4H1750

TEACHING SCIENCE

...when you don't know diddly-squat

Can you make an animal move without touching it?

Purpose:

The purpose is **not** to teach specific content, but to teach the process of science – asking questions and discovering answers. This activity encourages young people to try to figure things out for themselves rather than just read an answer on the internet or in a book. As a leader, try not to express your opinion, but let the youth engage in arguments based on evidence.

Time required:

20 minutes or multiple days depending on the interest and questions the youth have

Materials:

- ❏ Pencil
- ❏ Paper
- ❏ Tape measure
- ❏ An animal (Any domesticated animal could work such as a gerbil, cat, dog, chicken, sheep or horse.)
- ❏ An enclosed area appropriate for your animal (A dirt floor is preferable.) Make sure the enclosed area is an appropriate size for the animal. (A horse will need more space than a dog, which would need more space than a gerbil.)

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IMPORTANT NOTE: Depending on the animal and how comfortable it is with humans, you should have a way to quickly move to safety if the animal becomes agitated, overly excited or fearful. Most animals that have been around humans should behave normally, but a large or noisy group could affect animal behavior.

Science Practice:
Asking questions and defining problems

1. *Can you control how an animal moves without touching it? Do animals move a certain way in response to a human presence? Can where you stand cause them to move forward or backward? Does an animal's body language give you an idea of where it is going?*

Science Practice:
Planning and carrying out investigations

2. Have youth stand far away from the animal. Ask them to be observers. *What things are important to observe? Do you think the animal's eyes, ears, feet or tail might give clues as to when it will begin to move? Do you think it would be better for everyone to observe the entire animal, or give each person a particular part to watch for?* Have one person approach the animal, and the rest observe.
   a. *How close can you get before the animal moves? At what speed does it move away from you?*
   b. *Where is the animal looking while it moves away from you? What is its body language, (such as ears, hair or fur, tail, nose and back) telling you?*
   c. *Do you think approaching from a different direction might change the way it moves? Might the animal react to different people in different ways? Does the speed of the approach matter? Does the angle of approach matter? What happens if you walk in a straight line toward the animal? Zig-zag? Walking in circles?*
   d. *Does how noisy you are change how the animal reacts?*
   e. *Does where you direct your eyes matter to the animal? If you look at the ground, at the sky or somewhere else besides directly at the animal, does it change how or when it moves? If you turn your back to the animal, how or where does it move?*

You do not need all the answers to teach science. You simply need an inquisitive mind and to be willing to carry out an investigation.

f. *Does the animal make any sounds as you approach? What do you think the animal is trying to communicate with its vocalizations?*

Science Practice:
Developing and using models

3. Have youth try to develop a model for where to stand with this particular animal to get it to move in a certain way. Allow the youth to draw a picture of the animal. Map out on the paper around the picture of the animal how close youth can get from the side, back or front before the animal moves. If the animal is on a dirt floor, use the tape measure to record this, by measuring from your footprint to the footprint of where the animal was standing. If the animal is on a hard floor, it might require more observation to get an accurate measurement. *Is it a perfect circle around the animal? Is it bigger on one side compared to the other?* NOTE: This is much more difficult than it seems.

Science Practice:
Analyzing and interpreting data

4. *Once you make your model, does it always work? Can you determine which way an animal will move 100% of the time? What might lead to errors? Are there ways you can improve your model?*

Science Practice:
Using mathematics and computational thinking

5. *Can the model you used for one animal work for another? If the animal were twice its size, would the zone of approach be twice as big? If the animal were small, would that change the zone of approach?*

Science Practice:
Constructing explanations and designing solutions

6. *Does the information gained in this exercise give you ideas on how to better transport your animal? Are there things you can do to get the animal to move better in a show ring? What observations about the animal's body language can help you understand when it might be good or bad to approach an animal? Why do you think you might notice differences in how the animal moves? How can these clues help you be a better caretaker of animals you might have or how to react if you encounter an animal you do not know?*

Science Practice:
Engaging in argument from evidence

7. *Is there a "best" way to approach an animal? How would you tell another person to approach an animal based on what you learned?*

Science Practice:
Obtaining, evaluating, and communicating information

8. *Can you teach a friend how to approach an animal based on what you learned?*

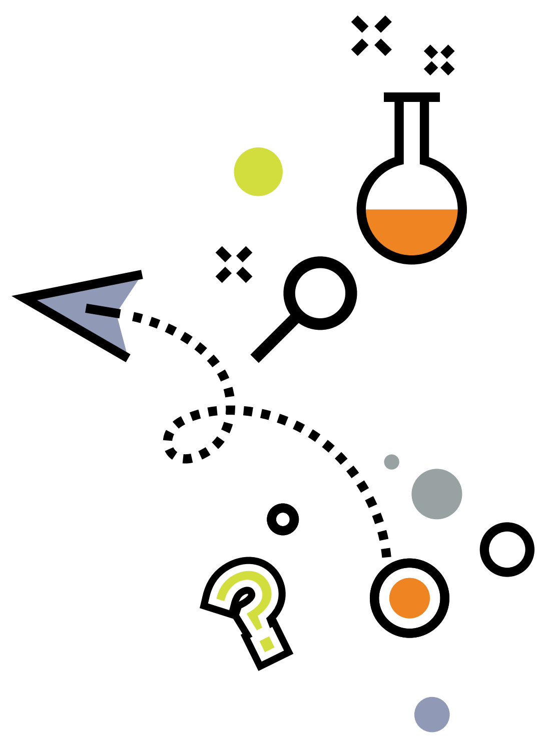
Other thoughts:

- *If you repeated this activity with several animals, both of the same species or different species, do you think all animals would respond the same?*
- *Do animals respond differently to different people? Could this be measured?*
- *Are there gestures people make that might cause an animal to move?*
- *If you test an animal in an area it is familiar with rather than in an area foreign to it, how does that change things?*
- *Did the animal stay in an open area as it moved or did it get closer to a wall, tree or other object that might be in the test area?*

Science & Engineering Practices:

These eight Science and Engineering Practices come from *A Framework for K–12 Science Education* (National Research Council, 2012, p. 42). These research-based best practices for engaging youth in science are connected to in-school science standards that all children must meet.

- Asking questions and defining problems
- Developing and using models
- Planning and carrying out investigations
- Analyzing and interpreting data
- Using mathematics and computational thinking
- Constructing explanations and designing solutions
- Engaging in argument from evidence
- Obtaining, evaluating, and communicating information



Reference:

National Research Council. (2012). *A framework for K-12 science education: Practices, crosscutting concepts, and core ideas.* Washington, DC: National Academies Press.