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The following lessons were created by Denise Trufan, a teacher participating in a National Endowment for the Humanities Summer Institute for Teachers entitled Touch the Past: Archaeology of the Upper Mississippi River Region.

## PROJECT 1

As a Science Lab teacher to about 1,000 kindergarten through fifth grade students, it's important that they understand how to make accurate observations. One topic that is difficult for them is making inferences as they have difficulty differentiating between an observation and an inference. The following activity will help third through fifth graders improve their understanding. Previously, students will have become familiar with making quantitative / qualitative observations using a Discovery Box.

**Final Evaluation:** Have students create a two column informational sheet about their coin, listing inferences and observations in their journals. Have them choose one inference to question and devise a way to test their hypothesis. Rubric is provided on separate page.

**Intermediate Evaluation:** p.18 Intrigue of the Past by Shelley. J. Smith, Jeanne M. Moe, Kelly A. Letts, and Danielle M. Patterson; U.S. Dept of the Interior / Bureau of Land Management, 1996

**Purpose:** Differentiate between and observation and inference.

**Materials:** Discovery Box with several coins of various sizes inside, Quantitative/ Qualitative overhead (or chart on the board) or SMARTBoard, for recording non-visual information about the objects; Pages. 14 – 18: Intrigue of the Past, “Boy in the Water” activity sheet (page 16-17) on overhead or SMARTBoard; “ Ancient Coin” activity sheet, Journals.

### **Introduction:**

Pass around Discovery Box. Each student will reach in and, without looking at the objects, write four observations about them in their journals. These observations will be recorded on the board as each student contributes an observation. Students will then view objects and evaluate tactile observational responses using other senses and make note of differences when data from those additional senses were observed (if any). Students will define “Observation” in their own words. Teacher will provide definition from page 14 for students to copy into their journals.

Present observational / inference scenario:

1. All the children at XYZ Elementary School who ate lunch in the cafeteria were ill at 1:30 last Thursday. Teacher will (TW) ask if this is an observation? (Yes) How do they know? (Examining records at the nurse's office could prove it.)
2. Brainstorms reasons for this illness (proposed inferences).
3. How could we test the inference, which is now a hypothesis?

**Procedure:**

A.

1. Show p. 16 "Boy in the Water" overhead and ask students to reflect on it alone.
2. In small groups have students, have students discuss picture.
3. Show each line from p 17 and ask students if it is an observation or an inference, giving reasons for their answers.
4. Brainstorm how to test one of these inferences (hypotheses).
5. Assist students' creation of definitions for observation, inference and hypothesis.
6. Show students text definitions and compare to their definitions.

B.

1. Project "Ancient coin activity sheet, p 18.and explain that the coin was found by an archeologist at a site.
2. Ask students to evaluate questions as to whether it is an observation or an inference. Note answers in journals and sketch coin.
3. Choose 1 inference and develop a way to test it by looking at other evidence at the site.
4. Summarize the importance of observations, inferences, and hypotheses in Science.

## **Rubric**

Points are based on information from student's Science Journal

4 pts:

Student:

- Participates appropriately in brainstorming sessions.
- Writes their own definitions, which are legible, understandable and in complete sentences.
- Writes text definitions.
- Sketches coin in activity B (p. 18) in detail.
- Correctly identifies at least 5/6 answers from p 19
- Correctly develops a hypothesis based on the inference chosen.
- Correctly makes at least 5 observations, 2 inferences, and 1 hypothesis about his/her coin and sketches it.
- Summarizes correctly the importance of observations, inferences, and hypotheses in Science

3 pts:

Student:

- Participates appropriately in brainstorming sessions.
- Writes their own definitions, which are legible and understandable.
- Writes text definitions.
- Sketches coin in activity B (p. 18).
- Correctly answers at least 4/6 answers from p 19
- Correctly develops a hypothesis based on the inference chosen.
- Correctly makes at least 4 observations, 2 inferences, and 1 hypothesis about his/her coin and sketches it.
- Summarizes, with minor flaws, the importance of observations, inferences, and hypotheses in Science.

2pts:

Student:

- Participates appropriately in brainstorming sessions.
- Writes text definitions.
- Correctly identifies at least 3/6 answers from p 19
- Develops a hypothesis based on the inference chosen.
- Correctly makes at least 2 observations, 1 inference, and 1 hypothesis about his/her coin and sketches it.

1 pt:

Student:

- Participates appropriately in brainstorming sessions.
- Writes text definitions.
- Correctly identifies at least 3/6 answers from p 19
- Develops a hypothesis based on the inference chosen.
- Makes at least 1 observations, 1 inference, and 1 hypothesis about his/her coin.

0 pts:

Student does not attempt assignment or shows no signs of understanding the material.

## PROJECT 2

Classification is an important skill for kindergarten through third graders. This activity will help them become more careful, accurate observers.

**Final Evaluation:** Have students distinguish between different shades of color. Rubric is provided on separate page.

**Intermediate Evaluation:** Informal assessment of student understanding and formal assessment of journal entries by rubric. Rubric to be found on separate page.

**Purpose:** Differentiate between colors. Active participation in search.

**Materials:** Color chips from Home Depot or Lowe's with hole punched in center, roughly corresponding to a page from Munsell chart in Archaeology \*\*\* NOTE: THIS MUST BE DONE AHEAD BY TEACHER\*\*\*, 1 per student. Journals for log entries. Crayons.

### Procedure:

1. Have student make a color swatch in their journal. Help them write the name of the color, as needed.
2. Have student describe items that might be the color that they chose, without telling the color. Students will guess the color.
3. Discuss color choices as a large group.
4. Discuss names like: Powder Blue, Forest Green, Saddle Brown, Gold, Sea Green, Hot Pink, and Tomato Red. Why isn't blue good enough?
5. Write colors names and color order in a rainbow in journals.  
For kindergarten: write rainbow, copied from board.
6. Demonstrate color swatches and show the hole in the middle. Find articles in the room that match the colors, using the hole in the middle.
- 7a. If the weather is inclement, remain inside- skip to step 8.
- 7b. Take students outside to the garden area (after review of expectations).
8. Distribute one color swatch to each child. Ask them to find one item that is the same color as their swatch and freeze there, drawing item and coloring it in, if possible. Have students orally describe the item they found and its color using the color name on the chart (with help from teacher).
9. Have children sit (on benches) near the garden or in the room. Explain about Archeology and how archeologists use a chart called a Munsell chart to distinguish between soil layers.
10. Ask students: what activities are done in different rooms in a home? Explain how activities change soil color. Show a soil chart.

**Extension** – third grade – after rock and soil units:

Take students outside and dig a 1meter deep hole (if possible in your area or have it pre-made and carefully roped off). Look at the color of the soil. Geologically, why is the soil that color? Note answers in journals.

## Rubric

4 pts.

Students will (in their journals):

1. Draw and color rainbow and write the word (legibly) rainbow next to their rainbow (grade k)
2. Write color words, spelled correctly in order next to appropriate areas on their rainbow (grades 1-3).
3. Answer question: Why it is important to have more than 8 colors when making observations? With minor technical errors but no informational errors. (Grades 1-3).
4. Write about a Munsell Chart, with minor technical errors but no informational errors. (Grade 3).

3 pts

Students will (in their journals):

1. Draw and color rainbow and write the word rainbow (with 1 or 2 minor errors) next to their rainbow (grade k)
2. Write color words (with 1-2 errors) in order next to appropriate areas on their rainbow (grades 1-3).
3. Answer question: Why it is important to have more than 8 colors when making observations? With minor technical errors but not informational errors. (Grades 1-3).
4. Write about a Munsell Chart, with minor technical errors but no informational errors. (Grade 3).

2 pts

Students will (in their journals):

1. Draw and color rainbow and write the word rainbow (with more than 2 minor errors) next to their rainbow (grade k)
2. Write color words (with more than 2 minor errors) in order next to appropriate areas on their rainbow (grades 1-3).
3. Answer question: Why it is important to have more than 8 colors when making observations? With minor technical errors but not informational errors. (Grades 1-3).
4. Write about a Munsell Chart, with minor technical errors but no informational errors. (Grade 3).

1 pts

Students will (in their journals):

1. Draw and color rainbow
2. Write color words
3. Answer question: Why it is important to have more than 8 colors when making observations? With major technical errors but not informational errors. (Grades 1-3).
4. Write about a Munsell Chart, with major technical errors but no informational errors. (Grade 3).

0 pts: Assignment is not attempted or understanding is not demonstrated