Testing Animal Intelligence

Virtual Classroom Extension

Objective

This activity is designed to help your at-home student(s) recognize themselves as scientists and think critically about problem-solving. The goal is to help students understand how scientists learn about intelligence in animals. As with all lessons provided, please feel free to adapt them according to your students' abilities. Take these ideas, make them your own and your at-home students will have a greater chance at success.

Materials

Paper, writing utensils, computer or tablet with internet access.

Procedures

1. Ask your students what they think "intelligence" is and what it looks like in animals. If you were a scientist studying animal intelligence, what is something you would look for to let you know how smart an animal is? What would an animal need to be able to do to be considered intelligent? Make a list of all your students' ideas.
2. Watch the Kea Virtual Classroom video https://resourcelibrary.clemetzoo.com/Area/21.
3. Discuss with your students what they learned about keas and animal intelligence.
4. Revisit your students' definition of intelligence, and their ideas of what it looks like in animals. Is there anything that they want to add? Is there anything that they want to remove from the list?
5. Explain that there are different types of intelligence in animals. What animals are good at depends on the environment they live in and their physical characteristics. They use their intelligence to help them find food, find shelter, and escape from predators. In social animals, they may need to have the ability to cooperate and understand social cues. For example, young wolves may need to learn how to work with the rest of the pack.
6. Three examples of intelligence that scientists may study in animals are problem-solving, spatial memory, and self-control.
    a. Problem-solving: Scientists are interested in seeing if animals can solve problems to get a reward. Some of these tests may be simple and some may be very complex. Scientist may not only look at whether or not the animal can solve the

problem, but also how long it took. An example of this may include pushing a button or pulling a lever to access food.

   b. Spatial memory: Scientists want to know how different animals remember spaces. In particular, they look at how animals remember where important things are, such as food or shelter. An example of how this might be tested is through a maze.
   c. Self-control: This is the ability of an animal to control its initial impulses. One way this is tested is by seeing if an animal will pass up a treat if it knows that it will get something better at a later time. For example, would they choose to have one treat now, or two treats later?

7. Tell your students that they will now have the opportunity to create a scientific inquiry that would test the problem-solving abilities of an animal of their choice. If you have a pet or access to an animal, you could allow your student to collect data and follow through with their study idea. However, it is important that they do not do anything that could potentially harm the animal. If you do not have a pet at home, or your students want to create something for a different animal, they can explain how they will design and set up the inquiry, but not collect data. Another alternate activity would be to have the students create a problem-solving test for another member of the household.
8. Explain the inquiry process with your students. The attached worksheet can also help guide your students through steps of a scientific inquiry.
   a. Create a research question. What do you want to find out from your research?
   b. Use background knowledge to come up with a prediction. What do you think you will find and why?
   c. Plan and conduct the investigation. What will you do to answer your question?
   d. Gather evidence from observations.
   e. Propose an explanation. Explain how your evidence answers your question.
   f. Communicate your explanation. Share what you learned with others.
9. First, have your students choose an animal that they would design the experiment for.
10. Before creating a design, ask your student to do a little bit of research. What is already known about that animal? What types of food does the animal eat and what are behaviors of the animal in the wild? This is important because the experiment needs to test something that the animal is physically capable of doing. For example, if your animal is colorblind, you should not conduct an inquiry that requires the animal to recognize different colors. If your students are going to create an inquiry about a pet, ask them to consider what they already know about their pet. What is the pet already trained to do? Have they ever observed the pet doing behaviors that may suggest problem solving? For instance, if a favorite toy falls behind the couch, does the pet try to figure out how to get it back?
11. Tell your students to create a research question based on what they already know and what they want to find out.

12. Next, your students should make a prediction of what they think they will find during the investigation. Make sure that they have a reason for their predication. It should be based on their background knowledge.
13. Design the investigation. Students should consider the following:
    a. How will they test their question? What methods or procedures will they use? Students may need to look up some ideas online to help them come up with something. An internet search will show some simple ideas for testing the intelligence of a pet dog or cat.
    b. What materials will they need to run the inquiry? Do they need to create a puzzle? If so, what will it look like? Do they need some sort of food reward?
    c. How many individuals will go through the test? For instance, if their question involved a dog, will they test one dog, or multiple dogs?
    d. How many times will they conduct the investigation? Will they run the test once, or will they run it multiple times?
14. Draw and label a picture of what the set-up will look like. If your students' inquiries involve creating some sort of puzzle box, allow them to construct it from materials at home, if possible.
15. If your students are able to carry out the investigation, allow them to work with their animal and gather their evidence.
16. Once your student has gathered their evidence, help them to create an explanation. Their explanation should include a statement that directly answers their question, a description of the evidence they used to answer the question, and an explanation of how the evidence was used to answer the question.

Ohio's Learning Standards

Science Content Standards
Grade 3 Life Science Topic: Behavior, Growth and Changes **3.LS.2:** Individuals of the same kind of organism differ in their inherited traits. These differences give some individuals an advantage in surviving and/or reproducing.

English Language Arts Content Standards
Grade 6-8 Writing Standards for Literacy in History/Social Studies, Science, and Technical Subjects WHST.6-8.1 Write arguments focused on discipline-specific content.

Animal Intelligence Inquiry

Species of animal you are studying: _____

In the space below, write what you already know about the animal:

What is your research question?

What is your prediction (what do you think you will find and why)?

Describe how you plan to investigate your research question:

Draw a picture of the materials you will use to test the problem-solving skills of your animal. Label the picture with what each item is and how it will be used.

Record your evidence here:

Write an explanation of your findings. Your explanation should include the answers to the following questions:

- What is the answer to your research question?
- What evidence did you use to come up with this answer?
- How does the evidence support your answer?