



## Raptor Resource Project Lesson Plans

To find more plans, go to [www.raptorresource.org](http://www.raptorresource.org)

### Lesson Plan: What do animals do all day?

<b>Grade/Level</b>	Middle School
<b>Time Allotment</b>	45 - 50 minutes
<b>Content Area(s)</b>	Science, Animal Behavior

#### Objectives

- Students will observe and record data using scientific tools and process.
- Students will create an ethogram.
- Students will learn how researchers use ethograms to draw conclusions about animal behavior.
- Students will make observations of bird behavior by journal recordings and ethogram recording.

#### Curricular Connections

Disciplinary Core Ideas: Structure and Process and Ecosystems: Interactions, Energy, Dynamics

- MS-LS1-4 Animals engage in characteristic behaviors that increase odds of reproduction.
- MS-LS2 Organisms, and population of organisms are dependent on their environmental interactions both with other living things and with nonliving factors.

Science and Engineering Practices:

- Analyze and interpret data.
- Planning and carrying out an investigation.
- Asking questions and defining problems.

Cross-Cutting Concepts:

- Patterns: Patterns can be used to identify cause and effect relationships.
- Graphs, charts and images can be used to identify patterns in data.

## Instructional Materials

Appendix: How to make an ethogram, two ethogram templates. Instructors are welcome to change the categories or layout of either ethogram.

## Resources

- Measuring animal behavior: <https://www.lpzoo.org/blog/measuring-movement>
- Decorah EagleCam: <https://www.raptorresource.org/birdcams/decorah-eagles/>

## Background Knowledge

Ethograms are tools developed by ethologists (scientists who study animal behavior) in order to determine patterns of behaviors in animals. They are a quantitative description of behavior. In this lesson plan, students will be watching for typical Bald Eagle behaviors, including eating, preening, feeding, nest building, sleeping, giving alarm calls, and walking. They will be recording these behaviors on an ethogram.

When scientists record data in the field, there are several important variables that must be recorded during each observation session, including the time of day, weather, and the area of study. Make sure students include them as well.

## Opener

Watch 10 minutes of the EagleCam. Students can watch live at <https://www.raptorresource.org/birdcams/decorah-eagles/> or the instructor can select video from our youtube channel at <https://www.youtube.com/c/RaptorResourceProject>.

Have students journal their observations in their science journals. Write a narrative for what they see happening. Discuss the behaviors that they see.

Ask questions:

- What other behaviors might you expect to see? Are there limits to what we can/can't see based on our camera? What nesting behaviors can we expect to see?
- What can patterns of behavior tell us about animals?
- How are narrative observations of animals helpful? How can they be difficult?
- What behaviors were "states" and what behaviors were "events"?

Introduce: Ethograms

### Procedure/Method/Activity

1. Have students work to develop an ethogram for a 15- minute observation of the EagleCam. You can have students design their own or create a class table.
2. What would be relevant information that would need to be included in every ethogram?
3. Have students watch 15 minutes of video and record their observations in their ethogram.
4. Follow-up questions:
  - How did using an ethogram compare to your narrative observations at the beginning of class?
  - Looking at the data, what questions might you ask about bird behavior that would warrant future research and observation.

### Assessment

Students will turn in their ethogram, narrative, and questions about bird behavior.

### Extension

Students could develop their own research project. Using their ethogram, they could watch several segments of EagleCam footage to gather and analyze data. This lesson could also be applied to other bird species for a contrast and compare project.

Instructors are welcome to submit their ethograms to the Raptor Resource Project once the lesson plan is complete. Please email them to Amy Ries: [amy@raptorresource.org](mailto:amy@raptorresource.org)

## How to Make an Ethogram

### What is an ethogram?

An ethogram is a scientific tool used for quantifying and recording animal behavior.

### What is included in an ethogram?

- Animal Identification: A note about who you are observing. For this lesson: adult or eaglet?
- Behaviors: Generally, scientists describe two groups of behaviors:
  - State behaviors are ongoing behaviors that can be timed (think sleeping).
  - Event behaviors happen fast enough that they can't be timed (think sneezing).

**Description of the Behavior:** This is the definition of the behavior. What is the behavior and how do you know they are engaging in it? For example:

- Sleeping, no movement eyes closed.
- Alarm Freeze: no movement, erect stance, eyes open.

**Behavior Type:** This provides a way to categorize the behavior, such as movement, vocalization, maintenance (sleeping, preening), or aggression. Defining a data type helps interpret and quantify data.

**Behavior Reference Code:** An abbreviation or shorthand for the behavior that allows for quicker recording. For example:

LE – Laying Eggs	EGR – Rolling Eggs	INC – Incubating eggs
HE – Hatching eggs	BR – Brooding young	FY – Feeding young
ET – Eating	PRN – Preening	SLP - Sleeping
PS – Shooting poop	PEL – Pellet	NB – Nest-building
MV – Mutual vocalizing	ND – Nest defense	PL – Playing
BK – Bonking or pecking	FP – Flight practice	FS – Food steal
AFM – Adult female	AMA – Adult male	EGLT – Eaglet
AU – Adult unknown		

Instructors are welcome to come up with additional behavior reference codes.

**Video Reference Point:** If you use videos, at what point did you observe the behavior.

**Notes:** It's always helpful to have some place to jot down notes about your observations, things out of the ordinary, or other observations you might like to make for example: changes in weather, changes in baseline (noise, threats, etc.)

EXAMPLE of ETHOGRAM BEHAVIORS in a BALD EAGLE's NEST

Video Reference Point	Type of Behavior	Behavior	Description	Code
1:00	Food-Related	Eating	Adult female consumes food	ET AFM
3:00		Feeding	Adult female feeds eaglet	FY AFM
2:10		Feeding	Adult male feeds adult female	FY AMA
:48		Stealing	Eaglet takes food from a sibling by distraction or aggression	FS EGLT
4:25		Stealing	Female takes food from male by distraction or aggression	FS AFM
1:05	Aggression	Bonking	Eaglet pecks or bonks sibling	BK
3:30	Nest Work	Nest Building	Adult female brings stick	NB AFM
:10		Nest Building	Adult male brings stick	NB AFM
1:15		Playing	Eaglet moves nest material	NB PL EGLT
1:35	Maintenance	Preening	Adult female preens herself	PRN AFM
2:02		Preening	Eaglet preens sibling	PRN EGLT
:48	Egg-Related	Incubation	Adult female incubates eggs Eggs in triangle	INC AFM
1:16		Incubation	Adult male incubates eggs Eggs in line	INC AMA
1:33		Egg-Rolling	Adult male rolls eggs	EGR AMA

*Ethogram One*

Observer \_\_\_\_\_ Date: \_\_\_\_\_

Weather: \_\_\_\_\_ Time: \_\_\_\_\_

Location (provide URL if using video):

Video Reference Number	Type of Behavior	Behavior	Description	Code

*Ethogram Two*

Observer \_\_\_\_\_ Date: \_\_\_\_\_

Weather: \_\_\_\_\_ Time: \_\_\_\_\_

Location (provide URL if using video):

Video Reference Number	Food-Related	Maintenance (preening, sleeping)	Aggression	Nest Building	Egg-Related