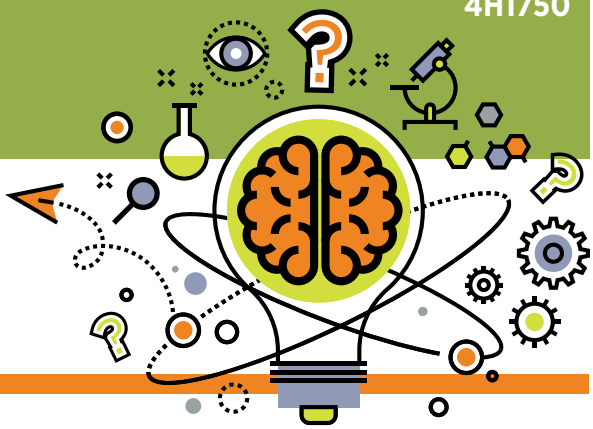
4H1750

TEACHING SCIENCE

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



Why do different animal poops look different?

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:

- ❑ Manure from several different animals (different species and breeds, different ages, different diets and other differences)
- ❑ A plan to deal with the leftover manure (compost pile, landfill)
- ❑ The animals that made poop
- ❑ "Animal Poop Photos" handout
- ❑ Disposable gloves
- ❑ Tools for taking the poop apart (trowels, hand cultivators, old silverware, sticks)
- ❑ A place to wash your hands
- ❑ "Diagrams of Animals' Digestive Systems" handout
- ❑ Newsprint or whiteboard
- ❑ Markers

Utah's Hogle Zoo

This lesson was done in partnership with Utah's Hogle Zoo, Salt Lake City, Utah.

SCIENCE PRACTICE:
Asking questions and defining problems

1. *Why is goat and sheep poop shaped like little pellets, while rabbit poop is shaped like almost perfect spheres? Why is dog and cat poop cylindrical? Why do horses poop in clods and cows poop in big pies? Did you know a wombat has cubic poop? Does the shape offer any advantages? Is it based on the digestive system? Is it based on what the animal eats?*

SCIENCE PRACTICE:
Planning and carrying out investigations

2. Look at the manure or manure photos from different animals in the "Animal Poop Photos" handout. If you can observe the animals defecating, do so. *What do you notice is the same and different with the various poop?*

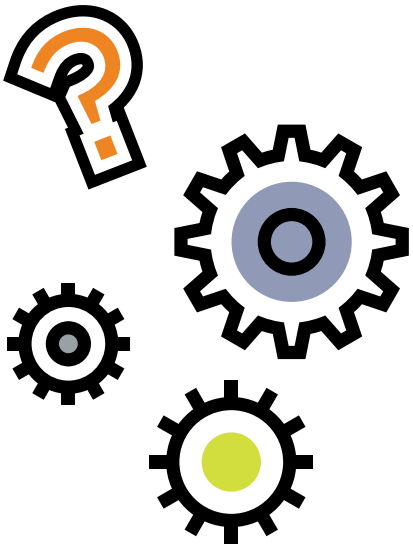
3. List questions youth have and have each pair or small group select one question at a time to investigate. *Why do you think those two are similar? Why do you think they are different? What is different about them?* Include questions from #1 as needed.

4. Put on the disposable gloves and tear the manure apart with the tools. *Does it all have the same consistency? Why or why not?*

5. *Do the manure samples smell different from each other? Why might that be?*

6. *Are there any undigested bits in the manure? Why do you think some things remain undigested?*

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.



SCIENCE PRACTICE:
Developing and using models

7. Look at the diagrams of the animals' digestive systems in the "Diagrams of Animals' Digestive Systems" handout. *Do animals with similar digestive systems have similar manure?*

SCIENCE PRACTICE:
Analyzing and interpreting data

8. Create a chart like the one below to organize your data

9. *Why do you think the sheep poop and cow poop look different? Do you think an animal's diet has an impact on its poop? Do you think some animals have been selectively bred in ways that have changed their poop? Do you think the water needs of the animal has an impact on its poop?*

Audible Hearing Frequencies Data

Animal	Poop shape	Poop texture	Digestive system type	Odor	Other notes

SCIENCE PRACTICE:
Constructing explanations and designing solutions

10. *What evidence did you discover in your investigation that helps you answer your questions?*

SCIENCE PRACTICE:
Engaging in argument from evidence

11. Encourage youth to talk about what they discovered. Ask them to give reasons for the answer to their questions connecting the evidence (poop data) they collected. For example, have them explain why an animal's poop might have a particular shape, smell or texture, relating their conclusions to their observations.

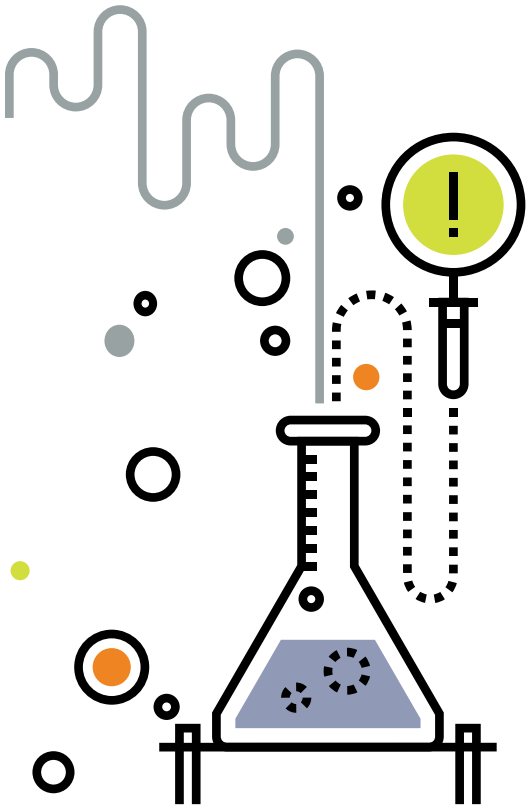
SCIENCE PRACTICE:
Obtaining, evaluating, and communicating information

12. Ensure there is time for all the youth to share their discoveries and discuss additional questions they have because of the animal poop exploration.

13. *Do you think if you knew an animal's diet and digestive system, you could predict poop shape? What do you think an elephant's poop might look like? A giraffe? A kangaroo? A jaguar? A bear? A coyote? A whale? Why do you think that?*

Other thoughts:

- *Do you think the shape and texture of human poop might tell something about a person's diet, health or both? How might a vegetarian's poop be different from an omnivore's poop?* (See "Resources" list for information on human manure.)
- *Could you design pooper scoopers for specific animals?*



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.

Resources

Healthline Media. (2019). *Poop and you.* https://www.healthline.com/health/digestive-health/types-of-poop

Mayo Clinic. (n.d.). *Constipation.* Washington, DC: National Academies Press. https://www.mayoclinic.org/diseases-conditions/constipation/symptoms-causes/syc-20354253

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