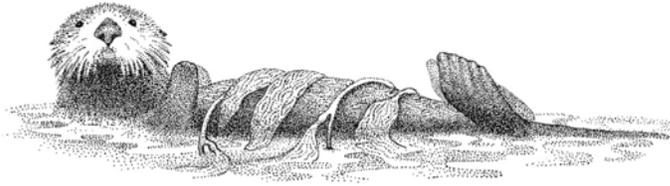


Activity Budget



Topics

Needs of living things

Grades

6-8

Site

Outdoors, Classroom

Duration

30-60 minutes initially,
then 15 minutes weekly

Materials

- Activity Budget Data Collection Sheet
- Timers for each group
- Binoculars

Vocabulary

budget, protocol

Next Generation Science Standards

Practices

Analyzing and Interpreting Data

Core Ideas

LS2.A: Interdependent Relationships in Ecosystems

Crosscutting Concepts

Energy and Matter in Systems

Performance Expectations

See page 4

Focus Question

What can animal activity tell us about its survival and energy needs?

Overview

Students develop a protocol to collect long-term activity data on a local wild animal. They use this data to discuss feeding and foraging patterns and energy cycles.

Objectives

Students will be able to:

- Create a protocol for observing a local animal
- Collect long-term activity data
- Analyze activity data
- Discuss the implications for the energy needs of the animal

Background

An activity budget is a tool biologists use to quantify the behavior of animals over time and across populations. Scientists observe the animal for a set period and check off behaviors at regular intervals. In sea otter research for example, scientists have been collecting activity budget data in 12- and 24-hour increments for decades. This information has helped to inform the greater understanding of what sea otters eat, how much of their day is spent looking for food, and how that is similar or different to sea otter populations in different areas.

To use an activity **budget**, scientists identify the behaviors they want to note. Then, at particular intervals they check the box of the behavior the animal is doing at that moment. This also requires that observers know what each behavior looks like and the importance of uniform timing. This activity encourages students to develop and refine their own **protocol** for observing the animal to engage in authentic data collection.

Teacher Preparation

1. Take some time to observe in the field site you have regular access to. Are there animals that your students can take activity data on? Try it out for yourself!



VOCABULARY

Budget: a tool for studying animal behavior

Protocol: A system of steps and rules to carry out an investigation

**THE MISSION OF THE
MONTEREY BAY
AQUARIUM
IS TO INSPIRE
CONSERVATION OF THE
OCEANS.**

2. Collect binoculars, timers, and make copies of the **Activity Budget Data Collection Sheet** for your students.

Procedure

Part One: Introduction to Activity Budgets

1. **INTRODUCE THE FOCUS QUESTION TO THE CLASS.**

Share the question: *What can animal activity tell us about its survival and energy needs?* You may write it up on the whiteboard or have students add it to their science notebook. Give students time to write their initial thoughts down or discuss with a partner.

2. **INITIAL OBSERVATIONS**

Ask your students to name the animals that live at your field site. Take your students out to the field site and split them into smaller groups to observe the different animals they found. Have students make a list of all the different behaviors they observe they're animal doing in their science notebook.

3. **STUDENTS CHOOSE AN ANIMAL TO OBSERVE**

Ask the students what they think they could learn from observing the same species of animal over time? (Feeding habits, behavior habits) Tell them that they'll be using a tool that biologists use to collect data on animal activity but first they'll need to determine an animal to observe. Decide as a class to observe one animal, or each small group could observe a different animal.

4. **CREATE THE PROTOCOL**

Once each group or class has chosen an animal to observe, pass out the Activity Budget Data Collection Sheet. Guide the groups in a discussion of what behaviors they think they will see the animal engaging in. Have them fill out the behaviors on the data sheet. Lead a discussion on potential data collection errors and the importance of protocols by asking the students, *How can we make sure our data is valid? Why do scientists develop and use set protocols? What does each of these behaviors look like?*

Part Two: Data Collection at the Field Site

5. **PREPARE STUDENTS TO TAKE DATA**

Put students in groups of three. Let them decide how they will take data or assign a timer, a recorder, and an observer.

6. **STUDENTS TEST OUT THEIR PROTOCOL**

Let students go out, sit quietly and take activity data. Afterwards, let them discuss if their protocol worked. Are there other behaviors they should be noting? Did they know which behavior the animal was engaging in? Do they need to observe for more or less time? How often should they observe their animal? Let students revise their protocol if necessary.

7. **STUDENTS COLLECT LONG-TERM DATA**

Based on your protocol discussions, have students collect activity data overtime. Usually, weekly observations work well.

Part Three: Analyze Collected Data

8. COLLECT AND ANALYZE CLASS DATA

Have students represent their data graphically. Often scientists will use a bar chart with activity on the x-axis and percent time on the y-axis (the percentage of time the animal was engaged in each particular activity). Ask students what they see in the graph, what patterns or relationships do they notice? If different groups observed different animals, ask students to compare and contrast the graphs or compare across class periods.

9. SCIENCE TALK

Engage in a science talk (See Resources) with your students. What did you observe your animal doing for its survival? How much time did it spend looking for food? What might this tell us? What might happen to the data if there was a major change to the field site and your animals' food source was cut in half? After the discussion, you may decide to assign them a reading on resource availability and its impact on ecosystems.

10. RETURN TO THE FOCUS QUESTION.

Now that students have collected data, have them revisit the question: *What can animal activity tell us about its survival and energy needs?* Students may think on their own or discuss with a partner. Then in their science notebook, you may have them draw a line of learning and under it add to their original thoughts about the question.

Resources

Website

Monterey Bay Aquarium www.montereybayaquarium.org

You might introduce this activity using a live web cam. Check out our web cams and try it with our African Penguins!

Science Talk Primer https://inquiryproject.terc.edu/shared/pd/TalkScience_Primer.pdf

Standards

Next Generation Science Standards www.nextgenscience.org

Performance Expectations

Relates to MS-LS2-1: Analyze and interpret data to provide evidence for the effects of resource availability on organisms and populations of organisms in an ecosystem.

Relates to MS-LS2-4: Construct an argument supported by empirical evidence that changes to physical or biological components of an ecosystem affect populations.

Common Core State Standards www.corestandards.org

6.PR.A.3: Use ratio and rate reasoning to solve real-world and mathematical problems.

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



CONSERVATION TIPS

Making careful observations can be a hook for students to become better environmental stewards.

Becoming aware of intricate and delicate ecosystem interactions may lead students to take conservation actions such as carrying reusable water bottles and bags or participating in community cleanups to maintain a healthier environment.

Activity Budget Data Collection Sheet

Animal: _____

Name: _____

Directions:

1. Choose one individual animal to observe.
2. Observe the animal for 10 minutes.
3. Every 30 seconds, record which behavior the animal is doing by placing an "X" in the box.

Date: _____ Time: _____

Weather: _____

Time in minutes																					
Behavior	:00	0:30	1:00	1:30	2:00	2:30	3:00	3:30	4:00	4:30	5:00	5:30	6:00	6:30	7:00	7:30	8:00	8:30	9:00	9:30	10:00

Animal activity notes: _____

Protocol notes: _____