

Observation and Inference

Teacher's Guide

- Subject:** Integrated Science (Life; Earth-Space; Physical)
- Topic:** The Practice of Science. Scientific knowledge is based on observation and inference; it is important to recognize that these are very different things.
- Summary:** Students will examine a set of objects and write down descriptions/notes about what they see. They will categorize their descriptions (sense, qualitative or quantitative, observation or inference). Students will examine patterns in their descriptions.
- Objective(s):** After completing the field lab, students will be able to:
1. Distinguish the difference between qualitative and quantitative observations.
 2. Understand the use of their senses and tools to enhance their senses
 3. Distinguish between observation and inference.
- Ecosystem(s):** Any including schoolyard
- Equipment:**
- 6 x Magnifying lenses
 - 6 x Ruler/tape measure
 - A set of 6 objects
 - Clip boards/data sheet

Background:

- Vocabulary: observation, description, inference, explanation, quantitative, qualitative, senses
- Reference Material: <http://www.slideshare.net/mrmularella/observations-vs-inferences/>

Procedure (Engage; Explore; Explain)

1. *Setup.* Establish stations. One for each individual or one per small group. Students will rotate between many stations. Place a predetermined object at each station.
2. *Engage.* Engage the students by showing them a piece of lab equipment (GPS, flask, etc.) and asking students to describe it? Write down their descriptions. Then categorize their descriptions by the sense they used (sight, smell, etc.), whether it was qualitative or quantitative, and whether it 'described' the object or was an 'explanation' or 'assumption' of the object. Clarify these differences.
3. Ask the students to formulate their own hypothesis relating to their own expectations of the outcome of the lab. Which of your senses do you think you would use the most when making observations?
4. *Explore.* Students go to each station and record three observations per object. They then determine (by checking the box) which sense was used in making the description and also determine if the description was qualitative or quantitative, and finally if the description was an observation or an inference.
5. *Explain.* After completing the lab, allow the students to answer the discussion questions as a group. Relate their answers to the concepts, processes and skills associated with the activity. Students should record their answers individually. At this time, facilitators can introduce/explain the specific concepts and explanations in a formal manner.
6. *Elaborate.* Teachers should reinforce the concepts back in the classroom.
7. *Evaluate.* Have students reflect on what they have learned by writing in their journal or by drawing a concept map of what they have learned.

Sunshine State Standards:

Science: Big Idea 1, D, SC.6.N.1.1; **Language Arts:** LA.A.1.3.3; LA.B.2.3.1; **Mathematics:** MA.A.3.3.3; MA.B.2.3.1; MA.B.4.3; MA.C.1.3.1; MA.E.3.3.1; **Social Studies:** SS.A.2.3.7; SS.A.3.3.3; SS.B.2.3.9

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Student Data Sheet

Full Name:		Date:	
School (teacher):		Time:	

Student Hypothesis and Rationale

If, when making observations, I use my senses, then I believe that I will use my sense of _____ the most when making observations, because _____.

Object	Descriptions	Qualitative	Quantitative	Sight	Sound	Smell	Taste	Touch	Observation	Inference
1										
2										
3										
4										
TOTALS										

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Assessment

1. Which one of your senses did you use the most? Which one did you use the least?

Most: _____

Least: _____

2. Calculate the difference in total times you used quantitative observations vs. qualitative observations. Which one did you use more?

3. Was your hypothesis supported by your data? Whether your hypothesis is supported or not, what can you conclude from your observations, measurements, and results?

4. If you were in a cave with no light, how would you use your senses differently? What types of things would you be able to observe?

5. Scientific technology can aide us in our observations, but does it make our inferences any better?

6. Think about the observations you have just made. Did the activity raise new questions? Write a short question (start with "What, Why, Where, When, or How") about something you want to learn more about.

