



GRADES
6-8

ANIMAL BEHAVIOR

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 some 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 investigate animal behaviors, complete an ethogram and discuss how scientists use behavior research to better understand animal reactions to environmental issues. 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





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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 why animals behave certain ways
- Feel confident in their ability to draw conclusions based on the results of an animal ethogram
- Learn how to use an ethogram to design ways of answering questions based on systematic observations
- Learn to draw conclusions about animal behavior based on ethogram results
- Learn how conclusions drawn from ethogram results can be used to help solve issues affecting an animal's habitat
- Use basic field skills, such as observing, to collect information about the environment
- Engage in critique and discussion as part of the process of inquiry

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.68.7c Identify an endangered animal species.
- LS.68.7b Explain how an animal population changes if resources become scarce.
- LS.68.7a Provide examples of how a plant/animal population changes in relation to the availability of certain resources.
- LS.68.11c Identify an animal trait needed for survival.
- LS.68.11b Match animals to traits that help them survive in their environment.

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





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ANIMAL BEHAVIOR
SEQUENCE OF ACTIVITIES

Suggested sequence of activities to support a self-guided field trip focused on animal behavior for 6th through 8th grades. See following pages for detailed descriptions of each activity.

5 STEPS TO A MEANINGFUL FIELD TRIP	DESCRIPTION OF ACTIVITY	ESTIMATED TIME	MATERIALS NEEDED
ENGAGE with a pre-visit activity in your classroom	You Otter See This: Practice observing and recording animal behaviors.	40 minutes	<ul style="list-style-type: none"> • A/V equipment and internet connection
EXPLORE at the Zoo within a habitat area	Bear Behavior: Collect data using an ethogram.	20 minutes	<ul style="list-style-type: none"> • Ethogram Coding: Bears (<i>one copy per student</i>) • Stopwatches (<i>can use phones</i>) • Pencils
EXPLAIN specific concepts	Animal Behavior Studies: Explain how animal behavior research can be applied.	10 minutes	
EXTEND learning by applying concepts to another habitat element	Bird Behavior: Use ethogram data to answer questions about animal behavior.	45 minutes	<ul style="list-style-type: none"> • Ethogram Coding: Birds (<i>one copy per student</i>) • Ethogram Data: Birds (<i>one copy per student</i>) • Understanding Bird Behavior worksheet (<i>one copy per student</i>) • Stopwatches (<i>can use phones</i>) • Pencils
EVALUATE during a post-visit activity/discussion back in the classroom	Think Like a Biologist: Examine how animal behavior researchers use ethograms.	30 minutes	



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YOU OTTER SEE THIS

At School

WHAT?

Preparation for field trip, learning how to observe and record animal behaviors

WHERE?

In your classroom

WHEN?

Prior to the Zoo field trip

WHY?

To introduce the concept of an ethogram as a tool for recording observable animal behaviors

HOW?

On the Columbus Zoo's YouTube page, show students this video of Asian small-clawed otters at the Columbus Zoo: [Asian Small-clawed Otter Pup Explores Outside](#)

1. Show the video without commentary to let students get out their "oooh cutes!"
2. Show the video again while students jot down behaviors they notice, such as "swimming" and "pawing another otter." Focus attention only on the otter pup.
3. Compile everyone's notes into a comprehensive list of observed behaviors. Agree on terminology to describe particular behaviors. It is okay to list behaviors that not everyone observed.
4. Watch the video again to confirm all behaviors are covered.
5. Introduce the term "ethogram" as a data collection tool used by biologists to systematically record animal behaviors.
6. Share the example ethogram and notice that it includes clear definitions of each behavior and abbreviations for each behavior. Point out that data is collected on a regular timed interval. This is called interval sampling.
7. Create a class ethogram for Asian small-clawed otters, including behavior definitions and abbreviations, following the example ethogram. Be sure to include a "not visible" option.
8. Watch the otter video again, this time using the ethogram to record otter pup behaviors using 10-second interval sampling.

HOMework EXTENSION:

Observe a live animal (e.g., pets at home, birds at a bird feeder, squirrels at the park) and create a behavior ethogram.



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BEAR BEHAVIOR

At Zoo

WHAT?

Data collection to complete an animal behavior ethogram

WHERE?

Batelle Ice Bear Outpost in the Polar Frontier region

WHEN?

During the Zoo field trip

WHY?

To practice observing animal behaviors and following a protocol to record data

HOW?

1. Find the informational graphic that shows an ethogram used to track bears' behavior.
2. Distribute the *Ethogram Coding: Bears* sheet to students.
3. Together, review the active and inactive behaviors to understand what each behavior looks like and how to code it.
4. Have students look for identifying markers on the bears. Choose one bear for the class to observe.
5. Start a timer and at the 3-minute mark, record the bears' behaviors.
6. Repeat for up to 15 minutes.

GOOD TO KNOW!

The study of animal behavior is called ethology. Biologists use ethograms to collect data about animal behavior in a systematic way in order to answer questions about an individual animal, a population of animals or the environment where those animals live. By using an established ethogram, scientists researching different populations of the same animal can compare their data. Behaviors change in response to changes in the environment. By researching the behavior of animals, scientists can also learn information about the environments where those animals live.



ETHOGRAM CODING: BEARS

Researcher (student) Name(s): _____

Date: _____

TIME	BEHAVIOR CODE	NOTES
EXAMPLE	W	RAINY DAY
3 min		
6 min		
9 min		
12 min		
15 min		

ACTIVE BEHAVIORS:

BEHAVIOR	CODE	DESCRIPTION
WALKING	W	Using legs to move from one area to another. Also used for running.
SWIMMING	SW	Swimming in pools. Feet are actively moving and not touching the ground.
WADING	WA	Standing or walking in the water. At least two feet are touching the bottom of the pool.
PLAYING	PL	Two or more animals interact without aggression.
EATING	E	Consuming food provided by Animal Care.
DRINKING	D	Consuming water provided by the Animal Care.
VOCALIZING	V	Making audible noises.
FISHING	F	Attempting to catch, catching or eating a fish. Note success rate.

INACTIVE BEHAVIORS:

BEHAVIOR	CODE	DESCRIPTION
STANDING	S	Temporarily immobile; not moving or performing any other visible behaviors but not sitting.
SLEEPING	SL	Eyes closed, immobile, un-reactive to environmental stimuli. Body on the ground with legs tucked underneath.
OUT OF SIGHT	OS	When the animal is completely hidden from view by the den or other enclosure items. <i>(Overrides any active behaviors going on at the same time).</i>
SITTING	SI	Body on the ground with legs tucked underneath. Head may move slightly, eyes open.



At Zoo

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ANIMAL BEHAVIOR STUDIES

WHAT?	Application of how animal behavior researchers use ethograms
WHERE?	Batelle Ice Bear Outpost in the Polar Frontier region
WHEN?	During the Zoo field trip
WHY?	To explain what types of questions scientists can answer using ethograms

HOW?

Direct students to look at the photos and read the informational graphics in Polar Pete’s Living Room. They cover details about the work of Dr. Tom Smith and Dr. Steven Amstrup, including how these biologists identify individual polar bears and their use of FLIR cameras (forward-looking infrared cameras) to study denning mothers and cubs. Notice the ethogram that can be used to track the bears’ behavior. Find the sign titled “Busy Bears are Happy Bears” that describes the enrichment pieces included in the design of the habitat.

DISCUSS:

Q: How is behavior research used in the study of polar bears in their native range?

A: Smith and Amstrup are able to detect whether a den is occupied by using heat-sensing cameras called FLIR cameras. Then they set up other cameras to film the bears when they exit the den. Because humans are not present, the bears perform their natural behaviors. These behaviors are documented and can be compared to how bears behave when people are nearby. It is important for cub survival to know whether the presence of humans disrupts the normal interactions between mother and cub.

Q: How was behavior research used in the design of this habitat?

A: Knowing the typical behaviors of polar bears in their native range, Zoo designers included special features that would allow and encourage those same behaviors for bears at the Zoo. Natural behaviors include digging, browsing, sniffing, climbing and swimming.

GOOD TO KNOW!

Animal studies that are done in the wild are called in situ research; studies focus on animals in human care are called ex situ research.

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BIRD BEHAVIOR

At Zoo

WHAT?

Ethogram activity to collect data about animal behavior

WHERE?

At any habitat that houses birds.

Options include:

- **Asia Quest** - red-crowned crane
- **Australia and the Islands** - Black swan; cattle egret; rainbow lorikeet
(kiwi not recommended due to inconsistent viewing conditions)
- **Congo Expedition** - African gray parrot
- **Heart of Africa** - Common ostrich; East African grey-crowned crane; guinea fowl; saddle-billed stork
- **North America** - Bald eagle; trumpeter swan
- **Shores** - Caribbean flamingo; Humboldt penguin

WHEN?

During the Zoo field trip

WHY?

To practice observing specific animal behaviors and to understand what information can be learned from those behaviors

HOW?

Familiarize everyone with the bird behaviors listed on *Ethogram Coding: Birds Chart*. Notice how the behaviors are grouped into categories to make it easier to find the correct code. Once everyone understands how to read the coding chart, send students in groups of two or three to collect behavioral data on a bird of their choice using the ethogram provided. One student should be the recorder and one should be the timer. You may need to print both the Ethogram Coding and Ethogram Data pages.

Answer the questions on the Understanding Bird Behavior worksheet, individually written or through group discussion.

GOOD TO KNOW!

Birds are an excellent choice for ethogram activities because they are generally active throughout the day and there are many species of birds around the Zoo. Depending on the season, some birds may not be on view. Check in advance to know which habitats are best suited for this activity when you visit.



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ETHOGRAM CODING: BIRDS

Category of Behavior	Behavior	Code	Description
FOOD RELATED	Drinking	D	Bird takes in liquid (usually water) and swallows
	Eating	E	Bird is foraging (looking for) or consuming food items
	Nibbling	N	Bird is chewing on leaves or various objects
LOCOMOTION	Flying	F	Bird moves through the air by flapping wings repeatedly
	Hopping	H	Bird jumps from one place to another using force from legs
	Running	Ru	Bird moves at a quick pace on both legs
	Pacing	Pa	Bird walks back and forth (or circles) on a certain path repeatedly (at least 3 times in a row)
	Walking	W	Bird moves at a moderate pace using both legs
STATIONARY	Perching	Pe	Bird sits on tree or branch
	Resting	Re	Bird rests legs and sits on ground
	Shaking	Sh	Bird rapidly moves feathers and whole body in a shiver-like manner
	Standing on one leg	S1	Bird balances on one leg for a matter of seconds
	Stretching	St	Bird lengthens and elongates one or both wings
	Urinating/Defecating	U/D	Bird excretes waste
INTERACTIVE	Beak Snapping	BS	Bird opens and closes beak at another bird, similar to biting
	Manipulating Object	MO	Bird moves any object in its beak or toes
	Nest Building	NB	Bird gathers leaves and materials for nesting
	Preening	P	Bird manipulates own feathers with its beak
	Vocalizing	V	Bird produces sound through beak loudly
OTHER	Not Visible	NV	Bird is not in habitat or is not viewable
	Other	O	Behavior other than ones described



ETHOGRAM DATA: BIRDS

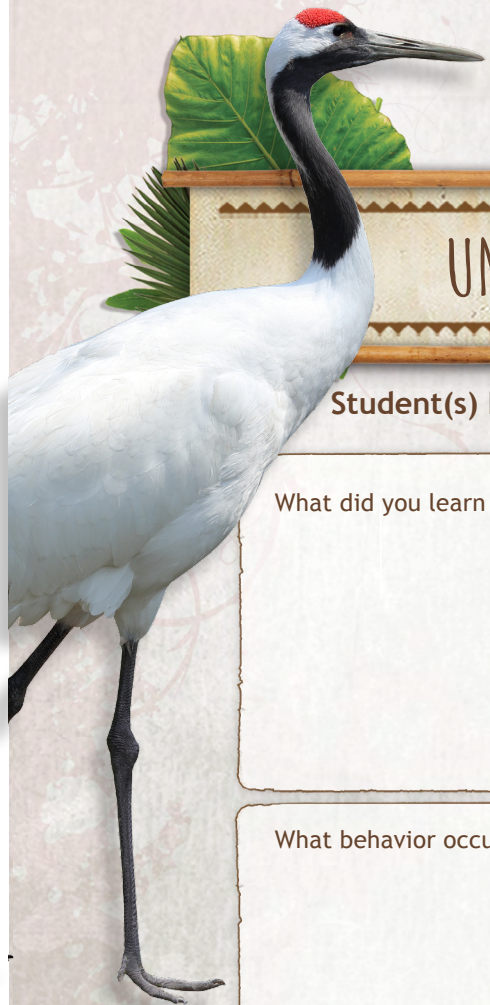
Researcher (student) Name(s): _____ Date: _____

Instructions:

Select one bird to observe for the study period. Make sure you can distinguish the individual from others of the same species. Before you begin, review the ethogram coding chart to familiarize yourself with common bird behaviors. At 30-second intervals, record the bird's behavior at that moment. Collect data for Five minutes.

Bird Species: _____

TIME	BEHAVIOR CODE	NOTES
0:30		
1:00		
1:30		
2:00		
2:30		
3:00		
3:30		
4:00		
4:30		
5:00		



UNDERSTANDING BIRD BEHAVIOR

Student(s) Name(s): _____

What did you learn by watching the bird?

What behavior occurred most often?

What behavior occurred least often?

What surprised you about the data you collected?

List factors that may have influenced the bird's behavior during the observation period. (e.g., weather, habitat elements, other animals, people, etc.)

What challenges did you encounter when using the ethogram chart?

Describe some of the challenges you think biologists face when studying birds in their native range.

Think of a research question that could be answered using the data you collected.




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THINK LIKE A BIOLOGIST

 At
School

WHAT?

Investigation of animal behavior through the lens of an invasive species

WHERE?

Back in the classroom

WHEN?

After the Zoo field trip

WHY?

To apply knowledge about animal behavior research to an environmental problem

HOW?

As a class or in small groups:

Link an environmental issue with a common bird behavior to craft questions a scientist would use an ethogram study to answer:

Environmental Issues	Bird Behaviors
<ul style="list-style-type: none"> • Climate change • Invasive species • Deforestation • Water pollution • Soil erosion • Other? 	<ul style="list-style-type: none"> • Migratory patterns • Mating • Feeding • Nest building • Preening • Bathing • Other?

For example:

- How does *deforestation* affect *nest building* behavior?
- Does *water pollution* increase birds' *preening* behavior?

Write a hypothesis to predict the answer to the question and draw a series of images depicting the hypothesis. What recommendations would you make to decrease the impact of this environmental issue?

It is not necessary to answer the questions; rather, the goal is for students to understand the types of questions biologists ask as part of their animal behavior research.