



Protecting Southwest Florida's unique natural environment and quality of life ... now and forever.

Wild about Wildlife Pre and Post-Program Activities

Grade Level: 9-12

Next Generation Sunshine State Standards

- SC.912.L.15.3; SC.912.L.17.20; SC.912.L.17.8; SC.912.L.17.9

Program Overview

Explore the diverse habitats of southwest Florida and meet some of the wild animals that call these areas home. Learn how these animals have adapted to live in unique environments and what you can do to help protect wildlife in your own backyard.

Learning Objectives Students will be able to:

1. Interpret the trophic levels of a food web, and understand how all living organisms in an ecosystem are interconnected.
2. Describe how biological diversity is increased by the origin of new species and how it is decreased by the process of extinction.
3. Recognize the consequences of the losses of biodiversity due to human activity and the introduction of invasive, non-native species.
4. Predict the impact of individuals on environmental systems and examine how human lifestyles affect sustainability.

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Conservancy of Southwest Florida has been awarded Charity Navigator's prestigious 4-Star top rating for good governance, sound fiscal management and commitment to accountability and transparency. Charity Navigator is America's largest and most respected independent evaluator of charities.

Pre-Program Activity 1: Bye, Bye, Birdie

Duration of Activity: 1-2 hours

Materials: computers for research

Background: Human influence is driving the extinction of a large numbers of animals, insects and plants. The rate of wildlife endangerment is increasing. Difficult decisions are required to determine how to prioritize our efforts to save endangered species. Students will develop a method for making these decisions on wildlife conservation and compare the relative “value” of different species. Before beginning the activity, be sure that your class is familiar with the concept of biodiversity- *the variety of life in a particular habitat or ecosystem*.

Students will determine which factors should be considered in deciding the fate of endangered species. They will then conduct research to find out about an endangered species and prepare a short presentation, justifying the preservation of the species.

Directions:

1. Working individually or in pairs, have students determine which factors should be considered before a decision is made to save a species or let it become extinct. They should list each reason they think is important and write a short defense of each.
2. Students will then apply the criteria they developed. Students should “adopt” an endangered species in Florida. Florida’s endangered and threatened species can be found at <http://myfwc.com/media/1515251/threatened-endangered-species.pdf>. Students should prepare a short presentation that describes the species, states its importance, and gives reasons why it should be preserved. Students should also discuss threats to the species’ survival. These might include habitat destruction, poaching or overhunting, disease, lack of adaptability to changes in climate or other ecological systems, increase in numbers of predators or competitors, etc.
3. Students in each group will present their findings on their “adopted” species to the class. As the presentations are made, students should rate each species using the criteria developed in the first step of the activity. After the presentations, ask students if they would change the criteria they developed earlier after they researched their species and rated the others. Have students explain the changes they would make.
4. As the final part of the activity, students must decide which species they will “save” and why. Analysis should focus on the relative possibility of success, the value of the species, etc. In addition to the students’ individual ratings, each group should try to reach consensus on which species should be “saved.” Have students come up with a management plan on what they will do (hypothetically) to save their species.

Source: populationeducation.org

Pre-Program Activity 2: Survival of the Fittest

Duration of Activity: ~1 hour

Adapted from “Investigating Natural Selection”, Indianapolis Public School

Materials: For each group of 3-4 students:

- One piece of construction paper or patterned fabric to act as the “habitat”
- 60 dots of paper in 3 different colors to act as different prey species, 20 of each (hole punched dots work best). *The different colored dots represent the different levels of camouflage found in wildlife. Make sure one color contrasts with the “habitat” color while one color of dots should be the same color as the habitat or camouflage well. The third color can be in between very well camouflaged and non-camouflage.*
- Extra paper dots of each color
- Stop watch
- Graph paper or computer program capable of graphing
- Colored pencils; same color as paper dots (only if using graph paper)

Background: For wildlife, surviving is what life is all about. In order to survive in the wild, animals need to **adapt** and change along with their habitat. Many **anthropogenic** activities have been changing the natural habitats of Florida, forcing animals to adapt and pass on favorable traits or fall towards extinction.

Directions:

1. Divide students into groups of 3-4 students.
2. Assign two members of each group as predators, one as game keeper, and one as a recorder (for smaller groups, the game keepers and recorder can be the same person).
3. Have the game keeper place their piece of construction paper or fabric on a flat surface as this will serve as their “habitat”. Have them scatter 20 dots of each color onto their habitat while the predators look away.
4. Have the recorder time the predators for 20 seconds. In this round, the predators try to collect as many dots or individual prey as they can, one at a time of any color.
5. Group members will then count the dots that are remaining in the habitat of each color. The recorder will record the number of remaining dots for each color. The game keeper will then add “offspring” or one dot for each remaining dot. Record the number of dots of each color in the habitat again.
6. Repeat the predation (step 4) using the second generation of dots.
7. Again, count the number of dots remaining and record. Calculate the number of individuals that would be present in the third generation after reproduction.
8. Have students then graph the growth or decline of their three different prey species.
9. Have each group present what they found in their experiment.
10. Discuss:
 - a. What prey species survived the best? The worst?
 - b. Why did the predators select the prey that they did?
11. Have students do a short write up addressing the following:
 - a. Analyze graph. What effect did predation have on the next generation? Predict what the population for each species would be in the sixth generation.

- b. How is this applicable to endangered species? Provide an example.
- c. How does this relate to the origin of new species?

Source: <http://www.myips.org/cms/lib8/IN01906626/Centricity/Domain/8123/Natural%20Selection%20Activity.pdf>

Post-Program Activity 1: Gene Dilemma

Duration of Activity: ~1 hour

Adapted from “Bottleneck Genes”, Project WILD

Materials:

For the whole class:

- One large, long-necked bottle
- Yellow, black, orange, pink, blue, green, purple, red, and white beads (3 of each color)
 - o Pony beads (keychain beads) work best but a similar supply could be used

For each group; 8 groups of 2-4 students:

- Environmental Situations sheet (see below)
- Florida Panther Bottleneck Scenario Worksheet (see below)

Background: Wildlife depends on three types of diversity for survival: individual, species/population, and ecosystem diversity. All three play a crucial role for survival and adaptation. The loss of variation in any of the three types of diversity from catastrophic events, climate change, human activity, etc., can put a species population at risk of extinction. These events can drastically lower population numbers and could lead to a “bottleneck” effect in the population or a decrease in gene variety. In order to change along with its environment, a population is dependent on its genetic variability.

Directions:

1. Divide the class into groups of 2-4 students. Provide each group with one Environmental Situations sheet and one Florida Panther Worksheet.
2. Assign any five random situations from the Environmental Situations sheet to each group.
3. Discuss the nine bead colors and what they represent (see Key to Genetic Characteristics on student Worksheet). What are the benefits of each?
4. Put all of the beads into the glass bottle and gently shake the bottle to mix the beads. Mixing the beads this way ensures the “genes” are randomly distributed such as they are in the wild.
5. For each group, pour out 5 beads to represent the genes available to their wild population. Have students circle their bead colors, #, and genetic characteristic on their worksheets. Once characteristics are recorded, have students return beads to the bottle before distributing beads to the next group.
6. Have students complete Worksheets and discuss as a class. Additional discussion points:
 - a. Why does genetic diversity help protect a population?
 - b. Why would a small population have a higher risk of being eliminated than a large population?
 - c. Why do you think smaller populations have a harder time surviving disease?

Source: *Project WILD K-12 Curriculum & Activity Guide*, Council for Environmental Education, 2011, 172-176

Environmental Situations

1. An interstate has been built by your panther's critical habitat. How does this road affect your panther population? Given its genetic makeup, would your population survive? The Florida Fish and Wildlife Conservation Commission have implemented a feral hog hunting season in your panther's home range. The hunters have been very successful and have eliminated three-quarters of the feral hogs. How will the decrease in your panther's primary prey species impact its survival?
2. A large development project has decreased the high quality panther habitat in your area to two-thirds of its original size. Other panthers are now being forced into your panther's home range. Does your panther, looking at its genetic makeup, have the strength to out-compete another panther?
3. Panther kits are vulnerable in the wild until they are almost two years old. A female will have 1-4 kits that may stay with her until they are able to survive completely on their own. Would your panther's litter have a high offspring survival rate? Does your panther have the gene for strong parental?
4. A wildlife corridor was constructed to connect two quality panther habitats in your panther's area. Will your panther have the inclination to disperse and utilize the corridor?
5. A local conservation group has implemented a pen building assistance program to help local farmers protect their pets and livestock. With these easy target animals no longer available to your panther, will your panther be able to find prey in the wild?
6. Feline leukemia has been introduced to your panther's home range. This infectious, often fatal, disease has the ability to spread rapidly in native populations. Given its genetic makeup, how would your panther survive? Does it have a strong immune system to fight off the infection?
7. To find a mate, panthers will use the scent of their urine and a *caterwaul*, a vocal display, to attract other panthers in the area. Given its genetic makeup, would your panther be able to locate the scent of another panther? Would it be able to hear another panther?
8. Adult males are very territorial over their home range and will not hesitate to kill juvenile males or juvenile females. Your panther has just left its mother and is now on its own. Will your panther be able to find its own territory? A mate?
9. Panthers are *crepuscular*, mostly active during dawn and dusk, since the activity of their prey is highest at this time of the day. They stalk their prey silently until they have an opening to rush their target. Does your panther have the ability to hunt without being detected?
10. A new exotic apex predator has been introduced in Florida and is rapidly spreading across the state. It has the ability to outcompete and predate on all of Florida's top predators including the panther. Does your panther have the genetic makeup to survive the introduction of this new species?
11. The white-tail deer population in your panther's home range has contracted a transmissible bacterial disease. Female panthers often feed on deer while nursing their young. Does your panther have a strong immune system so that the disease is not passed onto her kits? How would the kits be impacted?

12. Female panthers create dens out of vegetation before birthing their kits. After the first 2 to 3 weeks, the mother will leave the kits in den while she goes to hunt. Does your panther have strong parental care instincts and the knowledge of constructing a safe den? Does your population have a high offspring survival rate?
13. Female panthers create dens out of vegetation before birthing their kits. After the first 2 to 3 weeks, the mother will leave the kits in the den while she goes to hunt. Does your panther have strong parental care instincts and the knowledge of constructing a safe den? Does your population have a high offspring survival rate?

Florida Panther Bottleneck Scenario Worksheet

Names: _____

Directions: Circle both the colors of the beads and genes that your panther population received through the bottleneck activity on your Key to Genetic Characteristics below. Use the key to help you answer the following questions. Think of all the possible ways in which the genetic traits can benefit the panthers in each situation. There may be multiple genetic traits that will increase your panther's chance of survival!

Key to Genetic Characteristics

Yellow	- accurate sense of smell
Black	- acute hearing
Orange	- strong immune system
Pink	- strong parental care
Blue	- inclination to disperse
Green	- high agility
Purple	- precise vision
Red	- high offspring survival rate
White	- low detection rate

1. Calculate the percentage of genetic diversity of your population.

If you received all nine genes, your population would have 100 percent genetic diversity or the same genetic makeup as the original population.

_____ genes received \div 9 possible genes = _____ x 100 =
_____ % diversity

2. List all of the genetic characteristics that your population received.
3. List all of the genetic characteristics that your population did **NOT** receive due to the bottleneck effect.
4. Randomly pick five cards from the environmental situations. Based on the genes your panther population received, how will it survive each situation? How will this impact your population in the next year? Will your population thrive or will it decrease? How does high or low diversity affect populations?

Suggested Answer Key (for teacher)

Each environmental situation may have multiple genes or multiple bead colors that are beneficial to the panthers. Encourage students to analyze their scenarios by first looking at all the possible traits that could have been passed on from the original population. Have them select all of the genes that would increase the panther's chance at survival. How many of those traits did their population get? Did their population get all, just a few, or none? Some situations have many genes that would be beneficial for the panther. Listed below are just a few suggested answers for each scenario.

1. Black, green, purple, blue (negative or positive?)
2. Yellow, black, blue, green, purple, white
3. Blue, green, white
4. Red, pink
5. Blue
6. Yellow, black, blue, green, purple, white
7. Orange
8. Yellow, black
9. Blue, yellow, black
10. White
11. Black, blue, green, white
12. Orange
13. Pink, red

You can further the discussion by looking for genes that would have negative effects on their panther population in certain scenarios. Overall, really encourage students to think about all of the possibilities as there is not one correct answer for any scenario.

Post-Program Activity 2: Live at 5

Duration of Activity: ~1 hour

Adapted from “Sustainability: Then, Now, Later”, Project WILD

Materials: computer or other reference material, resources to create short news segment videos, if available

Background: Individuals have a daily impact on the environment without even realizing it. Products that we buy and use along with human lifestyles affect **sustainability**. Sustainability is known as “long-term strategies to restore and maintain environmental quality while maintaining quality of human life within the carrying capacity of the supporting ecosystem”. A sustainable society is hard to achieve because it requires the cooperation of all individuals, businesses and government.

Directions:

1. Discuss with students individual needs and wants. Have students list three items or services that they believe that they “need” and three that they “want”. Make sure students include why they listed the items. Encourage students to share their lists with the class.
2. Divide the class into six groups and assign each group one of the following categories: government, agriculture, business, tourism, conservation, and public interest. Next, have each group pick a career in their assigned category. Have each group come up with three needs and three wants for their chosen career. Once all groups have completed their lists, have groups share their list with the class along with why each item was listed.
3. Have groups come back together and create a list of resources that might be used in order to meet the needs and wants that they have listed. What waste materials might be produced as a result of these products and resources? How do these products impact the environment?
4. Have students go back to their personal list of needs and wants. Ask students to repeat step 3 with their own list now. How do the items on their list directly impact their local environment?
5. In small groups or pairs, have students identify an environmental issue that is impacting the health of the wildlife in their community caused from the production of a consumer good or service. Have them take on the role of a reporter for the local news station and research the following questions:
 - a. How is the wildlife being impacted? What species are being impacted the most?
 - b. What is the government doing to try to solve this issue?
 - c. Are there any regulations in place?
 - d. How successful are the regulations or government solutions?
 - e. What else could be done?
6. Have students present their findings as if they were on the 5 o’clock local news. If the resources are available, have students create a video of their news segment.

Source: *Project WILD K-12 Curriculum & Activity Guide*, Council for Environmental Education, 2011,