BIRD BEHAVIOR – Teacher's Guide

DESCRIPTION:

In the first part of this activity, students develop an ethogram of bird species' behavior at a ground feeding station. In the second part of the activity, students choose two behaviors from this ethogram and conduct a behavioral study to determine if the rate of these two feeding behaviors changes over the course of the school year.

GRADE LEVEL:

7th

OBJECTIVES: Students will:

- Record and describe the feeding behaviors of a common bird species.
- Identify and record behavior states and events of birds at bird feeders.
- Draw conclusions about the behavior patterns of a species during the year.

NEXT GENERATION SCIENCE STANDARDS:

This activity supports the following Performance Expectation:

MS-LS1-4. Use argument based on empirical evidence and scientific reasoning to support an explanation for how characteristic animal behaviors and specialized plant structures affect the probability of successful reproduction of animals and plants respectively.

This activity is aligned with the three-dimensional learning model of NGSS.

Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
Planning and Carrying Out Investigations Analyzing and Interpreting Data	LS1.B Growth and development of organisms	Patterns Cause and Effect

COMMON CORE STATE STANDARDS:

English Language Arts

RST.6-8.3. Follow precisely a multistep procedure when carrying out experiments, taking measurements, or performing technical tasks.

RST.6.8.4. Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to *grades 6-8 texts and topics*.

Mathematics

7.RP.A.2. Recognize and represent proportional relationships between quantities.

7.SP.A.1. Understand that statistics can be used to gain information about a population by examining a sample of the population; generalizations about a population from a sample are

valid only if the sample is representative of that population. Understand that random sampling tends to produce representative samples and support valid inferences.

MATERIALS:

- Human Eating Ethogram [1 per student]
- Bird Behavior Student Handout [1 per student]
- Stopwatches or timers [1 per group]
- Binoculars [class set]
- Bird identification books [class set]
- Meter tape [1]
- Bird seed

BACKGROUND:

The first thing an ethologist (a scientist who studies animal behavior) must do is create an *ethogram,* a list of behaviors with a description or definition of each one. For example:

Behavior	Description
Drinking from a cup	A cup is lifted from a surface to the mouth, liquid is drained into the mouth and swallowed, and then the cup is returned to the surface.

This list, or inventory of the species' behavior, is the starting point. From this list, ethologists can form hypotheses about the causes and rates of a particular behavior.

Behaviors can be divided into two groups: ***states*** are ongoing behaviors that can be timed, and ***events*** are behaviors that happen so fast that they would be hard to time. We count the number of times an event occurs. For example, reading a book is a state and we could time how long someone spends reading a book; sneezing is an event and we could count how many times someone sneezes.

TIPS FOR ENTIRE CLASS PARTICIPATION:

- During the creation of the ethogram, have each student carefully observe the chosen bird species and record the behaviors they see on the Bird Ethogram.
- During the study of bird behavior using two behaviors from the ethogram, students work in groups of five (tasks for each student are explained in the procedures that follow). Install as many feeding stations as necessary to accommodate the size of your class.

PROCEDURES:

Human Eating Ethogram

1. Explain ethograms to students and have them complete the Human Eating Ethogram during a meal. Students could complete the assignment during lunch, at home, or during snack time in class. All directions are listed on the student page for the Human

Eating Ethogram. During the next class period, discuss the result of the Human Eating Ethogram.

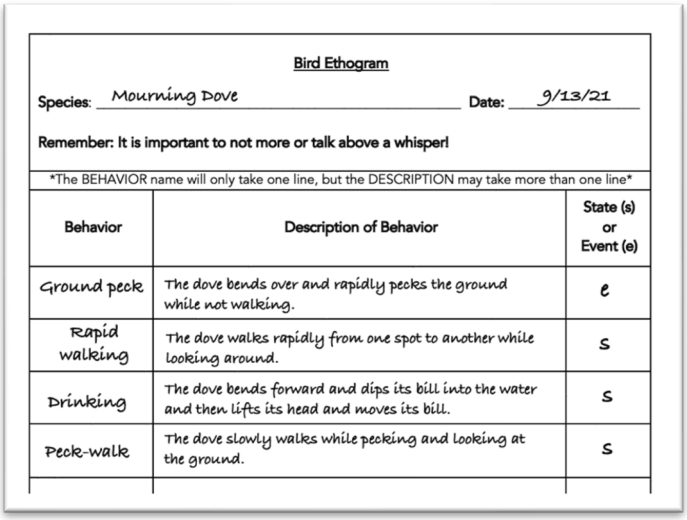
Creating an Ethogram for Feeding Birds

2. Tell students that they will now develop an ethogram for birds visiting a bird feeder. Help students learn to identify common birds by showing them pictures of birds common to your schoolyard.

3. Each student will choose one bird species to watch carefully for 5 minutes. Have students record the species of the bird on the Bird Ethogram.

4. In the schoolyard, select an area that birds frequent and mark out a three-meter circle as the feeding area. Set up as many feeding areas as needed to accommodate your class size. Three days before the study, scatter the bird seed on the ground in each feeding area (approximately 3 cups of seeds). This will acclimate the birds to a new food source.

5. During the five-minute observation, students will name and describe all of the behaviors of their bird on the Bird Ethogram. An example of how students may fill out the Bird Ethogram can be found in Figure 1.



Bird Ethogram

Species: Mourning Dove Date: 9/13/21

Remember: It is important to not more or talk above a whisper!

The BEHAVIOR name will only take one line, but the DESCRIPTION may take more than one line

Behavior	Description of Behavior	State (s) or Event (e)
Ground peck	The dove bends over and rapidly pecks the ground while not walking.	e
Rapid walking	The dove walks rapidly from one spot to another while looking around.	s
Drinking	The dove bends forward and dips its bill into the water and then lifts its head and moves its bill.	s
Peck-walk	The dove slowly walks while pecking and looking at the ground.	s

Figure 1. Bird Ethogram Student Example

6. As a class, list all the behaviors that were observed or recorded. Ask students if one ethogram can be created for all species of birds or if a different ethogram needs to be created for each species. After the class ethogram is complete, identify which behaviors were states (s) and which were events (e).

Conducting the Bird Behavior Study

7. Make sure the ethogram completed above contains "feeding" and that the class has a precise definition for this behavior (e.g., seeds in beak, head down with beak in seeds, etc.).

8. Have the class choose a different behavior to study.

9. Have the class choose one bird species to study. Be sure to choose a species that is common in your schoolyard.

10. Students work in groups of five to make observations with the following tasks:
    a. Timer: watches the stopwatch and says "now" every 20 seconds.
    b. Recorder: records data from each observer on the Bird Behavior Data Sheet.
    c. Total Birds Present Observer: makes an instantaneous count of the number of birds of the chosen species at the moment the timer says "now".
    d. Feeding Behavior Observer: makes an instantaneous count of the number of birds of the chosen species at the moment the timer says "now".
    e. Class-chosen Behavior Observer: makes an instantaneous count of the number of birds of the chosen species doing the class-chosen behavior at the moment the timer says "now".

Bird Behavior Data Sheet

Species: Mourning Dove **Date:** 9/13/21

Class-chosen Behavior: Peck-walk

Time	Number of Birds Feeding	Number of Birds Performing Class-chosen Behavior	Total Number of Birds
20 sec	0	0	0
40 sec	0	0	0
1 minute	3	0	5
1 minute 20 sec	8	0	8
1 minute 40 sec	3	1	6
2 minutes	7	1	8
2 minutes 20 sec	7	0	7
2 minutes 40 sec	5	0	8
3 minutes	4	2	9
3 minutes 20 sec	8	0	8
3 minutes 40 sec	1	3	7
4 minutes	4	3	7
4 minutes 20 sec	5	0	7
4 minutes 40 sec	2	2	9
5 minutes	7	0	7
Total	64	12	96
Average	4.3	0.8	6.4
Average Percentage	67%	13%	

Average % of Birds Feeding = (Average Number Feeding / Average Total Number of Birds) x 100

Average % of Birds Performing Class-Chosen Behavior = (Average Number Performing Class-Chosen Behavior / Average Total Number of Birds) x 100

Figure 2. Bird Behavior Data Sheet Student Example

11. Use the same feeding set up as described previously.

12. Observations of feeding and the class-chosen behavior will be done for 5 minutes once a month, at the same time each day. Morning is the best time to observe.

13. After the observations, calculate the total number of birds present, the total number of birds performing the feeding behavior, and the total number of birds performing the class-chosen behavior on the Bird Behavior Data Sheet. An example of how students may fill out the Bird Behavior Data Sheet can be found in Figure 2.

14. Calculate the percentage of birds feeding and the percentage performing the class-chosen behavior on the Bird Behavior Data Sheet.

15. Use data from each month to fill out the Monthly Behavior Data Sheet.

16. Graph the monthly percentages. An example of how students may fill out this data sheet and graph can be found in Figure 3.

CONCLUSIONS:

Allow students to draw conclusions from the graphs. Students should answer the following:

- Does the percentage of birds feeding vary during the school year?
- Does the percentage performing the class-chosen behavior vary during the school year?
- What other factors may influence bird behavior at a feeder?
- Discuss the sample size of this investigation. Was 3 minutes of observation long enough to make generalizations about the population? Was the three-meter circle large enough?

Monthly Behavior Data Sheet

Species: Mourning Dove

Month	Average Percent of Birds Feeding	Average Percent of Birds Performing Class-Chosen Behavior
September 2021	67%	13%
October 2021	69%	19%
November 2021	72%	21%

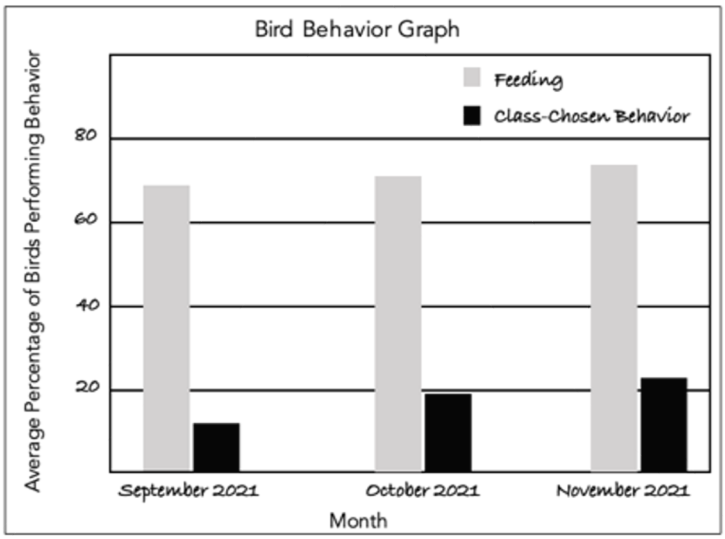


Figure 3. Monthly Behavior Data Sheet and Bird Behavior Graph Student Examples