



Bears of Glacier Bay National Park

Middle School Scientists Curriculum

Investigation 2: What's the Scoop on Poop?

Overview:

This investigation will introduce students to the importance of using good observation skills, which enables researchers to accurately collect and record data. Students will be given a sample of (teacher-created) bear poop to analyze. The scientific word for poop is **scat**. Through careful observation and examination, they will be able to answer questions about what bears eat, quality of habitat, time of year, and bear safety.

Background Information:

Park researchers use scientific tools and observation to study bear populations in Glacier Bay. Visible signs like well worn trails, rub trees, claw marks, tracks, and scat help researchers identify where bears spend their time, what they eat, if they are sick, and much more. Scat is one of the most important signs to look for when in the field. Bears are **omnivores** and their scat often contains identifiable remnants of their last meal such as grass, berries, seeds, fish bones, or hair. The scat varies quite dramatically depending on what the bear is eating at a particular time of year.

In the spring, bears are often seen grazing on young shoreline grasses, sedges, and other plants. Brown bears use their long claws to dig up plant roots such as sweet-vetch. Bears feed on beach and meadow plants throughout the spring and summer, and feast on the wide variety of berries that ripen in the late summer and fall.

When the tide is low, bears **forage** in Glacier Bay's extensive **intertidal** zone. Both black and brown bears can be seen scraping barnacles off of rocks and munching mussels. Occasionally brown bears are observed turning over large rocks and pouncing on the prickly backs and gunnels (small eel-like fishes) that live underneath.

Class Time Required	1 class period (50 minutes)
Materials Needed:	<ul style="list-style-type: none"> • Student journals • Colored pencils or crayons • <u>Bear Scat Analysis Date Sheet</u> (1 per group) • Scales for weighing • Newspaper, forks, tweezers, plastic gloves • Homemade bear scat ingredients (see investigation for details)
Teacher Preparation:	45 minutes to read background information, investigation, and prepare scat samples
Student Knowledge:	Basic understanding of the scientific method, bears, and bear sign
Vocabulary:	carcass, forage, intertidal, omnivore, scat, scientific method
National Content Standards	<ul style="list-style-type: none"> • NS.5-8.1 Science as Inquiry

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Salmon are very important to bears in the late summer and fall. Bears eat many other animals when they get the opportunity, including such items as bumblebees, sand fleas, bird eggs, birds, voles, marine mammal carcasses stranded by the tide, and occasionally even other bears. Moose calf hooves have been found in bear scat in the lower bay, and brown bears in the upper bay have been seen patrolling spring avalanche slopes probably in search of winter mountain goat casualties.

Bear scat is a good indicator of bear activity. Scat tells us what a bear is eating and where bears have been. Some bears may feed on a **carcass** for several weeks, and a bear during this time could be very dangerous. Learning to identify scat, and reading these signs can help park managers and visitors take preventative measures to reduce bear-human conflict.

Focus Questions:

How do biologists study bears in Glacier Bay?

What can you learn about bears from examining their scat?

What can we learn from bear scat that can help park managers and visitors prevent bear-human conflict?



Engagement:

(15 minutes)

Show students the library of black bear scat on the following website - <http://www.bear-tracker.com/blackbearscat.html>. This will give them an idea of how variable bear scat can be at different times of the year. Have students make a list of different items they may expect to find in bear scat. Tell students they are going to become bear biologists in charge of analyzing a sample of bear scat.

Investigation:

(30 minutes)



1. The day before the planned activity, make some bear scat from various non-allergenic ingredients. (It's probably best not to use nuts or peanut butter for this activity). For the best results, use Kellogg's Cocoa Krispies® or Rice Krispies® cereal. Melt 3 tablespoons of butter over low heat, add one jar (7 oz.) marshmallow crème until mixed, stir in 6 cups of cereal until well coated. This is the foundation of your bear scat. Divide the scat into three containers depending on how many groups of 3-4 students you will have. To each batch of scat, add a select number of items to represent consumed food items. Record your additions to each sample so you can determine the accuracy of student observations. You may want to include the following: gummy worms (represent meat), Swedish Fish (gummy fish), dried cranberries, dried or fresh blueberries, barley and/or rice (to represent seeds), green colored coconut (to represent grass). By varying your additions to the scat, you may create "spring, summer, or fall" scat samples. Use your imagination! Store in plastic containers for up to two days.

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2. On activity day, give students plastic gloves, newspaper (for desk), forks, tweezers, bear scat sample, and [Bear Scat Analysis Data Sheet](#). Explain the various categories on the sheet and help students identify each item. They should have an understanding that rice represents seeds, etc. If some students are not eager to “poke the poop,” have them be data recorders.
3. Allow students approximately 20 minutes to observe, examine, and analyze their scat sample. Students should NOT eat or sample the scat at this time! Let them know that in this activity, accuracy counts! They should separate items into groups in order to get an accurate count of each food type. Students should record data on [Bear Scat Analysis Data Sheet](#).
4. After careful examination of scat, have students clean up their area. Use your discretion if kids ask to eat the scat. Some kids may have fun, others may not be interested.
5. Using their results, have students estimate what percentage of their scat is made up of the different food groups. Have them create a graph and pie chart of their data. Share results and discuss.

Explanation:

(10 minutes)

Biologists can tell a lot about bears from examining their scat. After students graph their data, ask them “What did you learn about your bear by examining the scat?” Allow them to talk with a partner to develop their thought processes and understandings of the scientific method. Ask each student to write their hypothesis in their science journals. Discuss how food type can indicate time of year or place.

Extension:

Use the [Glacier Bay Bear Scat Handout](#) to compare student samples to actual scat samples found in Glacier Bay. How do they compare and why?

References/Resources:

Official Glacier Bay National Park Website

<http://www.nps.gov/glba/naturescience/bears-at-glacier-bay.htm>

Alaska Department of Fish and Game - Wildlife Notebook Series

<http://www.adfg.alaska.gov/index.cfm?adfg=educators.notebookseries> - 150 Alaska wildlife species

International Association for Bear Research and Management

www.bearbiology.com

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National Education Science Standards Addressed: Grades 5-8

NS.5-8.1 Science as Inquiry

Abilities Necessary to do Scientific Inquiry (5-8):

- Identify questions that can be answered through scientific investigations. Students should develop the ability to refine and refocus broad and ill-defined questions.
- Use appropriate tools and techniques to gather, analyze, and interpret data.
- Develop descriptions, explanations, predictions, and models using evidence.
- Think critically and logically to make the relationships between evidence and explanations.
- Use mathematics in all aspects of scientific inquiry.

Understanding about Scientific Inquiry (5-8):

- Different kinds of questions suggest different kinds of scientific investigations. Some investigations involve observing and describing objects, organisms, or events; some involve collecting specimens; some involve experiments; some involve seeking more information; some involve discovery of new objects and phenomena; and some involve making models.
- Current scientific knowledge and understanding guide scientific investigations. Different scientific domains employ different methods, core theories, and standards to advance scientific knowledge and understanding.
- Mathematics is important in all aspects of scientific inquiry.