



## ECOSYSTEMS PLANNING A SELF-GUIDED FIELD TRIP

**A FIELD TRIP AT THE COLUMBUS ZOO AND AQUARIUM** is a great way to extend the walls of your classroom and apply the concepts you are teaching your students. With a little pre-planning, you can make this an experience your students will appreciate for a lifetime. Before diving into the materials on the next few pages, here are a few tips to make your field trip experience even more successful.

- **Prepare students for the trip:** This packet contains an activity you can do with your students before your field trip.
- **Prepare chaperones for the trip:** The activities are designed to be led by chaperones with varying experience levels. We recommend you have the chaperones familiarize themselves with the materials before the field trip.
- **Bring it all back together:** After your field trip, reinforce the concepts the students learned by doing the final activity in the packet.

The purpose of this self-guided field trip activity packet is to help students discover environmental relationships and how changes to the environment affect those relationships while exploring a Zoo region. We encourage teachers to utilize all five activities chronologically to provide students a complete learning experience centered around a meaningful field trip.

### **5E Lesson Plan**

The self-guided field trip activities are structured around the 5E Lesson Plan model, commonly used in science education:

- Engage** - sparking interest in a topic
- Explore** - student-led investigation of concepts
- Explain** - adult-led clarification of concepts
- Extend** - student-led application of concepts
- Evaluate** - opportunity to demonstrate understanding of concepts





## ECOSYSTEMS PLANNING A SELF-GUIDED FIELD TRIP

### Outcome and Objectives

This self-guided field trip is designed to meet the following behavioral outcome: Apply critical thinking and problem solving skills when making decisions affecting the environment.

By participating in this program, students will be able to:

- Feel curious about biotic and abiotic factors in ecosystems
- Feel confident in their use of ecosystem vocabulary
- Learn key vocabulary terms related to ecosystems
- Learn interrelations of animals to the plants and abiotic elements in their ecosystem
- Observe characteristics, differences and changes in objects, organisms, events, places and relationships in the environment
- Generate ideas and questions about objects, organisms, events, places and relationships in the environment

### Ohio State Science Standards

Each of the activities in this self-guided field trip activity packet addresses certain components of the Ohio State Science Standards. When used in conjunction with other science-based learning experiences, the activities will help classroom teachers achieve the following Ohio State Science Standards with their students:

- LS.35.1b Given a physical trait, match the trait to its specific function (*e.g., birds have wings to fly*).
- LS.35.1a Describe how an animal's behavior helps it survive (*e.g., a cat will stalk its prey so it can go undetected in the hunt*).
- LS.35.5c Identify environmental changes that affect animal behavior.
- LS.35.5b Identify environmental changes that occur suddenly or gradually.
- LS.35.5a Predict the effect of environmental changes (*e.g., natural disasters, seasons*) on animal populations.
- LS.35.7c Match a food source for a given animal.
- LS.35.7b Identify predator/prey relationships in a food chain.
- LS.35.7a Identify producers, consumers or decomposers.

*And don't forget to look for Zoo volunteers throughout your field trip! They are a wealth of knowledge and always happy to answer questions and share their love of the Zoo and our animals.*



# SEQUENCE OF ACTIVITIES

Suggested sequence of activities to support a self-guided field trip focused on ecosystems for 3rd–5th grades. See following pages for detailed descriptions of each activity.

5 STEPS TO A MEANINGFUL FIELD TRIP	DESCRIPTION OF ACTIVITY	ESTIMATED TIME	MATERIALS NEEDED
<b>ENGAGE</b> with a pre-visit activity in your classroom	<b>Ecosystem Strings:</b> Practice using ecosystem vocabulary.	<b>20-30</b> minutes	<ul style="list-style-type: none"> <li>Worksheet to make Vocabulary Word Cards (<i>one per group</i>)</li> <li>Scissors</li> </ul>
<b>EXPLORE</b> at the Zoo within a habitat area	<b>Disappearing Act:</b> Imagine the impact on one part of an ecosystem when another part disappears.	<b>25-45</b> minutes	
<b>EXPLAIN</b> specific concepts	<b>Balancing Predators and Prey:</b> Explain the role of predators in an ecosystem.	<b>10</b> minutes	<ul style="list-style-type: none"> <li>Chaperone Conversation Starters (<i>one per group</i>)</li> </ul>
<b>EXTEND</b> learning by applying concepts to another habitat element	<b>Manatee Meditation:</b> Find examples of ecosystem elements.	<b>10</b> minutes	<ul style="list-style-type: none"> <li>Chaperone Conversation Starters (<i>one per group</i>)</li> </ul>
<b>EVALUATE</b> during a post-visit activity/discussion back in the classroom	<b>I Know That:</b> Demonstrate understanding of key vocabulary terms related to ecosystems.	<b>15-30</b> minutes	<ul style="list-style-type: none"> <li>Vocabulary Word Cards (<i>one set per group</i>)</li> </ul>



GRADES  
3-5

# ECOSYSTEM STRINGS

At School

WHAT?

Preparation for field trip, with a focus on ecosystem vocabulary

WHERE?

In your classroom

WHEN?

Prior to the Zoo field trip

WHY?

To introduce or review key terms relating to ecosystems

HOW?

Remind students that an ecosystem is a community of living things and the non-living things they interact with. Have students cut out the provided vocabulary cards. Have students work in pairs, choosing any two vocabulary words. Together, they string together the two terms in a single sentence. Each pair can share their favorites.

*For example: abiotic + decomposer*

*The vulture, a decomposer, found its meal decaying among abiotic rocks.*



## GOOD TO KNOW!

Is poop biotic or abiotic? **Answer:** Abiotic! Although it came from a living (*biotic*) thing, poop is a non-living (*abiotic*) part of the ecosystem.

**abiotic** non-living parts of an ecosystem, including soil, rocks, atmospheric gases, temperature, humidity and sunlight

**biotic** living parts of an ecosystem, including plants, animals, fungi and bacteria

**carnivore** meat-eater

**consumer** an organism that gains energy from eating other living things

**decomposer** an organism that feeds on decaying organisms, thereby recycling the nutrients

**food chain** a feeding order through which energy flows between organisms in an ecosystem

**producer** an organism capable of converting sunlight into energy (*through photosynthesis*)

**omnivore** plant and meat-eater

**food web** a model depicting interconnected food chains within an ecosystem

**herbivore** plant eater


 GRADES  
 3-5

# DISAPPEARING ACT

At Zoo

**WHAT?**

Activity where students imagine the impact on the ecosystem when another part disappears

**WHERE?**

At the Zoo in an area that showcases predators and prey.

Good options include:

- Heart of Africa
- Asia Quest
- North America
- Congo Expedition

**WHEN?**

During the Zoo field trip

**WHY?**

To generate ideas and questions about relationships between factors in an ecosystem

**HOW?**

Remind students what scientists mean when they talk about biotic and abiotic elements of an ecosystem. (*Refer to vocabulary cards on page 5 for a reminder.*) Challenge students to find three examples of biotic elements and three examples of abiotic elements in the animal habitats as you walk through the Zoo then find a space to circle up and share examples.

Next, choose an abiotic or biotic element. Imagine this element disappears from the ecosystem. How would this impact other elements in the ecosystem?

Give this example: *If rocks (an abiotic element) disappeared from the ecosystem, what would happen to carnivores (a biotic element)?*

Continue with the following pairings, having students explain what they think the impact would be:

- I wonder if water (*abiotic*) disappeared, how it would affect plants? (*biotic*)
- I wonder if water (*abiotic*) disappeared, how it would affect carnivores? (*biotic*)
- I wonder if sunlight (*abiotic*) disappeared, how it would affect plants? (*biotic*)
- I wonder if plants (*biotic*) disappeared, how it would affect carnivores? (*biotic*)

*Note: There are many correct answers to each scenario. Encourage students to think out loud through the particular impact on their element and get help from peers.*

*Time permitting; repeat this activity at another animal habitat.*

## EXTENSION ACTIVITY

Present the following scenario for discussion: In Ohio, as in many parts of the US, honeybee populations are declining. Entire colonies simply disappear and scientists are still trying to determine what is causing this devastation. There are likely a number of different issues contributing to this “colony collapse disorder.” Think about the biotic and abiotic elements in a honeybee ecosystem and suggest factors that might contribute to the bees’ decline. What could you or others do to keep the honeybee ecosystem balanced?

# BALANCING PREDATORS AND PREY

WHAT?

Thought exercise about the importance of predators in an ecosystem

WHERE?

At the Zoo near the exit to a habitat area that showcases predators and prey. Good options include:

- Heart of Africa
- Congo Expedition
- Asia Quest
- North America

WHEN?

During the Zoo field trip

WHY?

To explain the role of predators in an ecosystem

HOW?

Spend a few minutes observing the animals in the habitats.

Share this key message:

**HAVING THE RIGHT BALANCE BETWEEN PREDATORS AND PREY IS CRITICAL FOR A HEALTHY ECOSYSTEM!**

Lead a question and answer session using the Chaperone Conversation Starters as a guide. Don't worry if the conversation leads to other questions and you are not certain of the answers. If students present ideas that require further investigation, encourage them to research the answers back at school.

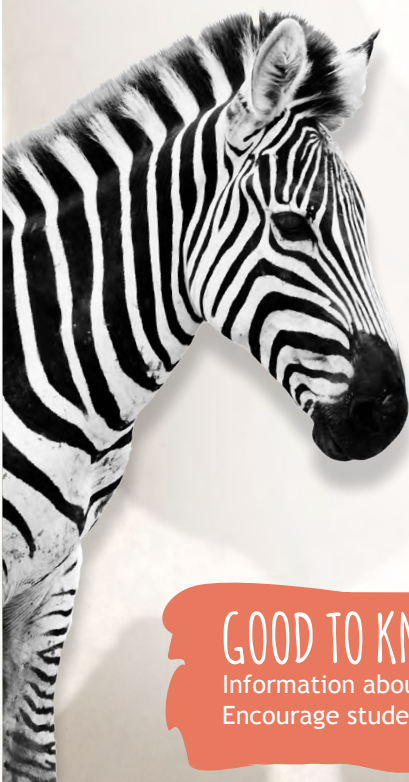
Repeat the key message:

**HAVING THE RIGHT BALANCE BETWEEN PREDATORS AND PREY IS CRITICAL FOR A HEALTHY ECOSYSTEM!**

*Time permitting; repeat this activity at another region.*

## GOOD TO KNOW!

Information about what animals eat is often included on the informational graphics at each habitat. Encourage students to read the signs aloud to each other to find clues about predators and prey.





GRADES  
3-5

## CHAPERONE CONVERSATION STARTERS

At Zoo

- **What predator species did you notice in the region?** *(Remember, a predator is an animal that hunts other animals to survive.)*
- **What prey species did you notice in the region?** *(Remember, a prey species is an animal that is hunted.)*
- **Are there any species that are both predator and prey?** *(Answers may vary, but often include bird species whose eggs and young are preyed upon.)*
- **What senses help prey species notice predators?** *(Sight, hearing, smell)*
- **How do predators look and behave to avoid detection when they hunt?** *(Camouflage, slow movements)*
- **How do prey look and behave to avoid being caught?** *(Camouflage, bright colors to warn of toxins, safety in numbers)*
- **What happens to a population of predators if there is not enough prey available?** *(Predators starve and the population decreases)*
- **What happens to a population of prey if they do not have as many predators?** *(Prey numbers increase at first, which increases competition for their food, and can cause some individuals to starve.)*







GRADES  
3-5

At Zoo

# MANATEE MEDITATION

WHAT?

Question and answer session involving ecosystem terminology

WHERE?

At Manatee Coast

WHEN?

During the Zoo field trip

WHY?

To allow students the opportunity to apply their understanding of ecosystems to another habitat

HOW?

When the group arrives at Manatee Coast, ask students to describe the manatee habitat using ecosystem terminology. Use the Chaperone Conversation Starters as a guide.

*Note: This discussion can be conducted at any of the Zoo habitats, replacing manatees with another species.*




 GRADES  
**3-5**

## CHAPERONE CONVERSATION STARTERS

At Zoo

- Are manatees producers, consumers or decomposers? (*Consumers*)
- Are manatees herbivores, carnivores or omnivores? (*Herbivores*)
- What elements of a food chain are visible in this habitat? (*Point out the plants and animals in the habitat.*)
- What other biotic (living) and abiotic (nonliving) features are part of the habitat that make it a healthy mini-ecosystem for manatees? (*Biotic = other manatees, fish, plant matter; Abiotic = water, rocks, logs*)
- What biotic and abiotic elements do manatees need to survive in the wild? (*Biotic = sea grass to eat, other manatees to raise them and mate with; Abiotic = water to live in, sand for sea grass to root in, rocks for shelter*)
- What abiotic factor would you add to make the ecosystem healthier? Why do you think it will help?
- What biotic factor would you add to make the ecosystem healthier? Why do you think it will help?
- How do you think the abiotic and biotic factors will affect parts of the ecosystem other than manatees?
- What would happen to the aquatic ecosystem if manatees disappeared from where they live in Florida? (*Manatees feed on sea grasses, functioning like a lawn mower that keeps those grasses growing. The sea grass provides protection for small fish, crabs and other crustaceans. If manatees did not feed on the sea grass, then it would not grow as efficiently. In addition, the seeds of those grasses would not be dispersed by manatees through the aquatic habitat.*)





At School

GRADES  
3-5

## I KNOW THAT...

WHAT?

Small group activity using ecosystem vocabulary as it relates to your school yard

WHERE?

In your classroom

WHEN?

After the Zoo field trip

WHY?

To assess students' ability to correctly describe ecosystem concepts using key vocabulary terms and apply ideas about healthy ecosystems to their school yard (or nearby natural space)

HOW?

Research animals online or at the library. (A reliable online resource is Animal Diversity Web - <http://animaldiversity.org>)

Focus specifically on terrestrial wildlife that thrives in Ohio, such as opossums, rabbits, squirrels, beavers, skunks and white-tailed deer, as well as songbirds, water birds and raptors.

Use the vocabulary cards from page 5. You may choose to use only a subset of this list. As needed, introduce or review the terms with the class.

Divide the class into small groups, each one focusing on a different animal. Provide each group with the research materials for their species and a stack of vocabulary cards. Group members take turns choosing a vocabulary card, then finding a piece of relevant information from the books or print-outs to complete the sentence, "I know that \_\_\_\_\_."

For example: *Beaver + Carnivore*

*I know that the beaver is not a carnivore because it eats leaves, tree twigs, inner bark and aquatic plants and grasses, which are plants!*

Invite groups to share their favorite "I know that," listening for examples of correct usage of the key vocabulary words.

(Continued on pg. 12)



## I KNOW THAT...

### HOW? (CONT.)

Next, discuss what elements in an ecosystem provide a healthy environment for wildlife. Ask students to describe how their decisions and actions can contribute to healthy ecosystems.

Take students outdoors to the school yard or nearby natural space to look for evidence of a healthy or unhealthy ecosystem. Discuss how students and teachers can positively or negatively affect the school yard habitat. Can they identify one thing about the existing space that could be changed to make the habitat healthier for wildlife?

Back inside, direct students to sketch a school yard habitat that would provide a healthy environment for Ohio wildlife. For an extra challenge, identify one thing your class could change to improve the school yard habitat for wildlife. Implement that change and send a picture of what you did to the Zoo!

*Send email to [librarian@columbuszoo.org](mailto:librarian@columbuszoo.org).*



### EXTENSION ACTIVITY

Compare and contrast two animals native to Ohio using ecosystem vocabulary. Start by making Venn diagrams. Then write a paragraph that describes how the animals are similar and different.