

Observation vs. Inference

Activity Length: 20 minutes (40 minutes if also completing extension activity)

Intended Learning Outcomes:

4th grade standards

1. Use science process and thinking skills
 - a. Observe simple objects and patterns and report their observations
 - c. Make simple predictions and inferences based upon observations

Skills: Observing, inferring

Lesson Objectives:

For students to understand the difference between making an observation and making an inference.

Vocabulary:

Observation – things that can be clearly identified

Inference – guesses based on evidence (observations and prior knowledge)

Materials Required:

- Mountain lion photograph – either as an image projected on the board or as printouts. A photograph of a different animal can easily be substituted.

Materials for Extension Activity:

- 5 different objects with obvious and not so obvious features. If possible use objects that are not commonly found in the classroom – e.g. items from an NHMU Teaching Toolbox
- Pencil and science notebook or loose leaf paper

Background information:

Students often find it difficult to tell the difference between making an observation and making an inference. It is important to understand that an observation is something that can be easily seen whereas an inference is a guess or idea that needs to be supported by evidence. For example, students can make the **observation** that a gecko has four short, skinny legs. They could then make the **inference** that the gecko moves very quickly because of the observable evidence of the leg shape. However, until the gecko has been observed moving quickly the guess is **still an inference, not an observation**.

Prior knowledge is another useful tool that provides students with evidence to make inferences. For example, prior knowledge may tell them that all birds can fly. However, it is important to question this prior knowledge as it may not necessarily be true – for example, an ostrich is a type of bird, but it cannot fly.

During Museum on the Move, students will be observing a variety of objects and will be asked to make inferences during the visit. This is an essential part of the scientific process and it is important that students have a clear understanding of the differences between observations and inferences so they are able to successfully participate in the inquiry.



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Activity:

- Show students the photograph of the mountain lion (if using another photograph, adjust accordingly)
- On the board, record a list of what students can see in the picture and any prior knowledge they have about mountain lions
- Introduce the definitions:
 - Observation: things that can be clearly identified
 - Inference: a guess based on evidence (from observations and prior knowledge)
- As a class, review the list gathered about mountain lions and sort the information into a T-chart of observations and inferences

Observation Examples	Inference Examples
<ul style="list-style-type: none">- Four legs- Big ears- Golden color- White underneath- Has whiskers- Has fur	<ul style="list-style-type: none">- Can hear well because it has large ears- Hides from its prey because of camouflage- Lives in a cold climate – fur and snow in the picture- Related to a cat – ear shape, face shape, long tail- Can jump far – jumping in the picture, muscular legs

Extension Activity:

1. Arrange the class into five groups, each group sitting around one desk.
2. Give each group one object.
3. In the group, create a T-chart with observations of the object and inferences that they can make with the evidence from observations or prior knowledge.
4. Rotate the objects between groups. Repeat steps 3 and 4 with the new object.
5. Allot five minutes for students to record their observations and inferences.

Conclusion:

- For each object, ask the students to share the observations they recorded about each object and how they knew they were observations, not inferences.
- Students share the inferences and supporting evidence they recorded for each object.
- Students individually write their own explanation of a difference between an observation and an inference.



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Image from: nhmu.utah.edu/special-exhibits



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