to cool and heat the penguin's pool water.

Conservation Education

- The Education Department and Docents increase public awareness about conservation issues and practices through conservation education programs and roaming interpretation throughout the Zoo.
- Conservation messages and practices are displayed in exhibits and gardens throughout the Zoo to teach guests how they can help conserve species and environment, and promotes them on social media and website content.
- MPZ hosts an annual Earth Day celebration "Party for the Planet", in partnership with the Association of Zoos and Aquariums.

Conservation In Situ

An **in situ** project is one that happens in an animal's natural habitat, like stopping poaching, restoring lost habitat, etc. This is in contrast to the **ex situ** projects in a protected location outside of the natural habitat, like captive breeding animals in a zoo for eventual reintroduction. When budgets are tight, municipal zoos have a difficult time explaining why we should support conservation projects in foreign lands. The zoo community realizes that without preserving habitat for species to live, captive breeding and reintroduction projects would never work. By combining modest funds and expertise, small zoos can often have the biggest positive impact by helping to protect habitats and species in their own backyards. The following are just a few examples of MPZ's in situ conservation efforts.



Hellbender Project



Hellbenders (*Cryptobranchus alleganiensis*) are the largest salamander in North America (17-24 inches) and are at risk of extinction in Indiana. They are habitat specialists with little tolerance of environmental change. Their principal threat is degradation of habitat due to activities causing sedimentation, thermal pollution and oxygen loss. Over-collecting and injuries when hooked by anglers have also decimated local

populations. Censuses indicate that there are likely only 50 adult Eastern hellbenders left in the wild on southern Indiana's Blue River, and densities are so low that experts believe that the species will be extirpated within the next two decades if captive breeding efforts are not initiated immediately.

A number of conservation partners including Indiana's Department of Natural Resources, Purdue University, and Mesker Park Zoo and Botanic Garden are assisting with a recovery effort to save the species. Area zoos are "head starting" Eastern hellbender larvae which are reared from wild-collected eggs and then released once they reach a size less likely to succumb to predators (at about 6 years old). Mesker Park Zoo has built the state's first artificial stream/raceway to home several wild-caught adults for captive breeding larvae. MPZ staff participate in annual hellbender releases on the Blue River, and raised several that were released in 2020. Mesker Park Zoo & Botanic Garden also offers a very unique opportunity for visitors to view the hellbender rearing tanks and gain awareness about the plight of this unique species.



Howell Wetlands

In the 1980's, Mesker Park Zoo & Botanic Garden's former Assistant Director began working with local groups and individuals to protect the wetland. After its acquisition in 1999 as an Evansville Park, restoration of the most disturbed part of the site began.

Howell Wetland is a 23-acre wetland remnant located on the West side of Evansville, Indiana. The wetland is significant for its diverse plant species including southern species such as bald

cypress, swamp mallow, passionflower and crossvine, which are uncommon in Indiana. It is utilized by migratory waterfowl and is home to many species of insects, reptiles, amphibians, mammals, and songbirds. Through the donation of money, time and technical expertise, Mesker Park Zoo & Botanic Garden has had a major impact on the continuing restoration and evaluation of the wetland.

Mexican Gray Wolf Recovery



Photo Courtesy of the Wild Canid Survival and Research Center

Dr. Susan Lindsey has been extensively involved in the United States Fish and Wildlife Service's recovery plan for Mexican wolves and continues to provide advice and assistance with behavioral and husbandry intervention as needed. This may include on-site work at a pre-release facility in the Southwest or other facility or phone consultations. As part of her work with Mexican wolves she was involved in the revision of the Mexican Gray Wolf Husbandry Manual and continues to provide

expertise in maintaining the MWSSP/USFWS approved enrichment list. MPZ partners with the Endangered Wolf Center in Eureka, Missouri for recommended breeding under the AZA's Species Survival Plan. Several pups born at MPZ have already been reintroduced to wild populations in the US.

AZA Conservation Initiatives

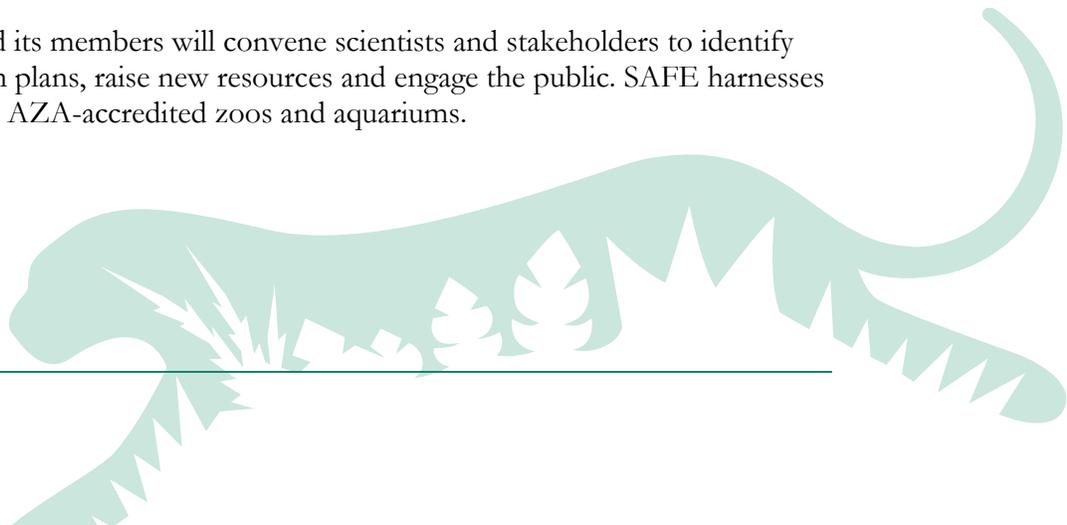
Mesker Park Zoo participates in and contributes to the following AZA (Association of Zoos and Aquariums) conservation programs.

SAFE: Saving Animals From Extinction

Across the 229 AZA-accredited zoos and aquariums, we have more wildlife care experts, more animals and a greater opportunity to engage the public than any other entity. We have three-quarters of a million animals representing 6,000 species, with close to 1,000 of them endangered in the wild. AZA-accredited institutions are already investing over \$160 million annually towards field conservation to help save animals in the wild.



Through SAFE, AZA and its members will convene scientists and stakeholders to identify the threats, develop action plans, raise new resources and engage the public. SAFE harnesses the collective power of all AZA-accredited zoos and aquariums.



Species Survival Plan

This icon is found on the signs and exhibits of species that are part of the Species Survival Plan. “The American Zoo and Aquarium Association's (AZA's) Species Survival Plan® (SSP) program began in 1981 as a cooperative population management and conservation program for selected taxa in zoos and aquariums in North America. SSPs were developed to manage the breeding of captive animal populations in order to maintain healthy, self-sustaining populations that are both genetically diverse and demographically stable. Since its inception the SSP has evolved to become a more holistic cooperative conservation program encompassing a wide variety of activities such as research, public education, fund raising, field projects and reintroduction. The mission of the program is to help ensure the survival of selected wildlife species into the future and to provide a link between zoo and aquarium animals and the conservation of their wild counterparts.” (Source: www.aza.org/ConScience/#ssp May 2004) New species are frequently added to the program, for a complete list of species currently being managed by the Species Survival Plan® program please check AZA's website (<http://www.aza.org/ConScience/ConScienceSSPList>).



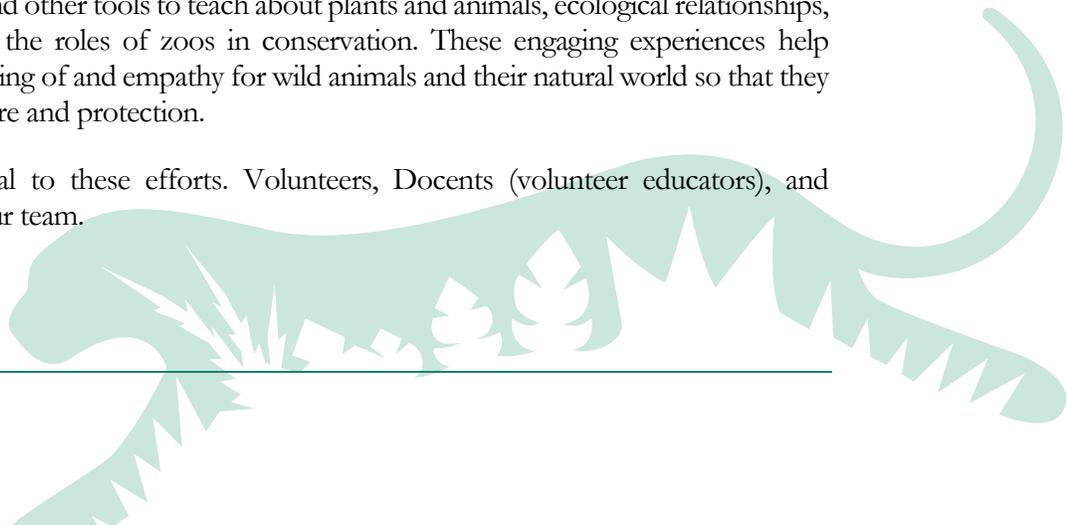
Conservation Education

Our ability to fulfill our mission would be seriously limited if the zoo's only efforts towards conservation were through our own direct actions. Reducing plastic use or breeding an endangered species in captivity are both worthwhile, but we must have an impact beyond our direct actions and physical borders. In order to have a greater impact we must inspire our community to make choices that will foster stewardship of our environment so all species have a world to live in.

Conservation Education Programs are those that are specifically designed to both raise awareness about a conservation issue and promote conservation actions. They should always deliver a conservation message and inspire action.

The Education Department provides a variety of interpretive and educational opportunities to the public, both at the zoo and out in the community. We utilize live animals, hands-on activities, demonstrations, biofacts and other tools to teach about plants and animals, ecological relationships, environmental issues, and the roles of zoos in conservation. These engaging experiences help people build an understanding of and empathy for wild animals and their natural world so that they might advocate for their care and protection.

Our Volunteers are critical to these efforts. Volunteers, Docents (volunteer educators), and ZooTeens are all part of our team.



Education

Education is the process of facilitating learning, or the acquisition of knowledge, skills, values, beliefs, and habits.

Educational methods include teaching, training, storytelling, discussion and directed research.

Education frequently takes place under the guidance of educators, however learners can also educate themselves.

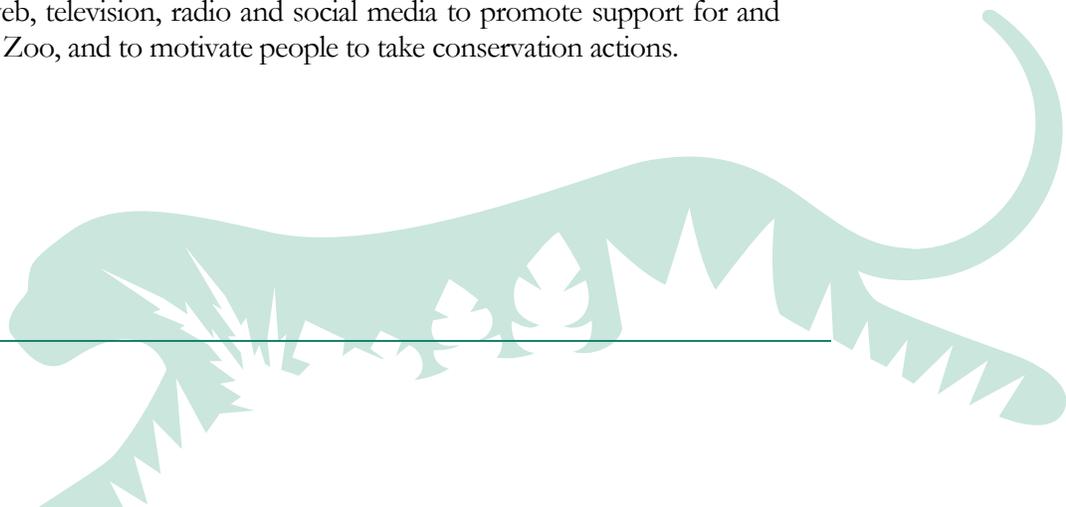
Education can take place in formal or informal settings and any experience that has a formative effect on the way one thinks, feels, or acts may be considered educational.

(www.wikipedia.com)

Conservation Education Methods

The following are some of the methods we use to provide conservation education.

1. Formal Programs - We provide formal programs with conservation messaging both at the zoo and off grounds to schools, scouts, clubs, organizations, businesses, and family groups. We also offer an immersive summer day camp for youth.
2. Roaming & Stationed Interpretation – We more casually interpret exhibits, biofacts, table displays, and ambassador animals while guests are on the move throughout the zoo.
3. Special Events – We host many events at the zoo that have a conservation message including Party for the Planet and Animal Enrichment Day.
4. Resources for Leaders – We develop supplemental materials to help educators and group leaders teach their members on their own terms or in conjunction with a program.
5. Signage - The species identification signs and other graphics around the zoo include conservation messages as a unifying theme.
6. Media – We use web, television, radio and social media to promote support for and participation at the Zoo, and to motivate people to take conservation actions.



Conservation Messages

What is a conservation message?

A conservation message 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 starting point toward a desired behavior.

Zoos must select messages that are understandable, relevant, and rewarding to audiences. Develop and use explicit conservation messages in programs, and **go further to provide concrete suggestions for ways people can take action** - daily, locally, and bigger picture globally. Actions should be realistically doable and relevant to their community and their lives.

Conservation Messages from AZA

The Association of Zoos and Aquariums (AZA) promotes high standards of excellence in all aspects of conservation education. The following conservation messages were developed by the AZA Conservation Education Committee and approved by the AZA Board of Directors as appropriate to the conservation education missions of AZA zoos and aquariums.

All of the messages below focus on either illustrating human impact on the environment, fostering feelings of empathy and appreciation towards other species, and/or conveying how people can help protect species and the environment. We encourage you to use these messages in your interpretive programming, focusing on only or two main messages at any time.

As presented in the monologue for the AZA Course
"Conservation Education: Effective Program Design", 2020

All life on Earth exists within an ecosystem.

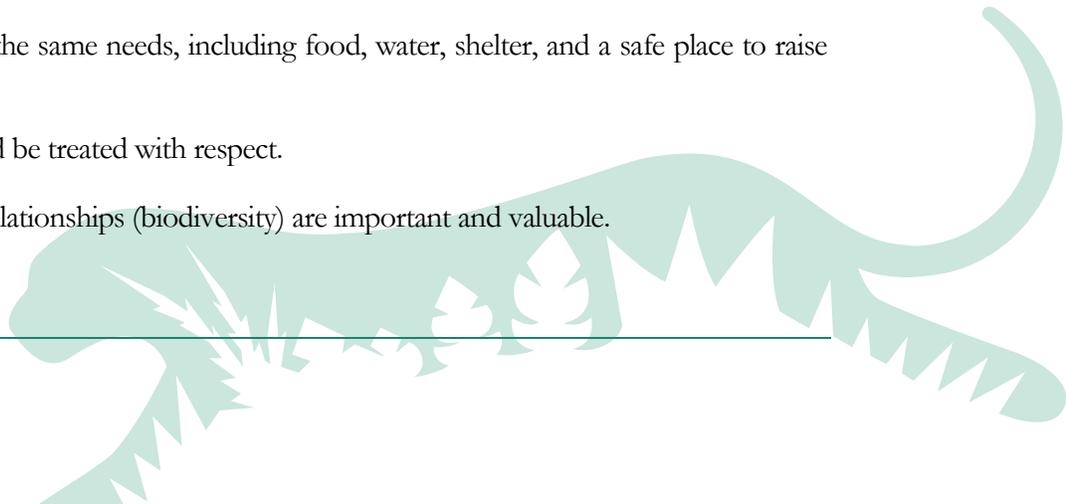
- a. An impact on any element of an ecosystem has ramifications throughout the ecosystem.

A healthy habit is one component of an ecosystem.

- a. A healthy habit is critical to wildlife survival.

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

- b. All animals and plant life are valuable and important beyond their utility to humans.
- c. All animals have the same needs, including food, water, shelter, and a safe place to raise young.
- d. All animals should be treated with respect.
- e. Interdependent relationships (biodiversity) are important and valuable.



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

- a. Natural systems maintain a habitable planet by regulating climate and by cycling water, oxygen and carbon dioxide and soil nutrients.
- b. Natural systems provide human beings with essential services (ecosystem services) that sustain life on Earth: fresh air, clean water, soil and oceans that can produce food.
- c. Biological diversity provides a multitude of natural resources used commercially for food, shelter, fiber, and other products.
- d. People depend on thousands of plants and animals to live their daily lives.
- e. Nature is the primary source 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.
- f. Healthy ecosystems underpin healthy human economics and sustainable nature systems support sustainable human communities. Many jobs depend directly on protecting natural ecosystems (fishing, farming, etc.).

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

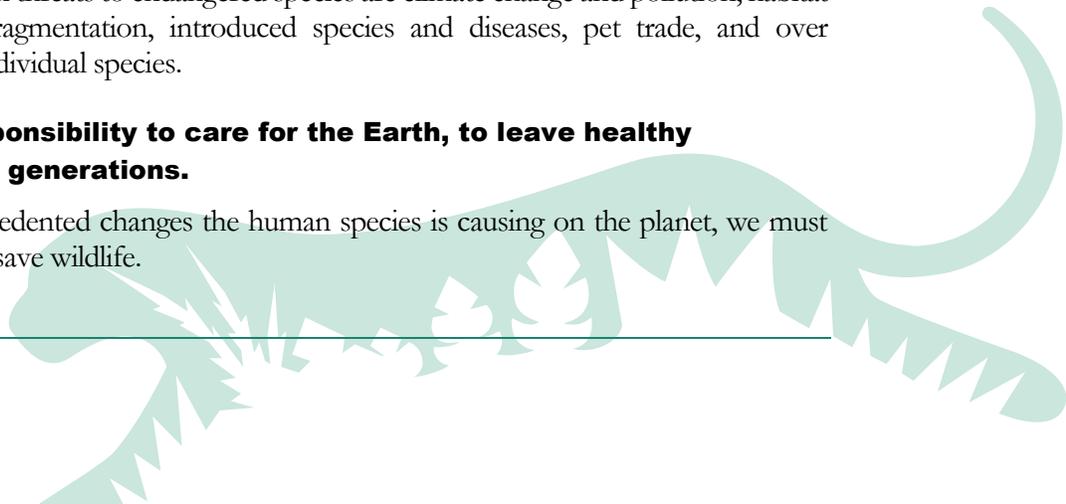
- a. Nature provides wondrous places to play and recreate, to explore, to be creative, to learn and enjoy both as individuals and with our friends and families.
- b. The beauty and resources of the natural world are national treasures. They help define America's national heritage and character, and provide the nation with valuable and irreplaceable natural resources.
- c. 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.

- a. 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.
- b. 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 future generations.

- a. Due to the unprecedented changes the human species is causing on the planet, we must often intervene to save wildlife.



- b. Many decisions involved with caring for the Earth are extremely complex, and must take into account both human and animal needs.

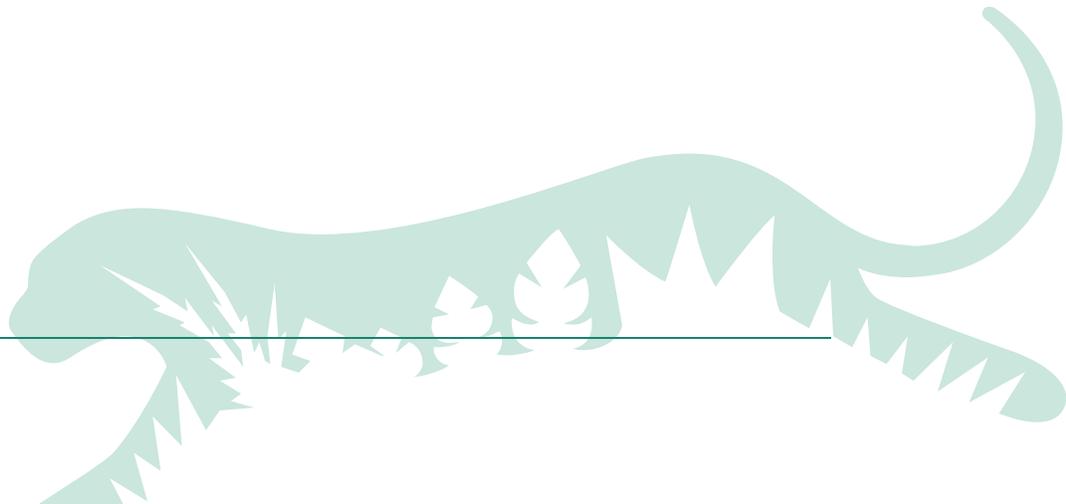
Responsible zoos and aquariums conserve ecosystems and promote action and care for the natural world.

- a. We share knowledge, ideas, and projects that empower people to take conservation action.
- b. We are active partners in the conservation community and help further conservation efforts worldwide by seeking realistic solutions to conservation problems.
- c. We provide animal and nature experiences that engender a sense of wonder.
- d. We share information about animals and the ecosystems they inhabit.
- e. We model caring by being leaders in animal care.

Through informed actions, individuals can positively impact the survival of wildlife.

- a. Making appropriate daily individual lifestyle decisions that benefit the environment and animals.
- b. Protecting and restoring natural wildlife areas.
- c. Enforced government protection of air, water, and land.
- d. Sharing the need to protect nature and make positive lifestyle choices with others.
- e. Joining or starting a conservation club or organization, support existing conservation organizations, including AZA zoos and aquariums.

In the next chapter, we go into ecological concepts to help you better understand the science behind these messages.





Ecological Concepts

All life is connected.

Even the word ecology acknowledges the simple truth that all life is connected. It originated from the Greek oikos (house) and logi (study) and means simply the study of the house, and has come to mean the study of the planet and its inhabitants.

As you may imagine it is a very big field with many subspecialties and complex concepts. It would be utterly hopeless to require docents to know everything there is to know about ecology. What we can do is attempt to provide you with a very brief introduction to ecology concepts that you should understand when you interpret to guests at the Zoo.

The Big Picture

So, what are the major subspecialties of ecology?

Population Ecology – study of population processes (births, deaths, and migration)

Community Ecology – study of the interactions of populations within a given habitat or area

Behavioral Ecology – study of the influence of natural selection on behavior

Evolutionary Ecology – study of interactions between populations' gene pools and selective factors in the environment

Wildlife Ecology – similar to population ecology, but implies management component

Vertebrate Ecology – study of vertebrate species in relationship to their environments

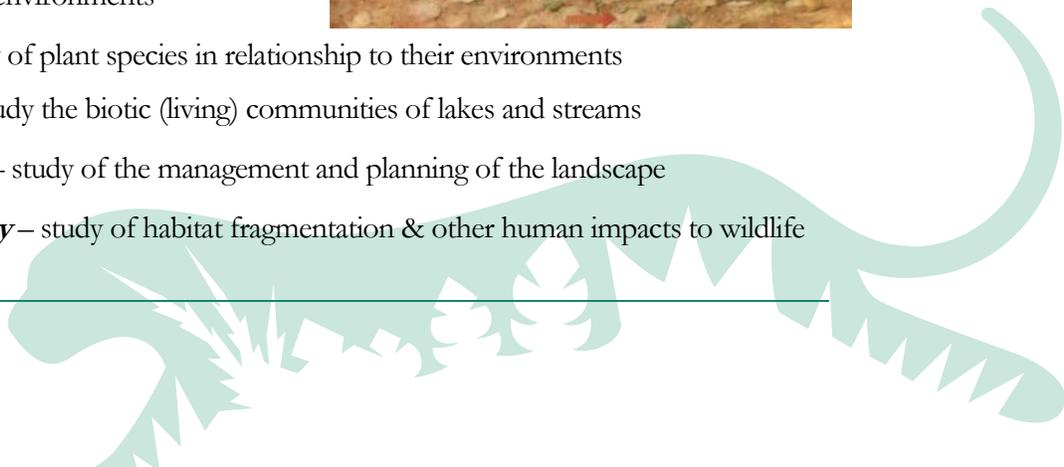
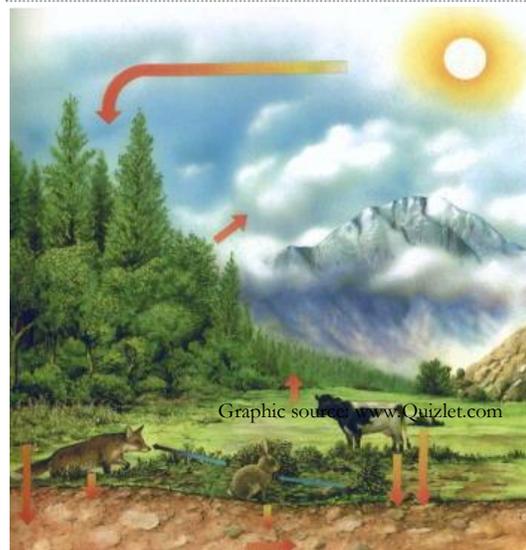
Plant Ecology – study of plant species in relationship to their environments

Aquatic Ecology – study the biotic (living) communities of lakes and streams

Landscape Ecology – study of the management and planning of the landscape

Conservation Ecology – study of habitat fragmentation & other human impacts to wildlife

Ecology - The study of how living things interact with each other and their environment.



Soil Ecology – study of soil biology and belowground processes with emphasis on microbial ecology and plant-microorganism relationships

The list goes on and on. As you can see almost anything can become an ecological specialty, because the label ecology simply means that you are going to consider the concept in the light of the big picture – the relationship between an organism and its environment. In this chapter we will mainly cover concepts in community ecology and evolutionary ecology. Those will be the most helpful to you as you interpret our plants and animals - what they are, where they live, what they eat, and how they compete and adapt - and as you deliver conservation messages to our guests at the zoo.

Topics in Community Ecology

Ecological Levels

Ecology can be studied in context of levels - from a single organism to the whole planet. These levels are presented below from smallest to largest. Each level is part of the next larger level, and all are part of the biosphere.

Organism – An individual living thing.

Species – A group of similar organisms that can breed and produce fertile offspring.

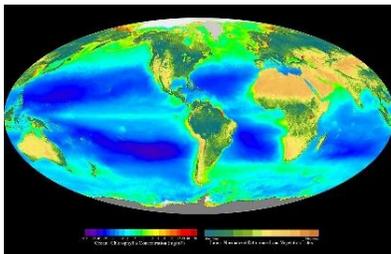
Population – A group of individuals that are the same species and live in the same area.

Community – A group of various species that live in the same habitat and interact with each other. (Tip – all the living things in an area)

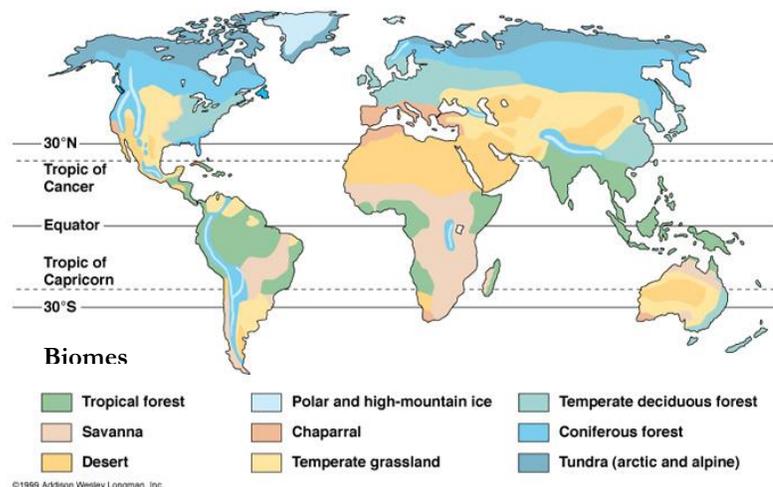
Ecosystem – A biological community of interacting organisms and their physical environment. (Tip – all the living things and their environment)

Biome – A large region characterized by a specific type of climate and certain types of plant and animal communities that can live there. (More on biomes will be detailed below.)

Biosphere – All interacting life on Earth and all parts of the Earth in which life exists, including land, water, and the atmosphere.



Biosphere
Sources: wikipedia



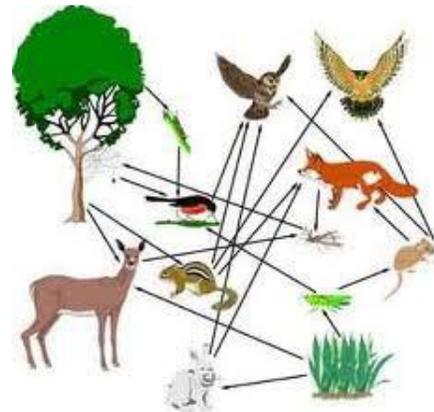
Ecological Concepts

Habitat - The place where an organism lives. A habitat has the proper food, water, shelter, and space for the organism to get all it needs to survive.

Niche - The ecological role of an organism in its environment. You can think of this like its job - it sums up what it does, what it eats, how it reproduces, and essentially everything it does to survive.

Food Web -

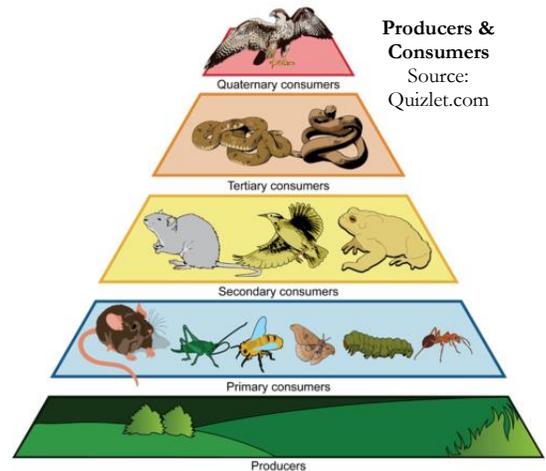
A food chain/web shows how each living plant and animal gets food. Some animals eat plants only (**herbivores**), some animals eat plants and animals (**omnivores**), and some animals eat only other animals (**carnivores**). A food chain always starts with a plant and ends with an animal. Animals are part of several food chains because they eat more than one type of plant and/or animal in order to survive. These interconnected food chains form a food web.



A food web
Source: Quizlet.com

The following are roles of organisms in the food chain:

- **Producers** – An organism that can make its own food from the sun or a chemical energy source. Most are plants, but there are also some bacteria and protist producers. Producers are required as the foundation for the entire food web. They make energy (like sunlight) into a usable form for all other organisms.
- **Consumer** – An organism that survives by eating other organisms
 - **Primary Consumers** – aka Herbivores; eat plants (producers)
 - **Secondary Consumers** – aka Carnivores; eat primary consumers (herbivores)
 - **Tertiary Consumers** – aka_top Carnivores; eat secondary consumers (carnivores)
 - **Scavengers** – a special kind of consumer that eats dead animals at any level
 - **Detritivores** – a special kind of consumer that eats detritus, which is organic debris on or in the soil - i.e. leaves on the forest floor.
- **Decomposers** – An organism that breaks down the dead remains of other organisms into its raw ingredients (i.e. nutrients & minerals).



Producers & Consumers
Source: Quizlet.com



Decomposer
Source: quizlet.com



Scavenger
Source: nationalgeographic.com



Detritivore
Source: willyswilderness.org

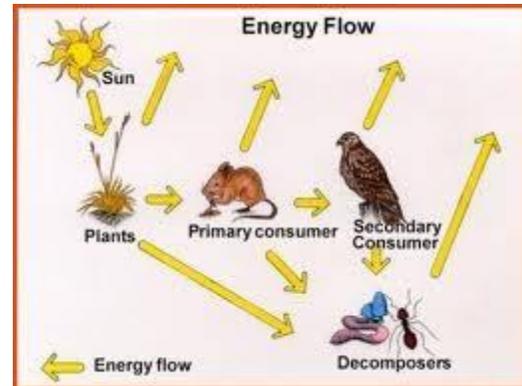
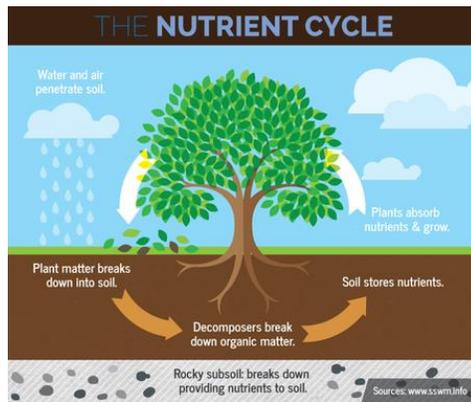
Energy & Nutrients -

Energy & nutrients move through an ecosystem and its living things. Energy and nutrients are consumed and passed from one organism to another in the food web as those organisms live and die.

Energy is never created or destroyed, but flows one way through a system. High quality energy includes sunlight and can become lower quality energy that is not as useful to living things like, heat.

Energy & Nutrient Cycles

Source: Quizlet.com



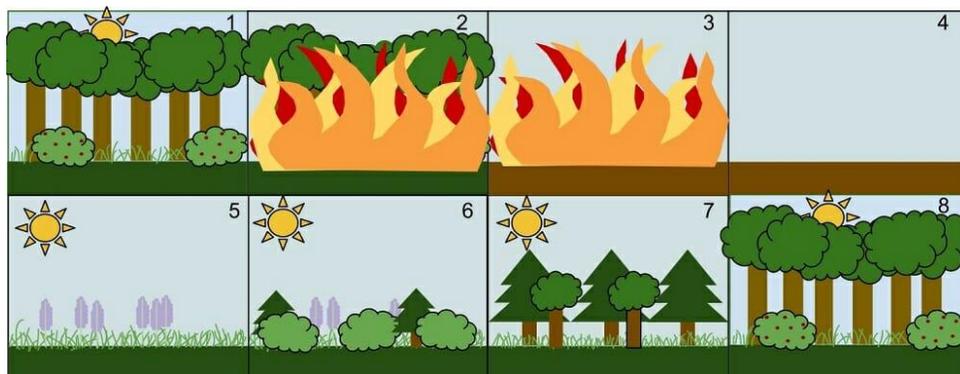
Nutrients cycle around an ecosystem. Nutrients like nitrogen, phosphorus, and sulfur are vital to building physical structures like plant stems and animal bones. Nutrients in rocks, soil, or dead organisms are converted by decomposers or weathering processes into forms that producers can use and incorporate back into the food web.

Succession – The change in the living community over time that follows a disturbance in the environment, such as a wildfire, flood, tornado, or human activity.

- **Primary succession** – changes to an environment that was not previously inhabited by plants. Examples: volcanoes, rock, open water.
- **Secondary succession** – changes to an environment after the removal of an earlier community. Examples: a forest after clearcutting, a field after tilling, or an area after a fire. This is a much quicker process since there is already soil and neighboring communities to colonize it.

Secondary Succession

Source: Biologydictionary.net



Biomes

Biomes are the global regions which are described by their climate, fauna, and flora. The biome concept embraces the idea of community and of interaction among vegetation, animal populations, and soils. A biome (also called a biotic area) may be defined as a major region of distinctive plant and animal groups well adapted to the physical environment of its distribution area.

Climate (predictable patterns of temperature & precipitation) determines where different biomes are found on the planet.

Scientists differ on the exact number of biomes because similar biomes contain unique qualities that set them apart, but are not enough to distinguish them completely from the others. The major biomes and associated subdivisions are described below to help you better understand where our plants and animals live and why.

Forest Biomes

Forest biomes represent the largest and most ecologically complex system. They contain a variety of trees, plants, animals, and microorganisms. Forests represent one-third of the earth's land surface, and are found on every continent, except Antarctica. The major attribute of the forest biome is its trees. Deforestation represents a great threat to the future of the earth's atmosphere, and the only way this can be avoided is by careful management of this resource.

- Tropical Rainforest – A very thick forest in the hot and humid tropics where there are constant temperatures, rainfall, seasons, and high biodiversity. (We will detail this more below.)
- Temperate Rainforest – A deciduous hardwood forest with moderate temperatures, ample rainfall, and distinct seasons.
- Chaparral – A tropical dry forest with small trees and bushes adapted to a moderate coastal climate.
- Taiga / Boreal Forest - A dry coniferous (evergreen) forest below the arctic and subarctic tundra regions.



Forest

Source: biologyonline.com

Grassland

Source: si.edu



Grassland Biomes

Grassland biomes are unaltered areas where grass is the dominant plant life, as opposed to other biomes where trees occupy most of the land surface. Grasslands are found throughout the world, have served as grazing areas for large numbers of animals, and have been exploited as farming grounds or plantations by humans.

- Prairie – A temperate grassland characterized by deep, nutrient-rich soil that supports many grass species, but has a lack of trees due to the hot, dry summer and cold, harsh winters.

- Savanna – A grassy plain in tropical and subtropical regions with few trees due to the extended hot, dry periods and grazing animals.

**Desert**

Source: biologyreference.com

Desert Biomes

Deserts cover about one-fifth of the earth's surface, and are caused by extremely low rainfall. Several species of plants and animals thrive in this climate because they have been able to adapt to very little water availability and extreme temperature fluctuations. Examples include cold deserts, hot deserts, and coastal deserts.

Tundra Biomes

Tundra, the ice desert, frozen prairie, the cold plains of the far north get their name from the Finnish word “tunturia”, which means treeless land. The tundra biome is the coldest of all the terrestrial ecosystems. The soil is poor in nutrients, and has a permanently frozen sublayer called permafrost, which accounts for the sparse vegetation. However, the tundra is host to many plants and animals, and represents a testament to nature's adaptability. Examples include arctic and alpine (mountainous) tundra biomes.

**Tundra**

Source: study.com

Aquatic Biomes

Water covers about three-quarters of the planet. Water ecosystems are the least understood because they are so vast and hard to access. The water in our vast aquatic landscape evaporates and provides rain, influencing much of our climate. From oceans to creeks, aquatic systems provide vast habitat to a variety of life forms, from algae to whales. Algae is a critical producer and foundation of the global food web, making sunlight energy available in a usable form to all other life. Algae also provides a great service, providing most of the oxygen and absorbing large amounts of carbon dioxide in the atmosphere.

Marine aquatic systems include oceans, estuaries, and saltwater wetlands. Oceans are the largest and most diverse of the ecosystems. Coral reefs in warm oceans are some of the most productive and biodiverse. Freshwater aquatic systems include rivers, lakes, and inland wetlands. Wetlands are biologically diverse ecosystems, teeming with life due to the high availability of nutrients, food, water, and shelter. Wetlands discourage human development, and so they are better able to provide wildlife with habitat, nurseries to raise young, resting grounds for migratory waterfowl, and much more.

**Coral Reef**

Source: sciencing.com

Biome Study: Rainforests

Rainforest
Xprice.org

Mesker Park Zoo has an extensive rainforest biome exhibit, an incredible man-made feat to have in the Midwestern US. To better prepare you to interpret in that part of the Zoo, we will provide a little bit more study about the rainforest.



What is a Rainforest?

The tropical rainforest is the most ecologically rich of the world's biomes. Daylight in the tropical rainforest lasts for 12 hours, there is no winter, and it is consistently warm and wet. It is a biological hotspot, which means it contains a huge number of species per unit size. Although the vast majority of rainforests occur in the tropics, some occur as far north as Washington state.

Humans pose the biggest threat to the tropical rainforests, causing irreparable damage to the earth's atmosphere. Rainforests are being destroyed for commercial logging, agriculture, livestock, and development projects (dams, road systems, mining, and oil drilling). Approximately 80,000 acres of rainforest are destroyed each year, resulting in more than 50,000 species becoming extinct.

Why are Rainforests so Important?

1. Rainforests help control the world's climate. The warm wet forest strongly influences the amount of moisture evaporating into the air. The clouds that cover the rainforest act as a cover around the equator to reflect the sun, mitigating temperature change. The rainforest canopies produce vast amounts of oxygen and absorb carbon dioxide. The rainforests are the "LUNGS" of the world.
2. The rainforests are by far the richest habitat on earth. There are as many as 30 million species of plants and animals or more than 50% of all life forms living in rainforests.
3. Indigenous peoples who have lived in rainforests for thousands of years know how early man lived and survived. They get everything they need to survive from the earth, and take only what they need – a lifestyle called subsistence. These people may be the only source of knowledge of how to live off the land, as most of it has yet to be written.
4. Rainforests are nature's pharmacy. In this vast reserve of natural resources are many answers to health ailments facing humankind. The U.S. National Cancer institute has identified 3,000 plants with anticancer properties, and 70% come from the rainforest.

5. Many food products are found in rainforests.

avocado

cola nut

bananas

corn syrup

brazil nuts

guava

allspice

ginger

cashews

kiwi fruit

cassava

macadamia nuts

chocolate

cinnamon

paprika

cayenne & black pepper

turmeric

passion fruit

coconuts

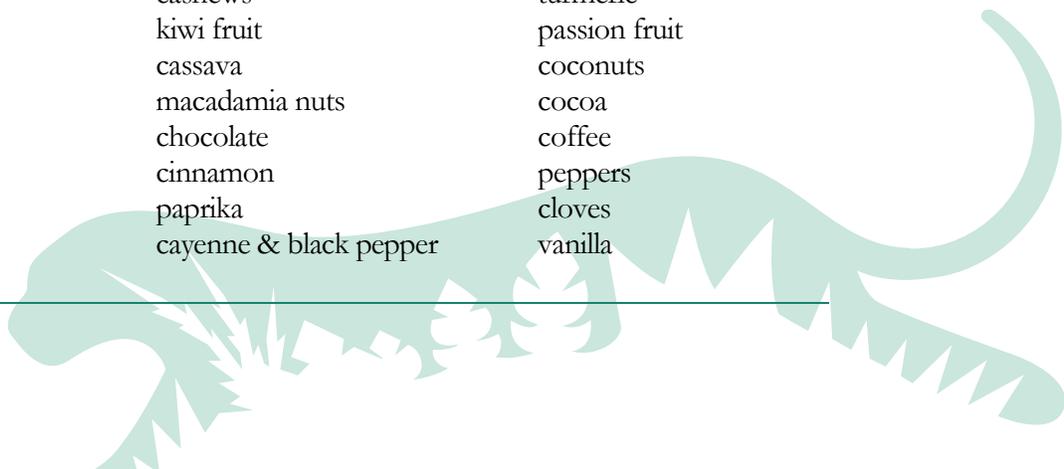
cocoa

coffee

peppers

cloves

vanilla



Adaptation & Evolution

Millions of years of evolution has resulted in the astounding diversity of life forms on the planet today. However, many of those species are in danger of becoming extinct because they have not been able to adapt to the overwhelming human impacts to their environments. In order to understand why species are vulnerable to extinction, you should have a general understanding of how adaptation and evolution work.

All organisms must compete to survive. They must compete with their own kind, and all other forms of life looking to secure the same resources – food, water, nesting sites, mates, etc. Competition drives organisms to adapt to their always changing environment in order to survive. Those that adapt can evolve to become more fit for survival as a species.

- Competition – a natural phenomenon that occurs when two or more organisms actively demand or compete for the same natural resource in limited supply.
- Adaptation – an organism’s modification to its environment in order to improve its survival in that environment; a heritable physical or behavioral trait that improves its fitness for survival.
- Evolution – cumulative inherited change in a population of organisms through generations of time leading to the appearance of new characteristics or life forms; the change in the gene composition of a population over time.

Evolution is probably the single most misunderstood word in biology. I am sure you have heard people say (or said yourself) “I don’t believe in evolution.” It would be like saying “I don’t believe in change” or “I don’t believe in gravity.” It doesn’t matter whether or not you believe in change or gravity, they happen.

Changes happen in populations in response to changes in the environment every day. Green tree frogs adapt to global warming by expanding their range north, polar bears must change their feeding strategy due to melting oceanic ice, bacteria become resistant to frequently used antibiotics, and viruses mutate to increase their ability to spread from host to host.

A change may appear in an organism’s lifetime, but if they have a genetic foundation and are passed onto the next generations – that is evolution. Significant changes happen over MANY generations, which may be just months for a bacteria to form resistance to a drug, to tens of thousands of years for a reptile to develop modified scales called feathers.

A Word About Creationism:

Whether you believe Genesis is the literal truth, an elegant analogy, or one of many creation stories is immaterial. We teach the science of biology and we can only deal in the realm of the measurable and observable. Therefore, please leave your personal beliefs at home when discussing adaptation & evolution with the public.

We do not discuss the origin of life or the origin of species in our interpretation, so hopefully our messages and your personal beliefs will not be in conflict.

Evolution is the genetic change in a population over time. Genes that are favorable for survival, allow the organism to survive and reproduce, passing those genes on to the offspring. These genes are “selected” by nature, and are propagated to become more frequent in the population. Genes that are not favorable for survival die out of the population. Hence, genetic characteristics of organisms in a population change over generations of time. This is called evolution by natural selection.

Individuals do NOT evolve - only populations can evolve when genes are passed to the next generation.

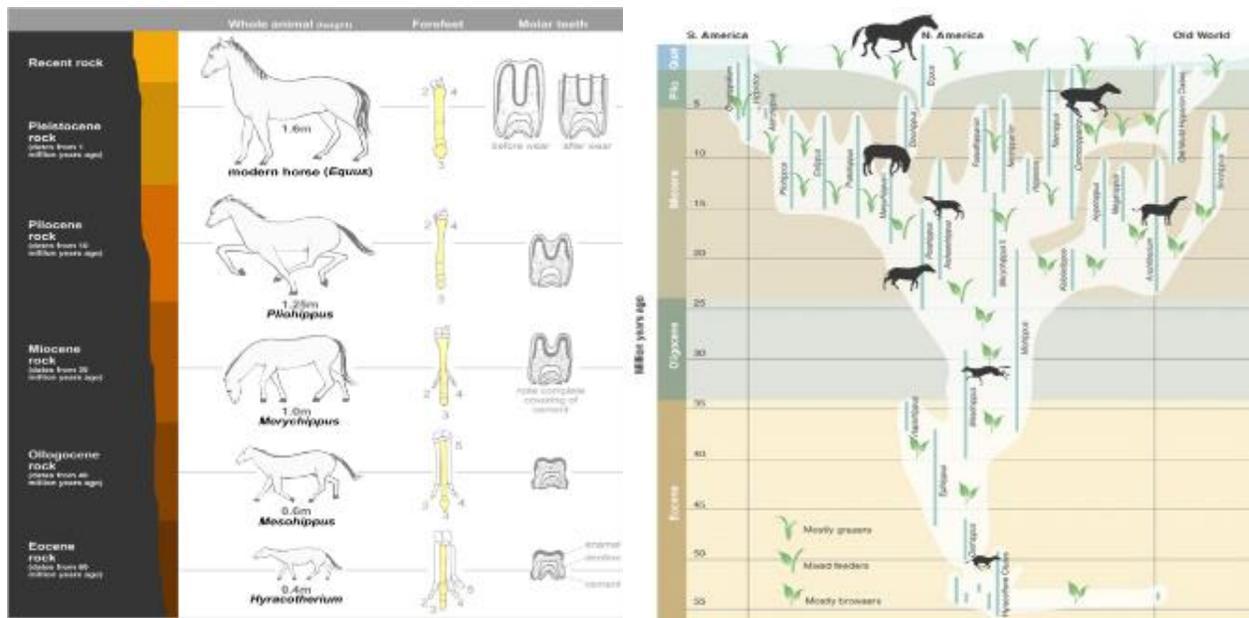
How gene frequencies in a population change:

Randomly

1. Small Populations – there isn’t enough genetic diversity in a small population to find favorable genes for the current environmental conditions, and they may die out all together
2. Random mutation – random mutations in genes happen all the time, sometimes good sometimes bad. These are passed onto the next generation if they survive and reproduce.

Selection

3. Natural – change resulting from favorability of survival due to natural conditions
4. Sexual – change resulting from differential selection on the sexes (ex. -peacock)
5. Artificial – change resulting from human preference and selective breeding (ex. -domestic plants and animals).



There is ample support for evolution of horses in the fossil record. However, the traditional view we all learned in grade school is too simplistic. The general progression of equids adaptation to a running, grazing lifestyle is illustrated on the left. A more realistic view of horse evolution, complete with branches that go nowhere and transitional forms that are not ancestral is shown on the right.

Left hand image: Wikipedia.org; Right hand image: MacFadden, B. (2005). Fossil Horses – Evidence for Evolution. Science 307, 1728-1730.

Domestication

We have several domesticated plants and animals on exhibit or in our Ambassador Animal collection here at MPZ.

Domestication has resulted from artificial selection, a human-induced evolution that started about 10,000 to 12,000 years ago. Early humans supported themselves by hunting, fishing, and collecting (fruits, seeds, and plants). It is believed that a food supply shortage changed this method of survival. People settled down to one place and began the agriculture society. The cultivation of some wild seeds and domestication of some animals made these changes possible.

Certain animals had the temperament to remain close to humans. As a result, these animals received the benefits of a secure food supply and protection. Animals were domesticated for several reasons, including, food, companionship, religious reasons, labor, and for skins or furs (shelter and clothing). In addition, certain plants, seeds, and trees were domesticated for food, medicine, clothing (flax) and shelter.

The dog is considered the first domesticated animal.

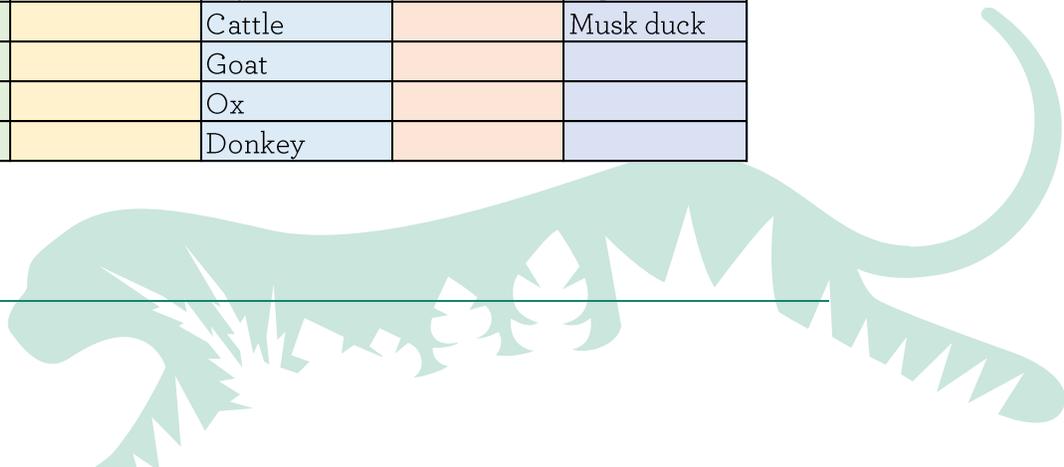
Levels of Domestication:

1. **Wild animals:** Those animals living in a natural state and not ordinarily tame or domesticated.
2. **Feral animals:** Animals or their descendants that have usually escaped domestication and become wild.
3. **Domestic animals:** Animals living near habitations of humans that are tame and useful to the lives of humans.
4. **Tame animals:** Animals that are reduced from the state of native wildness as to be tractable and useful to humans.

Domestication Origins:

Many animal species were domesticated and thrive today in the range of their wild ancestors, where they are adapted to ecological conditions. The first domesticated animals and their original environments are listed below:

Asia Grasslands		China/India	Central Asia	N. America	S. American Highlands
Yak	Ox	Water buffalo	Horse	Turkey	Llama
Camel	Rooster	Chicken	Pig		Alpaca
Dog	Goat		Cattle		Musk duck
Zebu	Buffalo		Goat		
Horse			Ox		
Sheep			Donkey		



Extinction

Organisms that cannot adapt and evolve to changing conditions are likely to be in danger of extinction. Many species that live at our zoo are vulnerable, threatened, or endangered of extinction in the wild. These terms are defined for you below, in order of their severity of risk for the species.

- Least concern - a population of species that is not at risk of population decline.
- Vulnerable - a species likely to become endangered unless the circumstances that are threatening its survival and reproduction improve.
- Threatened – A declining population and likely to become endangered
- Endangered – In danger of becoming extinct
- Extinct – The disappearance of all members of a species from Earth
- Extirpated – Extinct in a geographical area (i.e. locally)

Conservation status:

The status of a species is based upon the research gathered by the International Union for Conservation of Nature and Natural Resources (IUCN) and published periodically in its Red List of Threatened Species™ (found online at www.redlist.org). The IUCN status bar on our exhibit signs at MPZ shows the risk of extinction that a species faces in the wild.



Animals and Plants Are More Prone To Extinction If They:

Interfere in some way with people's activities

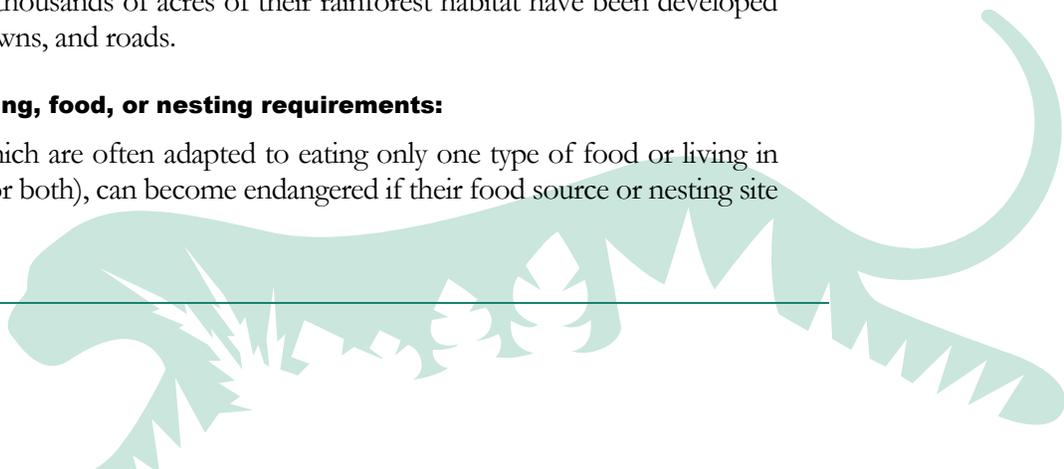
If animals kill livestock, eat or ruin crops, or feed on animals that people also like to eat they are often shot, poisoned, or harmed in some other way. For example, many predators such as eagles, wolves, and cougars may hunt livestock, and deer, geese, or squirrels sometimes eat crops. Land that is favorable for agriculture or development are plowed under or built on, converting the habitat that wildlife depended on.

Migrate:

Migrating animals depend on many different habitats therefore they are very vulnerable to habitat destruction. For example, many songbirds that migrate to tropical forests in winter are in trouble because thousands of acres of their rainforest habitat have been developed into pastures, farms, towns, and roads.

Have very specific growing, food, or nesting requirements:

Specialized animals, which are often adapted to eating only one type of food or living in only one type of area (or both), can become endangered if their food source or nesting site disappears.



Are sensitive to change:

Many species have a very difficult time adapting to changes in their environment. Both plants and animals have a hard time adapting to significant weather fluctuations, global climate change, use of pesticides and herbicides, and competing with introduced species (e.g. kudzu, starlings, zebra mussels, etc.) or tolerating human activity and development.

Have small numbers of offspring and slow reproductive cycles:

Species that produce small numbers of offspring every year or more infrequently (elephants, bats, fruiting trees, etc) are at risk because when their populations drop, it takes them much more time to recover because of their low reproductive rates. Frequently they become extinct before their populations can make a comeback.

Are naturally rare:

Some animals are rare throughout their range, and others have a very limited range. In both cases, the animals are more vulnerable to habitat destruction, diseases, invasive species and other factors just because there are fewer of them to begin with.

Are exploitable:

Plants and animals are frequently exploited to the extent that they cannot recover (e. g. exotic hardwoods, fur-bearing mammals, and species collected for the exotic pet and plant trade).

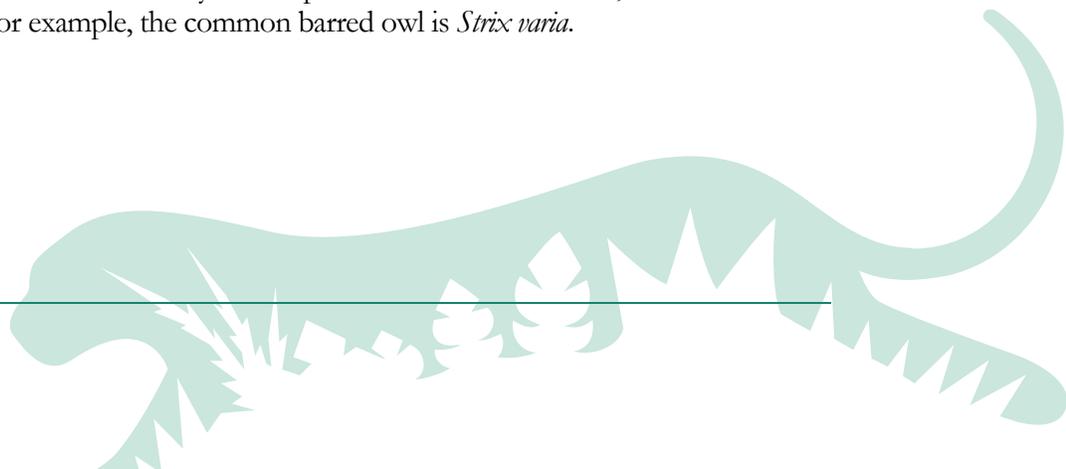
Taxonomy

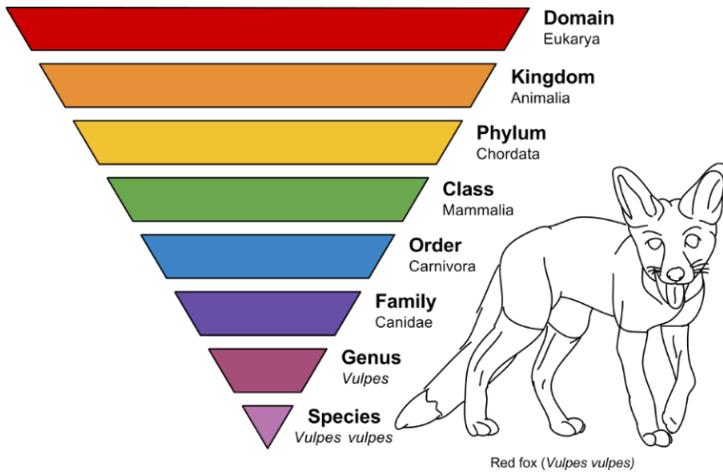
Our MPZ signs for plants and animals on exhibit include both common names and scientific names. Insight as to how they are named may be helpful for you as you interpret to guests.

How do we name a species?

The field of naming and classifying organisms is called **taxonomy**. Organisms are named and classified based on their physical, developmental, and behavioral characteristics and their evolutionary relationship with other organisms. All species, living or extinct, are classified into groups with similar or closely related organisms, and then given names accordingly.

Organisms can have many common names, but those can differ between cultures, languages, and localities. So, organisms are also given a scientific name that is used universally by all scientists. Scientific names are Latin – a universally accepted language because it no longer has a home country. The scientific name is always a two part name written in italics, and contains both Genus and Species. For example, the common barred owl is *Strix varia*.



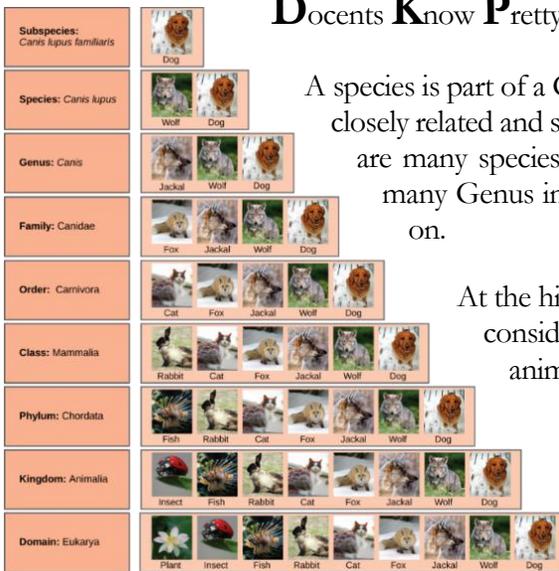


There are 8 levels of taxonomic classification, starting with species – the smallest and most specific group, up to domain - the largest, most inclusive group. The Genus and species is the most specific, and both are always given in naming an organism.

Taxonomic Levels
<https://en.wikipedia.org/>

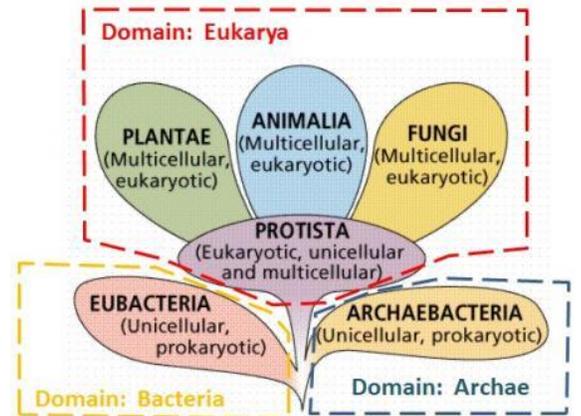
A good way to remember the order of the taxonomic levels is by creating or memorizing a memory aide for them. We have created one to help you:

Do cents **K**now **P**retty **C**ool **O**bjective **F**acts and **G**ood **S**tories



A species is part of a Genus, and grouped with other species that are closely related and share similar characteristics. For example, there are many species of canids in the genus *Canis*. There are also many Genus in a Family, many Families in an Order, and so on.

At the highest levels, every living thing is basically considered either a bacteria, protist, fungi, plant, or animal.



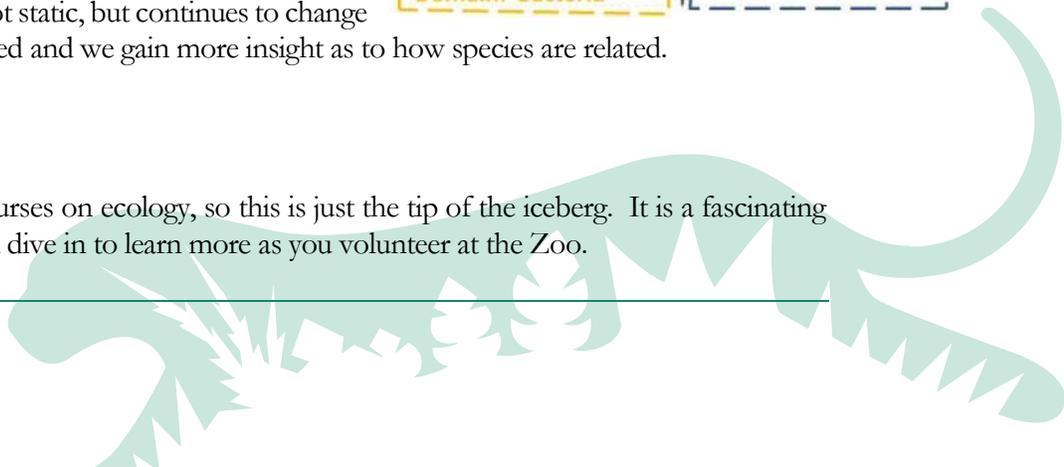
Level groupings
www.courses.lumenlearning.com

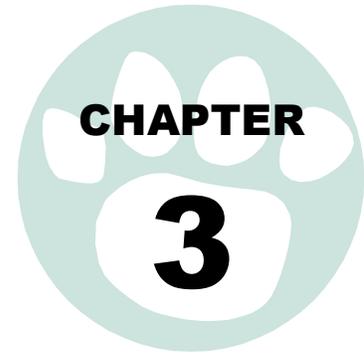
Domains & Kingdoms
www.texasgateway.org

The taxonomic system is not static, but continues to change as new species are discovered and we gain more insight as to how species are related.

Ecology Etc.

There are whole college courses on ecology, so this is just the tip of the iceberg. It is a fascinating topic, and we hope you will dive in to learn more as you volunteer at the Zoo.





Interpretation

Connecting people to the message.

Education is teaching people about what we do. Interpretation is connecting people to care about what we do. It is the bridge between people knowing something, and people caring and doing something about it. Interpretation requires a human bridge between the information and the connection – it requires you.

Your job as a docent is to forge those connections with people. We want our public to not only understand the who, what, and where facts about our wildlife species, but more importantly we need them to feel connected to them, care about them, and take actions to protect them. We want to teach the public about the environmental issues we all face and the conservation actions that can solve problems, but we need them to feel like their actions matter and they can make a difference. We need this connection, because without it, we are just a walking encyclopedia of information with no consequence of impact.

In this chapter we will provide to you more insight into the practice of interpretation, and give you some tips to help you do it effectively.

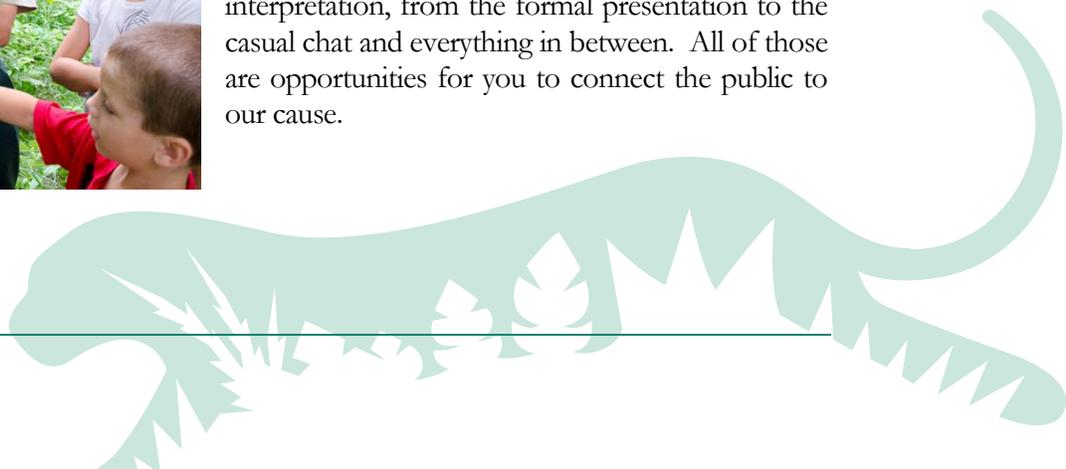
What Is Interpretation?

The definition provided by the National Association for Interpretation is: “Interpretation is a communication process that forges emotional and intellectual connections between the interests of the audience and the inherent meanings in the resource.” (<http://www.interpnet.com>, 2004)



Source: Lavendermagazine.com

Interpretation happens when you interact with guests to help them with questions, talk to them about an exhibit, share an ambassador animal with them, engage with them at a station somewhere in the Zoo, or when you conduct a program for a school group. All of those are forms of interpretation, from the formal presentation to the casual chat and everything in between. All of those are opportunities for you to connect the public to our cause.



You as an Interpreter

What does this mean for you, a Docent? Regardless of what task you are engaged in at the Zoo, you may be the only person they interact with while they are here. The impression they have of you is the impression they will have of the zoo as a whole, and we all want that to be a positive one. So, how can you make a positive impression on them?

- * Be positive, enthusiastic, courteous and friendly! Say “hello”, smile, eagerly engage, and converse with them in a positive manner.
- * Make a great first impression! It may be their only human encounter at the Zoo.
- * Promote the exciting things happening at the Zoo. There’s a lot to be proud of!
- * Know your subject – Study, do research, talk to people who know the information and have experience. Don’t be afraid to say “I don’t know” and help the visitor find the answer.



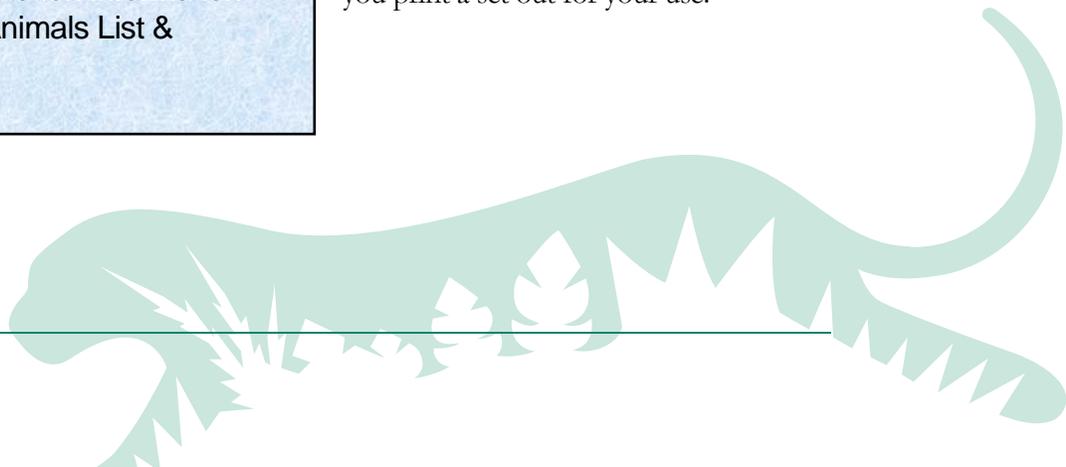
Interpretative Resources

You should plan to seek out the knowledge necessary to make you a competent educator on any one topic before interpreting to the public. We are providing many interpretive resources for you to review or reference. Please read these as an extension of this volunteer manual to complete your Level 2 volunteer training. This content will be on your Level 2 course test.

MPZ Interpretive Resources:

- Exhibit Animals List
- Biofact Interpretation Guidelines
- Contact Yard Guidelines
- Interpretation Station Information
- Ambassador Animals List & Guidelines

These materials can be found on our website under “Volunteer Resources”, or you can find them onsite in the Docent resource bookshelf. The most up-to-date will always be available online, so check it for updates from time to time if you print a set out for your use.



Effective Interpretation

An effective educator not only shares information with people, they also connect them to the topic, make them care about the message, and provoke them into action. Our goal is not just to teach about wildlife, it is to inspire people to care and act to save them. This is NOT an easy task. We must utilize interpretative techniques to make us more effective in achieving our mission.

The following are interpretation principles summarized from the 2020 AZA course Conservation Education: Effective Program Design. These principles are important to accomplish effective interpretation. Contemplate each one of these very carefully and let them sink in. Make it a goal to use them, and your efforts will have an impact.

How do we reach our goal?

- Education is sharing information. Interpretation is **revelation** based upon the information.
- Education alone is not enough. Education must include experience, connection, care (empathy), and inspiration. Education must include interpretative techniques.
- Education & interpretation should lead to **advocacy** and **inspire action**. We wish to influence daily actions, with the ultimate goal of **behavior change**.

Why will people care?

- We must go beyond spewing information, and inspire them through profound experiences. People decide to connect and care when they have **profound moments**.
- You must **connect** the visitor to the topic or message to reach them. It must be **relevant** to them and their lives.
- We must teach the heart, not just the mind. **Empathy** is vital to inspiring action.
 - We must tell **stories**, not just facts.
 - We must **feel** and **connect** to care.
 - We must connect them to the **individual**. (Empathy does not work on the species or ecosystem level.)
 - We need to use some **anthropomorphism**. (Naming an animal gives it a narrative and individualizes a species.)
- We must not squelch the public's empathetic reaction and auto correct misconceptions. Let them **feel** things, and build on that.

Empathy

is the ability to recognize, understand, and share the thoughts and feelings of another person, animal, or fictional character.

Developing empathy is crucial for establishing relationships and behaving compassionately. It involves experiencing another person's point of view, rather than just one's own, and enables prosocial, or helping behaviors that come from within, rather than being forced.

www.psychologytoday.com

When will people act?

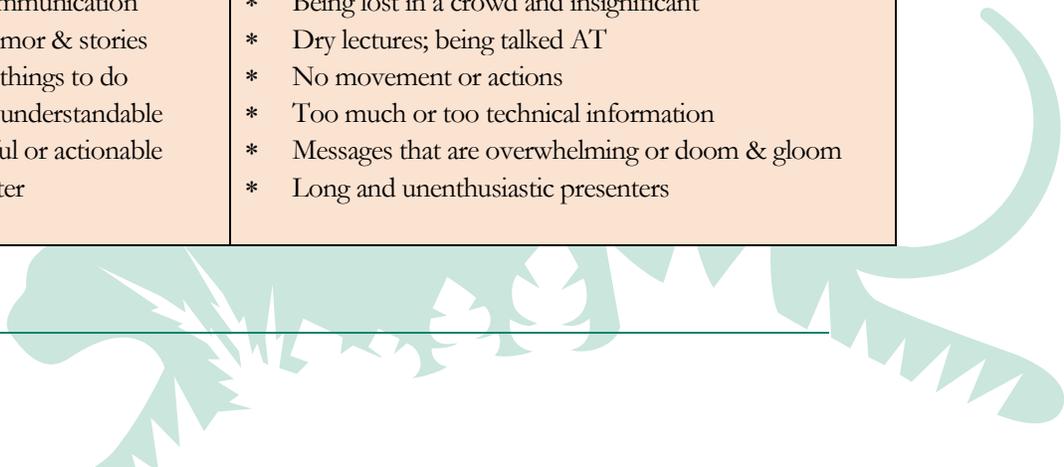
- We must lead people to empathy, but also **provide steps to action**.
Overwhelming doom and gloom causes moral disengagement for self-preservation.
- People are more likely to act on their values if they
 - are given **hope**
 - See others acting **similarity**
 - See it as within their **power**
 - Are shown examples of **success**
 - Understand the concepts - the **“why”**

Our Interpretive Strategy

Provide profound experiences that will promote connection to and empathy for nature, and will inspire actions to save wildlife and wild places.



GOALS OF INTERPRETATION	
As they relate to the Site:	
* Foster proper use of zoo & environment.	* Develop advocates for zoo & environment.
As they relate to the Organization:	
* Enhance public image of MPZ.	* Encourage public participation & support of the MPZ.
As they relate to the Visitor:	
* Provide information, recreation & entertainment.	* Heighten awareness and understanding of their natural and cultural environment.
* Inspire and add perspective to their lives.	* Inspire connection, empathy, & action.
Visitors like:	Visitors do not like:
* Personal relevance & connection * Personal attention & communication * Lively conversations, humor & stories * Sensory involvement & things to do * New information made understandable * Messages that are hopeful or actionable * An enthusiastic interpreter	* Information that doesn't pertain to them * Being lost in a crowd and insignificant * Dry lectures; being talked AT * No movement or actions * Too much or too technical information * Messages that are overwhelming or doom & gloom * Long and unenthusiastic presenters



Interpreting to Your Audience

An interpreter must be able to connect to their audience to deliver a successful program. You will have to adapt your presentation to your audience to capture and keep their attention, engage them in your activities, and drive your message home.

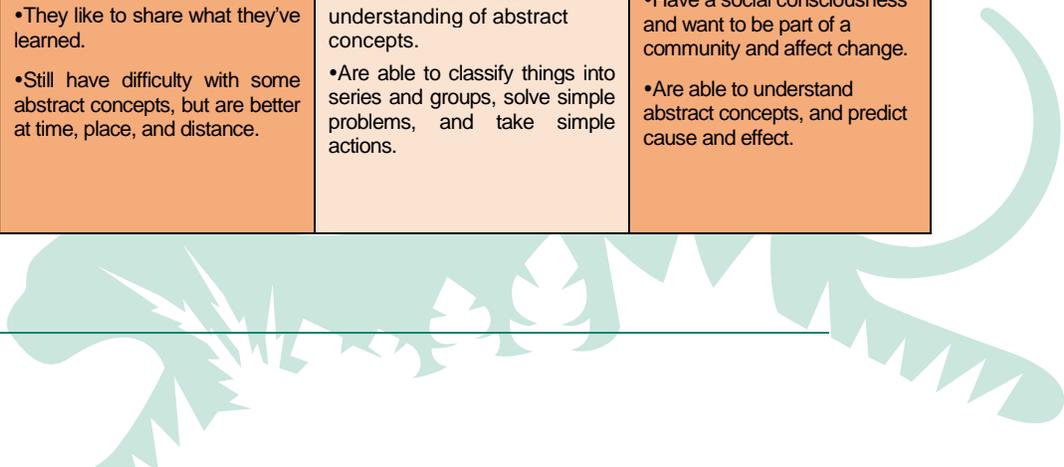
Best practices for connecting with any audience:

- Make eye contact & smile.
- Give them personal attention.
- Show enthusiasm.
- Find out what they already know.
- Ask questions.
- Use familiar examples & analogies.
- Make it personal & applicable to them.
- Involve them actively in the program.
- Use their interests as teachable moments.
- Talk to all ages at their level.
- React in a positive way.
- Help them draw parallels between people & animals.

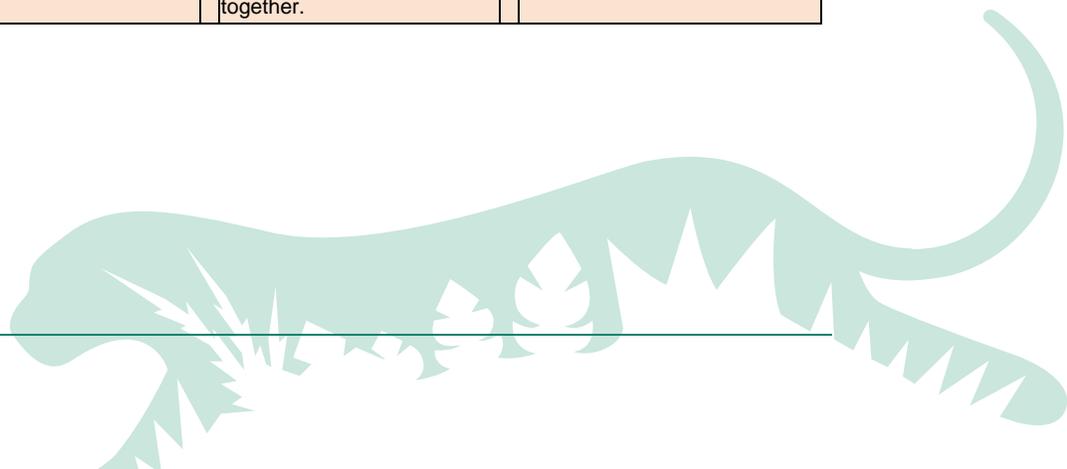
Each audience has its own characteristics and needs. You will want to be prepared for the diversity in your audience, and be ready to be flexible in how you deliver the program. You can customize the program “on the fly” as you are able to “read” the group for interests and abilities.

As you prepare your program for your audience, consider the developmental characteristics of children and the needs of special audiences using the charts below.

How to Speak Kid			
Preschoolers	Early Elementary	Upper Elementary	Mid / High School
3-4 year olds	5-7 year olds	8-11 year olds	12 years -adults
<i>Keep it short and active.</i>	<i>Make it apply to them.</i>	<i>Help them make the connection.</i>	<i>Let them lead the herd.</i>
<ul style="list-style-type: none"> •Have a short attention span and can't sit still long. •Are egocentric – the world revolves around them. Follow their lead to engage their interests. •Must learn by doing. They learn through sensory exploration. •Are concrete thinkers - if they can't see it, touch it, or do it, it isn't real. 	<ul style="list-style-type: none"> •Have slightly longer attention span. •Are still egocentric, the world still revolves around them but they have more context now. •They want to learn about what is close to home and are tuned into empathy. •They like to share what they've learned. •Still have difficulty with some abstract concepts, but are better at time, place, and distance. 	<ul style="list-style-type: none"> •Want to dig in and are interested in learning about what applies to them. •Are able to use their real world experience to understand cause and effect relationships and form logical thoughts. •Have a much better understanding of abstract concepts. •Are able to classify things into series and groups, solve simple problems, and take simple actions. 	<ul style="list-style-type: none"> •Want to be treated like young adults. •Question authority and scrutinize everything. •Are very concerned with what others think of them, want to belong and look “cool.” •Have a social consciousness and want to be part of a community and affect change. •Are able to understand abstract concepts, and predict cause and effect.



Needs of Special Audiences			
AUDIENCE	CHARACTERISTICS	SPECIAL NEEDS	INTERPRETIVE REQUIREMENTS
Older Adults	Constitute 25-35% of our interpretive audiences in national parks. At retirement there is increased leisure time, diminished physical ability (mobility, hearing, sight), a vast experience base, less inhibition, and more sociability.	Appreciate opportunities to interact with others their age. Often returning visitors. Like in-depth and follow-up programs. Able to spend more time at park or center.	Avoid long or fast paced walks. Sight and hearing are often diminishing, so depth perception and listening activities can become a problem. Rely on vast experience of visitors and encourage interaction and sharing.
Foreign Visitors	Often with limited English skills, may lack experience or knowledge of resource being interpreted. Generally younger population, often well educated.	Be sensitive to the cultural etiquette of each nationality. Be cognizant of their language ability.	Avoid colloquial expressions. Speak slowly and deliberately. Take extra time to learn of their special interests. Never assume the "common" isn't worth pointing out.
Minorities	Many minority groups are frequently alienated from parks, natural areas, and historic sites which tend to over-represent majority traditions. Predominate ethnic minorities in U.S. are Native Americans, Afro-Americans, Hispanics, Chinese, Japanese.	Interpreter must assume responsibility for learning about each minority group and how their values and traditions are represented at each site.	Involve minorities in the interpretation of their own cultures or seek their input in developing programs.
Visually Impaired	Range for those whose vision has been corrected by glasses to those who "see" by hearing and touch.	Address these visitors directly, not through another person. Provide descriptions of objects, scenes, etc. Ask what help they care for if you are uncertain.	Involve via handling of objects.
Hearing Impaired	Almost 4% of our population suffers from hearing impairment. Generally, assume that older people will have some difficulty hearing.	Need to see the face of the interpreter. Need to see objects and be given visual outlines.	Keep hands away from mouth when speaking. Face visitor. Repeat important points and questions. Speak slowly.
Ambulatory Limited	Those who must use a wheelchair, crutches, leg braces, of walkers and canes in moving.	To be allowed equal access.	Limit walks to areas that are accessible. (Avoid steep slopes and rough terrain.
Families	Wide range of motives for attending interpretive programs.	Lots of time to interact within the family unit. Learning is secondary to sharing time together.	Involving children will serve as a catalyst for whole family involvement.

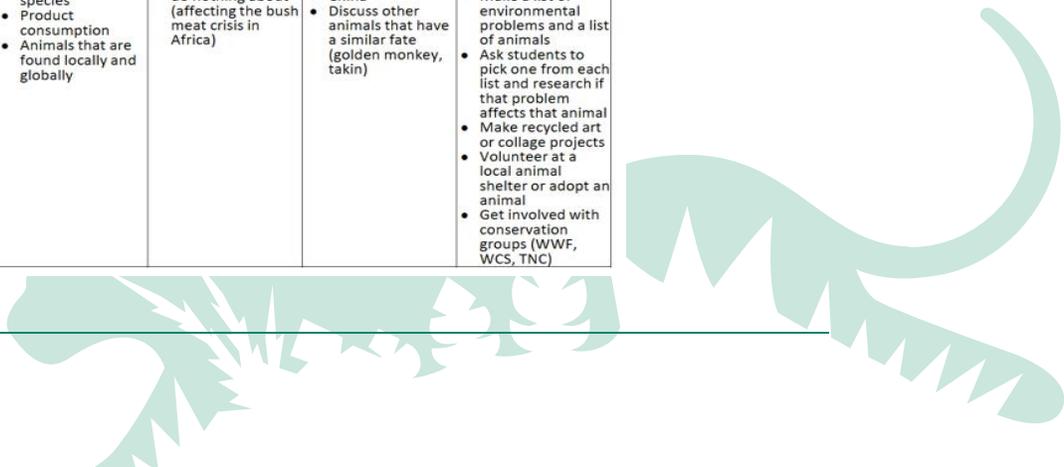


Age-Appropriate Topics

Use topics & interpretive methods that are age-appropriate for your audience. Examples are below.

Ages	Appropriate Topics	Inappropriate Topics	Same Topic Across Age Levels	Activity Ideas per Age Level
<p>Birth to 3</p> <p>Sensory</p>	<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)
<p>4 to 7</p> <p>Sensory Empathy</p>	<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), 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
<p>8 to 11</p> <p>Sensory Empathy Exploration</p>	<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 environmental manners, such as: "if we don't recycle, we will need more landfill space." Wise product consumption Animals that are found in neighborhood and community 	<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 range, elevation Compare giant panda habitat and life cycle with Asiatic black bear or red panda habitat and life cycles 	<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 Create/build a healthy panda habitat replica in a box Water cycle Make recycled art or collage projects.
<p>12 and up</p> <p>Sensory Empathy Exploration Action</p>	<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)

Source:
AZA Conservation Education:
Effective Program Design 2020



No Doom and Gloom before the age of 10

Children have less opportunity than previous generations to gain experience in nature to allow them to form a connection to it. At the same time, they have more access to technology and information at their fingertips anywhere and anytime. News, television, social media, and even personal conversations are filled with messages about the problems we face in our world: Covid-19, climate change, political division, weather events, immigration, endangered species, suicide, and on and on. And let's face it, many of the environmental problems we face are dire; many solutions are controversial and complex.

We do not want to contribute more negativity that will cause our children mental and emotional turmoil. That will only cause them to close themselves off to the issues in self-preservation because they feel hopeless and powerless to fix them. We want to acknowledge them and be truthful with them, but reassure them that there is hope and a future.



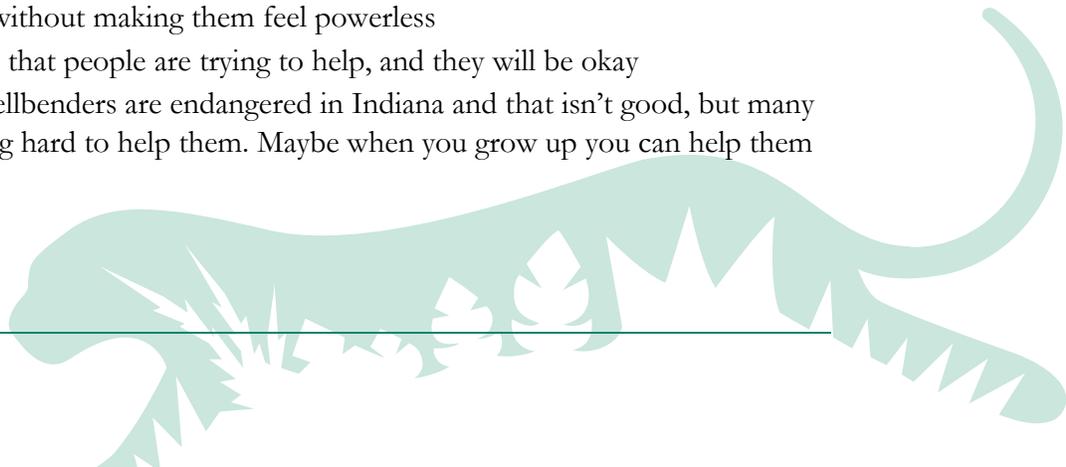
We want to teach kids about the problems facing our wildlife and environment and how we can help, but we have to adjust it to their level of understanding and responsibility. And we can always model for kids how to connect with, care about, and have a positive impact on everything in our world.

So, if a child brings up a serious conservation issue, how do you handle it? Consider these age-appropriate approaches below.

Under age 7

These children are learning what the world is all about, how it works, and who they are. They feel everything deeply, and care greatly. They want to know they will be okay.

- Acknowledge them with a brief and honest answer, without getting too deep
- Lift their burden without making them feel powerless
- Reassure the child that people are trying to help, and they will be okay
- Example: “Yes, hellbenders are endangered in Indiana and that isn’t good, but many people are working hard to help them. Maybe when you grow up you can help them too.”



Ages 8-11

These children are still trying to figure out the world and their place in it. They are still concrete thinkers, but are starting to understand the world more because they have more life experience. They have heard of some issues, want to help, and can handle simple solutions.

- Acknowledge their concerns and validate their feelings.
- Channel them to a similar issue more local and concrete (so they are not so overwhelmed)
- Suggest simple actions they can take to help.
- Example: “Yes, tigers are endangered and that is sad, isn’t it? It is hard to help them all the way across the world, but many people are working on it. We have some animals here in Indiana that we may be able to help a little easier. Do you have any ideas of things you could do to help them?”

Ages 11 and older

These children have more developed maturity, identity, and confidence. They have developed a social conscientiousness, and want to contribute to positive social change. They also understand cause and effect relationships and have experience to place issues in context of the real world. These children can handle more abstract notions like extinction, future generations, and pollution. They are ready for action.

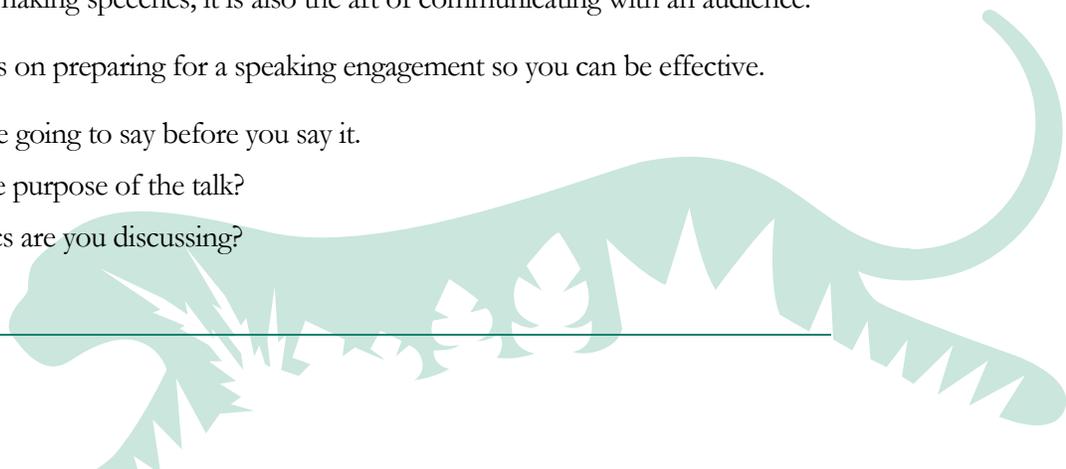
- Acknowledge their concerns and validate their feelings.
- Describe the issue briefly, and always give positives or possible solutions.
- Give them actions they can take to help, locally and maybe globally. Be a model! Share actions that you and others have taken.
- Example: “Yes, rhinos could be in trouble if we can’t find ways to protect them. Poaching to sell their horn is one of the threats. I know, it is so sad. We need to help the local people find ways they can make a living without poaching. How might we do that from across the world? I once joined the World Wildlife fund organization and gave them a donation so that they could work with the local people on this issue. Maybe your family can too.”

Public Speaking

Whether you are presenting a formal program, talking to people at an animal encounter, or roaming grounds interacting with guests, you will be conducting some type of public speaking. Public speaking goes beyond just making speeches; it is also the art of communicating with an audience.

The following are some tips on preparing for a speaking engagement so you can be effective.

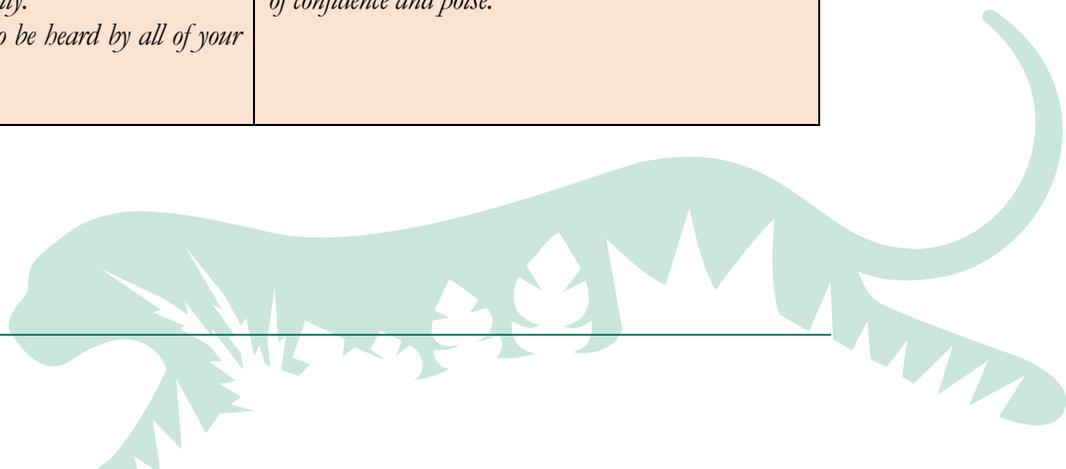
1. Know what you are going to say before you say it.
 - a. What is the purpose of the talk?
 - b. What topics are you discussing?



- c. Who is going to be saying what?
- 2. Know your time limitations.
 - a. What are your minimum and maximum time restraints?
 - b. What will you do if you fall short or go over on time?
- 3. Know your audience.
 - a. Be observant of their age, numbers, fears, and disabilities.
- 4. Know the area you are presenting in.
 - a. Is it indoors or outdoors?
 - b. Where will the audience be situated?
 - c. Where will you keep animals out of sight until needed?
- 5. Preparations.
 - a. Make note cards.
 - b. Be comfortable with handling the animal.
 - c. Go over your game plan with presentation partner(s).
- 6. Presentation.
 - a. Introduction – capture the audience’s attention and go over ground rules.
 - b. Body – use both verbal and nonverbal elements (see chart on below).
 - c. Conclusion – summarize main ideas, re-emphasize key points and always leave the audience with a thought or a call to action.

Elements of Public Speaking

Verbal Elements	Nonverbal Elements
<p>Diction – <i>pronounce words clearly.</i></p> <p>Emphasis – <i>stress words that are important.</i></p> <p>Mood (or tone) – <i>make your listeners feel certain emotions.</i></p> <p>Pause – <i>emphasize a point or help listeners catch up.</i></p> <p>Pitch – <i>saying some words higher or lower gives cues about your meaning.</i></p> <p>Rate – <i>talk more slowly than usual to help listeners hear and understand more easily.</i></p> <p>Volume – <i>be loud enough to be heard by all of your listeners.</i></p>	<p>Eye Contact – <i>look directly into the eyes of your audience members.</i></p> <p>Facial Expression – <i>wink, make eye contact, raise an eyebrow, smile, frown, or sneer to reveal your feelings or emphasize certain words.</i></p> <p>Gestures – <i>give the thumbs up, shrug, nod or shake your head to add meaning to the speech.</i></p> <p>Posture – <i>stand tall and straight to show an attitude of confidence and poise.</i></p>



Pointers

Be A Role Model

“Do as I say, not as I do.” This exhortation rarely works. You are the leader and the children will follow your example. Your attitude toward the environment will register clearly with them as you carefully replace a log rolled over for investigation, or pick up trash left by people there before you. How you feel about nature should and will come through to the children—when you stop suddenly to listen to a favorite bird song or pause to watch an ant laboring under a heavy load, or the way you handle the animal ambassador. Curiosity and caring are contagious.

Everyone is Afraid of Something

Most people fear, or “hate,” some things in nature. To lessen those fears by learning more about the object of them is a worthwhile goal, for our own sakes and for the sake of the children we influence. You are not forced to handle any animal in our collection, and should not handle one in front of the public until you are comfortable with it.

Should one express fear or conceal it from the children? You will have to be a very good actor to hide your fear of snakes when you’re startled by one on-grounds. So you might as well be honest. When the situation arises, explain that you are afraid of snakes, or spiders, or mice, and that you are trying to increase your knowledge about them so you will become less fearful. Many docents who were apprehensive have come away from training still wary but with admiration and curiosity to know more. If you can give the same to a visitor, what a favor you will have done him/her!

Sense of Humor

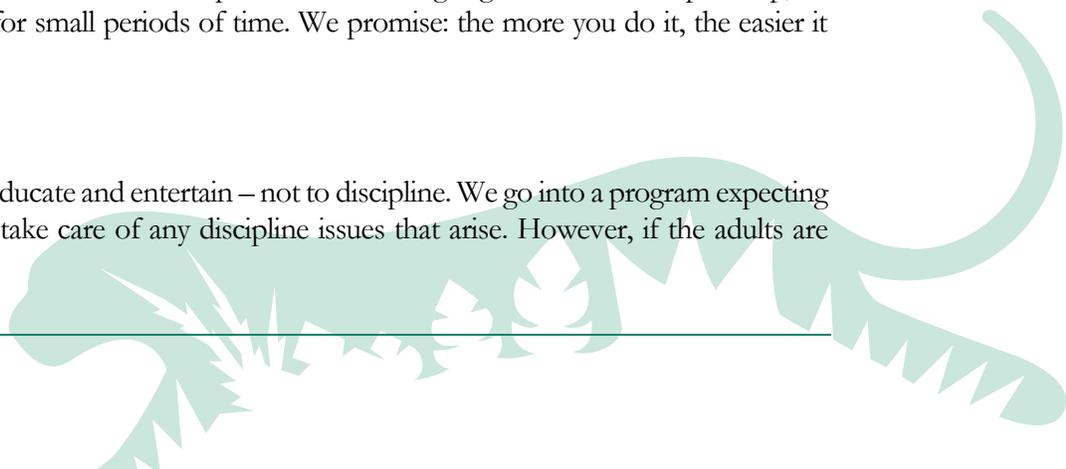
Children learn best when they’re having a good time: your playfulness and sense of humor will keep them on their toes. Children seem to relish corny jokes and ridiculous riddles—they will laugh at yours and feel great when you laugh at theirs. Keep some jokes up your sleeve for times when things drag a bit or children are restless. A witty remark can turn a mistake or a minor accident (like losing a shoe in the mud) into a comical situation. Laughter is good for the soul as well as for the brain.

Stage Fright

Most people are uncomfortable speaking in front of a group of people. The only way to lessen the fear and become more comfortable is to practice. Start small – focus on one animal at a time. You will then be talking about something you are very familiar with. When you start doing programs, remember that you are not alone. You and a partner are working together. You can split it up, so that you only have to talk for small periods of time. We promise: the more you do it, the easier it will become!

Expected Behavior

As a docent, your job is to educate and entertain – not to discipline. We go into a program expecting the group’s chaperones to take care of any discipline issues that arise. However, if the adults are



ignoring the program or problem, don't be afraid to ask them for help. Teachers, parents, scout leaders and other chaperones are our allies in that they want their children to behave and gain from the experience. Besides, reasonable behavior translates into a lot more fun for everyone.

Running Wild

Exuberance and pent-up energy, especially for children who have just emerged from a school bus or a classroom, can be channeled. Your plans may call for a sit-down discussion or a controlled scavenger hunt, but if you feel the lid about to pop, stop and sing a song or fingerplay or organize a red light game or a "hop like a _____" tour. Then when the kinks are out, you can go over your behavior expectations. Children who egg each other on should be separated. The other children have the right not to be distracted or misled.

Limiting Stories

Sometimes a question is asked because the child is curious to know the answer, but often questions are actually lengthy stories and anecdotes. Even carefully planned discussions with the children may open a Pandora's Box of tales from their own or their family's experiences. It feels mean to cut short a child's story, but children understand time limitations. If you explain there will not be enough time to meet or touch all the animals, they will be willing to move on. Tell the children they will have a chance to tell you after the program. Don't forget to give them a chance; often, however, they will have forgotten what they wanted to say.

Noisy or rowdy audiences.

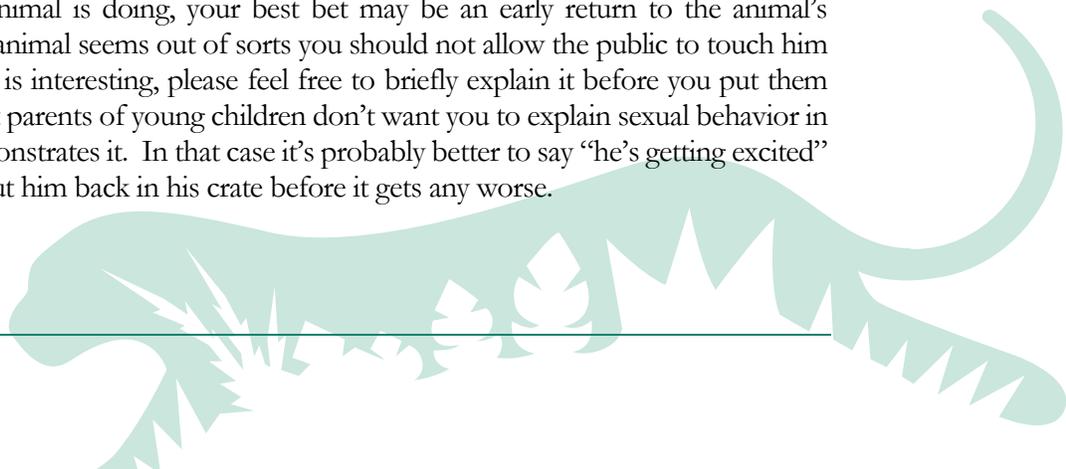
Sometimes the kids, or even the adults, are noisy and you can't hear yourself talk. Remind them that we can't get to all the exciting things in the program if they can't be attentive. Remind them that the animals need calm and quiet for the program. Ask them questions or give them something to do to interrupt and redirect their energies. Switch gears so they have to pay attention if they hope to keep up with the group. If they are restless, it is a sign they are bored and it is time to switch gears. Enlist teachers and chaperones to help with the children and the transitions.

The {insert animal} pooped, peed, threw up, or farted loudly.

Never fails to get a laugh. Everybody does it. Brush yourself off (or not) move away from the smell and keep going. Hopefully your partner will start cleaning up while you finish your part of the talk. A sick animal is different, of course, but that is covered elsewhere.

The {insert animal} acts strangely or misbehaves.

Depending on what the animal is doing, your best bet may be an early return to the animal's enclosure. Certainly if the animal seems out of sorts you should not allow the public to touch him or her. If the misbehavior is interesting, please feel free to briefly explain it before you put them up. Do be aware that most parents of young children don't want you to explain sexual behavior in detail, while an animal demonstrates it. In that case it's probably better to say "he's getting excited" by a smell, whatever and put him back in his crate before it gets any worse.



What if it goes horribly wrong?

One of these days it will go horribly wrong. When you combine public speaking, animals, and children you astronomically increase the odds that your plan will crash and burn. It happens to everyone, even people who carefully prepare, know their material, and have a plan. Don't worry about it. Pick yourself up, dust yourself off, and get back on that horse, so to speak. You at least learned what worked and what didn't, and you'll know better the next time. Lean on the staff Educators and the Docents. There will be a lot of experience and advice waiting there for you to gather from.

You can do this!

Being a good educator and interpreter takes time and experience. Use the information in this manual to build your knowledge of what and how to interpret to guests, and your experience will develop over time. Remember that you are a volunteer, that you will learn as you go, and that you will do the best you can. That is all that we can ask. In the end, you can and will help us in our mission of conservation & education, so we can ultimately save wild species and wild places. Thank you in advance for your contribution to this cause.

