Animal Behavior
Teachers Guide
Grades 9th -12th

Program Description: Before animals can live in an aquarium, biologists must understand their needs and behaviors. Students will discover how Georgia Aquarium staff maintain the health of the animals as well as the training and enrichment techniques used in the process.

Enduring Understandings:
- Observation is the best way to study and understand animal behavior.
- Understanding animal behavior helps us to maintain animals in aquariums and to protect their populations in their natural habitats.

Objectives:
- Students will be able to observe and interpret animal behaviors at Georgia Aquarium.
- Students will be able to recognize the importance of animal training and enrichment.

Georgia Performance Standards Addressed:

**Zoology**

SCSh1. Students will evaluate the importance of curiosity, honesty, openness and skepticism in science.
   a. Exhibit the above traits in their own scientific activities.
   b. Recognize that different explanations often can be given for the same evidence.

SCSh6. Students will communicate scientific investigations and information clearly.
   d. Participate in group discussions of scientific investigation and current scientific issues.

SZ4 Students will assess how animals interact with their environment including key adaptations found within animal taxa.
   b. Relate animal adaptations, including behaviors, to the ecological roles played by animals.

SZ5 Students will evaluate the relationships between humans and other animals.
   c. Explain how humans can preserve animal diversity in human care with regard to habitat creation, research, animal enrichment, diet, medical and breeding programs.
Post-visit Activities:

1. Are beluga whales smart?
2. Ethogramania
Are Beluga Whales Smart?

Activity was adapted from Inquiring Minds Want to Know, Seven Essential Principles for Ocean Literacy: An Activity Guide for Educators, a resource of Dolphin Quest.

Grade: 9th – 12th

Objectives: Students will think critically about common beliefs, determine whether these beliefs are fact or opinion, and develop skills necessary to recognize scientific research as a resource.

Duration: Prep 25 min., Classroom 45 min.

Vocabulary: fact, opinion, intelligence, hypothesis, experiment, behavior, cognition, poll, bias, experimental design, IQ and psychology

Materials:
Student Resource Page (one per group)
Books or access to a library
Computers with internet access

Background: The beluga whales are one of the most popular animals at Georgia Aquarium. People often ask, “Are beluga whales smart?” The answer to this question is that scientists really do not know. When browsing the Internet to research beluga intelligence, over 18,000 results are cited. It is important to question how many of these sources are based on a scientific study versus the opinions of those who have interpreted the facts.

Popular belief, however, is that belugas are intelligent, but how can science test this hypothesis? We measure human intelligence by using standards like IQ tests, but even standardized testing for humans in imperfect and methods can be controversial. Scientists look at many aspects of intelligence, such as size and structure of the brain in animals versus humans. From there, they have studied learning capabilities, communication, behavioral complexity and social structures, self-awareness and comparative cognition of whales to humans and other animals.

Procedure:

Part 1

1) Begin by asking your students to close their eyes and to raise their hands only if they agree with the following statements. Ask them in this order and one at a time. Record the number of hands raised.
   a. I believe beluga whales are intelligent
   b. It is scientific fact that beluga whales are intelligent.

   Share the results with the class.

2) Ask a student who raised a hand for both statements to explain how we know whales are intelligent.
3) Ask another student who did not raise a hand to explain why it is not scientific fact. Discuss that science is the study of the physical world using systemic observation and experiments to test hypotheses and prove or disprove theories.

4) Ask the students why they need to keep their eyes closed. Explain that their answers could have been influenced by the other students in the class.

5) Introduce the word bias and discuss how it can complicate scientific study.

6) Finally, ask your students to define the words “fact” and “opinion.” Is the statement, “beluga whales are intelligent,” fact or opinion? Furthermore, ask your students to define intelligence. Lead the discussion to demonstrate that like each person, science does not have a concrete definition of intelligence which can further complicate statements like, “beluga whales are intelligent.”

**Part 2**

1) Divide your class into small groups of 3-4 students.

2) Using the Student Resource Page, have the groups pick two sources that provide a good overview of beluga intelligence, one based on scientific study and one sharing more opinions. Make copies if needed.

3) Have each group answer the following questions based on the source they chose. Instruct them to answer the following for each source:
   a. Does the source list references of scientific studies, popular media or nothing at all?
   b. Is the source tied to valid research institutions including colleges, universities, professional organizations, etc.?
   c. Does the source include information that appears to be biased?
   d. Does the source include information that is anthropomorphic, applying human characteristics to non-human subjects?
   e. Write down three statements from the readings that you feel are opinions.
   f. Write down three statements from the readings that you feel are scientific facts.
   g. Can you find two additional sources for each fact that give scientific references?

4) Once the assignment is complete, ask the students to share their answers and discuss the results. Ask them again if the statement, “beluga whales are intelligent,” is a scientific fact. Hopefully, fewer will raise their hands. Why is it difficult to say the statement is scientific fact? Discuss the background information. Discuss other possible ways to test animal intelligence.
**Assessment:** Ask each student to select an animal found at Georgia Aquarium and write down at least three common beliefs about the animal that are thought to be fact. Ask them to poll at least 25 people on whether or not the common beliefs are fact or fiction and document the results of the poll. Afterward, have the student research each common belief and write a small 500 word essay based on their own research. Ensure students verify whether these commonly held beliefs are fact or fiction and use supporting information.


Student Resource Page

Books


Web sites

Brief overview and great comprehensive information on whales
http://www.ammpa.org/faqs.html#4

Overview with multiple sources both scientific and popular media
http://en.wikipedia.org/wiki/Cetacean_intelligence

Scholarly article with multiple scholarly sources
http://journals.plos.org/plosbiology/article?id=10.1371/journal.pbio.0050139

Popular article based on some scientific research with some opinion shared
http://www.theguardian.com/science/2003/jul/03/research.science
Ethogramania

Grades: 9th-12th

Objective: Students will see firsthand what it means to be an animal researcher by observing an animal, creating an ethogram (a catalog of behaviors), collecting data on the animal’s behavior and drawing conclusions from that data.

Duration: 2 – 45 minute periods and homework time

Materials: Copies of the “Animal Data Collection” worksheet (3 for each student)

Background: An understanding of animal behavior is important to researchers to protect and manage animal populations in their natural habitats, knowing where and how animals spend their time, what they eat, when they mate and what the structure is of their social groups. This can also help us better understand ecosystems and predict human impacts.

If we are going to maintain animals in zoos or aquariums, we need to know as much as possible about their specific needs and behaviors. This helps us determine what their nutritional requirements are, how much space they need, and which animals can and cannot live in the same habitat. Understanding behavior can also help biologists monitor their health and reactions to changes in their environment.

Observation is the best method researchers have for learning about the behavior of a species or an individual animal. Through repeated observations, researchers can develop an understanding of an animal’s baseline behavior (“normal” behavior for that animal). Once this baseline is developed, observations at different times or in different situations can show researchers which factors cause variations in the animal’s behavior.

Researchers often collaborate when conducting animal behavior research. To ensure the researchers see and interpret behaviors the same way, researchers will create an ethogram, a visual or written catalog of the common behaviors for a particular species. These descriptions may be written and/or pictorial.

Procedure:

First Day (in class):

1) Go over background information with the students. Discuss the importance of animal behavior research and the methods used in research.

2) Explain ethograms and show the students an example of one (you can google ethogram for numerous images). Ask the students how they think researchers develop ethograms.

3) Explain to the students that they will be developing an ethogram of their own and using it to collect data on animal behavior.

4) Pass out Animal Data Collection worksheets for students to take home.
**Homework (may be done over several days):**

1) Have each student choose an animal (a pet, a friend’s pet, or an animal easily viewed in a backyard, park or in the house), and observe the animal for 15 minutes.

2) During observation, students should take notes on the animal’s behaviors, beginning to separate and identify distinct behaviors.

3) Using the data collected from these preliminary observations, students will create an ethogram by choosing 5 specific behaviors they observed and making a list of these behaviors with a description of each one. Alternatively, students may use photographs or sketches to represent the behaviors.

4) Once the students have developed their ethograms, they will fill in the names of the five behaviors in the spaces on their Animal Data Collection sheet.

5) Students will use the worksheet to do three separate observations of their animal. It is recommended that teachers decide if these observations should be done at different times on the same day or at the same time for three consecutive days.

6) Before each observation session, the student should record the date, time, and any environmental factors (weather outside, noise, presence of other animals or people, etc.).

7) During each observation session, the student will watch their animal for 15 minutes, recording its behavior every 30 seconds. For example, once they start their 15 minute session, they will count to 30. On 30, whatever behavior the animal is performing is what they will mark down a tally for on their worksheet. They then start over counting to 30 and repeat until their 15 minutes are up.

8) Students may use the “additional observations” section on their worksheet to record any “other” or unusual behaviors or to make any notes.

9) After finishing all three observation sessions, each student should write a few paragraphs explaining what conclusions they can draw from their observations, any difficulties they had and anything they think merits further study.

**Last Day (in class):**

1) As a class, discuss the students’ data collection experiences. What difficulties did they have? Were there factors that affected the collection process? How do they think they could improve the study methods?

2) Either split the students into groups to have them discuss their findings with each other, or have each student give a brief presentation of their conclusions.
Animal Data Collection Sheet

Directions: Select an animal. This can be a pet, common animal found in your backyard, an animal in a park, etc. On three separate occasions, time yourself for 15 minutes and tally the observed behaviors on the charts below. Tallies should be recorded every 30 seconds.

Animal: ________________________

Date: _______ Time: ______

Environmental Factors (i.e. noise, weather, etc.): ________________________________

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Additional Observations:
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