


# LESSON 4: Recognizing Polar Bear Behaviors

## Science Standards Skills & Processes

Students will demonstrate the thinking and acting inherent in the practice of science.

## Constructing Knowledge

Indicator:
Gather and question data from many different forms of scientific investigations. These include reviewing appropriate print resources, observing what things are like—or what is happening—somewhere, collecting specimens for analysis and doing experiments.

**Objectives:**

- Recognize that the results of scientific investigations are seldom exactly the same, and when the differences are large, it is important to try to figure out why.
- Identify possible reasons for differences in results from investigations including unexpected differences in the methods used or in the circumstances in which the investigation is carried out; sometimes, results are different due to uncertainties in observations.

## Assessment

Student responses to discussion questions at the end.

## Materials

- Copies of and equipment to show "Identifying Polar Bears" PowerPoint
- "Polar Bear Behavior" reference sheet for each student
- Equipment to show video that demonstrates the actual collection of data for the experiment

## Lesson

1. Engagement
   Have four students stand in front of the class. Explain that if they were test subjects, the scientists would have to establish some criteria to determine who was who. Describe one student's clothing and ask the class to identify who you are describing. Explain that scientists do this with the bears they study, but it is not as easy. Show the "Identifying Polar Bears" PowerPoint.

2. Tell the class that now they know how to identify individual bears, the scientists must figure out how to consistently describe their behavior. Tell the students that they are going to act out some behaviors. Ask for a volunteer to act out what you describe. From the list of bear behaviors read the explanation of a behavior. Have the student act out the behavior. Do a few behaviors and then explain to the students that in order to determine whether noise from Tundra Buggies® and humans has an effect on polar bears, scientists first must be able to identify basic bear behaviors. Scientists must carefully define what they mean by each behavior so that other researches can duplicate the experiment exactly.

3. Have students get into pairs and then distribute the "Polar Bear Behavior" reference sheet. Have the students work together to read through the behaviors. One partner can act out a behavior while the other tries to guess what it is. Do this for a few minutes to allow the students to familiarize themselves with the terms.

4. Show the PowerPoint "PBI Sound Experiments."

5. Show the first 4 1/2 minutes of the video entitled *Nov 9 1212 1214 appr snd exp*. The video is provided by the PBI research team and shows an actual data-collection experiment. Students will be able to see how the experiment is conducted and will also be able to list the behaviors they observe. (Observed bear behaviors include: lying down, raising head, sitting up, standing, walking and lip smacking). Note: Fast-forward a bit at the beginning until you see the bear raise its head. Note that in the audio portion, the researcher calls out the distance to the bear and the observed behaviors. After the bear responds, the researchers play a tape of tourist sounds to note any further behavior. Stop the video when you hear the researcher switch to "Stand by."

6. Have student pairs compare lists of behaviors observed. Are all lists the same? Why or why not?

7. Show the video clip a second time so students can check and, if necessary, modify their observation chart. Share any changes that pairs make.

Behavior list modified from: The Effects of Fixed and Variable Time Schedules on Stereotypic Behaviors in Two Polar Bears (Fernandez, E.J. and Timberlake, W.D.) presented at the Association of Behavior Analysis Conference, San Francisco, May 2003).

8. Continue playing the tape to show the second bear. Note the position of the second bear: it is lying on its back in the snow. Have students compare the definition of "lying down" to this bear's position. How would students classify this behavior? Do the researchers need to change their definition or make a new one or is the current one good enough?

9. Ask students if they would add any other behaviors to the list or change any definitions. Explain that if they were continuing this research, they could use the given definitions or make up their own. Either way, a reader must understand what the researcher means by each term.


10. Discussion questions
    a. Ask the students
    Results from scientific investigations are seldom exactly the same. After watching the video, how do you think it might be different if another scientist were trying to repeat the investigation?
    *This video shows data from one bear. Other bears may react in a different way.*

    b. Ask the students
    Sometime the results that are recorded are different. What are some reasons for these differences? How did the discussion of our results with the class show that?
    *In this case, the observers may record different behaviors, record data from different bears, not notice a behavior or interpret a behavior differently even though they saw the same event.*