

Overview:

In this lesson, students develop observational skills of animals to make a connection between the behavior of animals and the physical environment. Students hear a story that describes amazing elephant behavior before the 2004 Indian Ocean tsunami then meet with an Elder to learn about animal observation in the local area. Students practice the skill of observing and record the account in writing. This lesson may be expanded to take place over several days.

Targeted Alaska Grade Level Expectations:

Science

- [3-4] SA1.1 The student demonstrates an understanding of the processes of science by asking questions, predicting, observing, describing, measuring, classifying, making generalizations, inferring, and communicating.
- [3] SA1.2 The student demonstrates an understanding of the processes of science by observing and describing the student's own world to answer simple questions.
- [4] SA1.2 The student demonstrates an understanding of the processes of science by observing, measuring, and collecting data from explorations and using this information to classify, predict, and communicate.
- [4] SC1.1 The student demonstrates an understanding of how science explains changes in life forms over time, including genetics, heredity, the process of natural selection and biological evolution by showing the relationship between physical characteristics of Alaskan organisms and the environment in which they live.
- [3] SF1.1-SF3.1 The student demonstrates an understanding of the dynamic relationships among scientific, cultural, social, and personal perspectives by exploring local or traditional stories that explain a natural event.
- [4] SF1.1-SF3.1 The student demonstrates an understanding of the dynamic relationships among scientific, cultural, social, and personal perspectives by connecting observations of nature to a local or traditional story that explains a natural event (e.g., animal adaptation, weather, rapid changes to Earth's surface).

Writing

- [2] 1.2.1 The student writes for a variety of purposes and audiences by producing a variety of written forms for specific audiences (e.g., stories, reports, letters, journal entries).
- [4] 2.2.1 The student writes for a variety of purposes and audiences by writing in a variety of nonfiction forms using appropriate information and structure (i.e., personal letters, recounts, descriptions or observations).

Targeted Alaska Grade Level Expectations:

- D1 Culturally knowledgeable students are able to engage effectively in learning activities that are based on traditional ways of knowing and learning. Students who meet this cultural standard are able to acquire in depth knowledge through active participation and meaningful interaction with Elders.
- E2 Culturally knowledgeable students demonstrate an awareness and appreciation of the relationships and processes of interaction of all elements in the world around them. Students who meet this cultural standard are able to understand the ecology and geography of the bioregion they inhabit.

Objectives:

The student will:

- Observe animal behavior; and
- Record animal behavior in writing.

Materials:

- Laiz, J., & Cafiero, T. (2005). *Elephants of the tsunami*. Massachusetts (The Berkshires): Earth-Bound Book
- Clip boards
- Pencils
- STUDENT WORKSHEET: “Animal Behavior Observations” (Grades K-2)
- STUDENT WORKSHEET: “Animal Behavior Observations” (Grades 2-4)

Whole Picture:

Some animals have remarkable adaptations for surviving their environment. This includes sensing things that humans cannot. For example, crabs have hair on their legs to detect water current and vibrations. Fish have sensory receptors that detect changes in water pressure. Mice can hear frequencies between 1,000 and 100,000 Hz. By comparison, humans can hear frequencies between 20 and 20,000 Hz. The hearing range of elephants is between 1 and 20,000 Hz. The very low frequency sounds are in the “infrasound” range, which humans cannot hear.

Animals sense even small changes in the environment and this influences their behavior. Through observation of animal behavior, we can learn about our surroundings. Detailed observation of surroundings can be applied to knowledge acquisition in traditional Native knowledge and Western science. Although the applications of knowledge may vary, it is understood that observation must take place repeatedly over time in order to build a knowledge base that can support pattern recognition, inferring, and prediction.

In traditional Native knowledge, observation of surroundings including animal behavior, often leads to inferences and predictions about weather conditions and sometimes earthquakes. Local Elders, hunters and culture bearers have a sense of the local environment and cues they take from animal behavior. Although many western scientists are not sure about animals sensing rapid changes to Earth’s surface, anecdotes about animals predicting earthquakes and tsunamis have existed for centuries. In 1979, T. Neil Davis of the Geophysical Institute at the University of Alaska Fairbanks reported on observations near Yakutat just before the Lituya Bay earthquake on July 10, 1958. This example shows a keen sense of observing animal behavior in relation to an earthquake.

One person picking berries saw leaves move when they shouldn’t have, while nearby others saw birds become disturbed and fly over the trees in unusual numbers. Simultaneously yet another nearby group suddenly started getting bites from fish with every cast into the river. Several minutes later the magnitude 8 earthquake struck. In this instance it seems likely that the birds and fish were responding to vibrations evidenced by the moving leaves but which were not noticed by the people present. Also, it has been suggested that animals may be responding to the release of gases such as methane just before the earthquake.

Animal observations were taken into account in China in 1975 when seismologists believed that a large earthquake would take place in Haicheng, a heavily populated area about 400 miles north of Peking. Observations of sudden changes in water well levels, abnormal behavior of domestic animals and even snakes emerging from below ground in subzero weather plus instrumental indications implied the earthquake was imminent. Massive evacuations of nearly one million people were completed just hours before the earthquake struck. There were no deaths but the entire town of Haicheng was destroyed in the earthquake on February 4, 1975 (Holland, 1976).

Activity Preparation:

1. Invite an Elder to visit with students to share local knowledge of observing animal behavior to learn about weather and other events happening in the environment. This can take place in the classroom or outdoors; make adjustments as needed to ensure the Elder's comfort. Make sure the Elder has adequate transportation to and from the classroom, and arrange for snacks and drinks for both the Elder and students.
2. Determine how often you would like your class to record observations and make copies of the STUDENT WORKSHEET: "Animal Behavior Observations."

Activity Procedure:

1. Explain that people have been reporting strange animal behavior before earthquakes and tsunamis for hundreds of years but a lot of scientists are not really sure about how animals can sense these events. Explain that you will share a story how elephants sensed a tsunami coming and how they helped people survive. Read aloud *Elephants of the Tsunami* by J. Laiz, & T. Cafiero.
2. Introduce the Elder and explain that he or she will talk to students about observing animal behavior to learn about what is happening or going to happen in the environment. This can take place in the classroom or as a walk outside.
3. Explain that observing is an important science skill. Model filling out STUDENT WORKSHEET: "Animal Behavior Observations." Any type of animal may be observed.
4. Distribute clipboards and worksheets and take students outdoors to make observations.

Extension Ideas:

- Read *Owen & Mzee: the true story of a remarkable friendship* by Hatkoff, I., Hatkoff, C., Kahumbu, P., & Greste, P. as an example of an unusual animal friendship between a tortoise and a hippopotamus after the 2004 Indian Ocean Tsunami.

Answers:

Answers will vary.

Lesson Information Sources:

Alaska Division of Homeland Security and Emergency Management. *Disaster Supply Kit for Pets*.

Aleut/Alutiiq Cultural Atlas. Retrieved from Alaska Rural Systemic Initiative & The Oral History Department of the University of Alaska-Fairbanks Rasmuson Library.
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Chudler, E.H. (2009). Neuroscience for kids. Amazing animal senses.
Retrieved from <http://faculty.washington.edu/chudler/amaze.html>

Davis, T.N. (1979). Earthquakes and animals. *Alaska Science Forum*.
Retrieved from <http://www.gi.alaska.edu/ScienceForum/ASF2/295.html>

Hatkoff, I., Hatkoff, C., Kahumbu, P., & Greste, P. (2006). *Owen & Mzee: The true story of a remarkable friendship*. New York: Scholastic Press.

Holland, J. (1976). Earthquake prediction-chinese style. *Alaska Science Forum*.

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Laiz, J., & Cafiero, T. (2005). *Elephants of the tsunami*. Massachusetts (The Berkshires): EarthBound Book.

Rozell, N. (2003). A man, his Dog and two earthquakes. *Alaska Science Forum*.

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Animal Behavior Observations Student Worksheet



Observer: _____ Date: _____

The animal I am observing is: _____

Sketch

Notes: _____

Animal Behavior Observations Student Worksheet



Observer: _____ Date: _____

Start Time: _____ Stop Time: _____

Weather:

Wind	Sky	Temperature

The animal I am observing is: _____

Sketch

Notes: _____
