

## Hypothesis and Evidence

**Overview:** Students will form a hypothesis and present evidence for its validity.

**Goals:** This lesson will

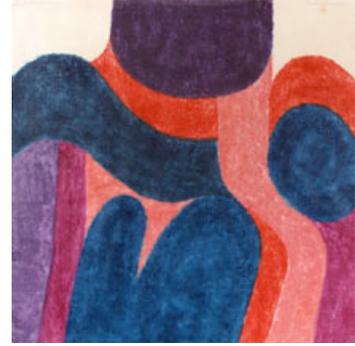
Support concepts & skills: draw conclusions based on evidence, make inferences, frame reasoned opinions, and arguments based on evidence, formulate a testable hypothesis.

Fulfill: Visual Arts 5.1, 5.3, 5.5, 6, 10; ELA 1, 2.4, 2.5, 6, 8, 11.

Science: Skills of Inquiry.

Practice: observing closely, noticing details, and evaluating the evidence.

Familiarize students with: the scientific process, existence of multiple perspectives.



*Aetna Waking*  
Carol Summers

**Objectives for Students:** Students will

Be able to: form reasonable hypotheses and cite their evidence.

Understand: that both art and science have a subjective component.

**Key Questions** (to be answered by students):

1. What is a hypothesis and how is it different from a guess or an opinion?
2. When is evidence strong enough to feel confident about a hypothesis?
3. What other kinds of evidence are missing that would prove my hypothesis?

**Materials Needed:** Looking Closely Process sheet; Hypothesis Worksheet

**Museum Objects:** Object shown is *Aetna Waking* by Carol Summers, ink on paper (woodcut), 1960, Gift of Herbert A. Colby in memory of Charles F. Godley (1981.20) and *Full Moon, Barbados* by Joseph Stella, oil on canvas, 1940 (1998.4)

**Pre-Museum Visit** – Review the definition of Hypothesis. Ask students to discuss and decide how a hypothesis is different from an opinion. (An opinion is more subjective, and does not have to be backed up by evidence. A hypothesis can presumably be tested and proved wrong or right.) Ask students where in their lives or in their schoolwork do they form and test hypotheses. They probably don't realize how frequently they actually use hypotheses, even in simple matters like trying to interpret whether someone is angry at them or not. "Why are hypotheses useful? Why is evidence important?"

Option to introduce or review the scientific method.

**At the Museum** – This activity focuses mainly on two works of art: *Aetna Waking* by Summers and *Full Moon, Barbados* by Stella (or the Rauschenberg print, *Watermark*). Don't give the students any information about the paintings beforehand (cover the information on the wall). Work in two groups, one group for each painting. Lead the students through the "Looking Closely Process" sheet; use the sheet provided or construct your own questions. Do not correct

anything the students say, or give them any information. The objective of this activity is to engage them in deeper reflection on the work, not to increase their knowledge about it.

Next ask students what they are wondering about as they look at this painting. Keep a list of what they say. Some wonderings may have come up in the looking process, and they should be recorded, too.

Finally, ask students: “What do you see? What do you think this is a picture of? What do you think it is showing us? What is its meaning? Does anyone have a different hypothesis?” They can work independently, and use the “Hypothesis Worksheet” to record their thoughts. When they have finished, bring both groups together in front of one of the paintings, and ask volunteers to share their hypotheses with the group, and discuss. Be sure to tell the students that, at this point, no hypothesis is true or false, since we don’t have any information about the painting, but the group can think about whether the evidence to support a particular hypothesis is strong or weak. Go to the other painting and repeat the process.

Ask a Museum educator to meet with your class to give students some information about the paintings.

Reflection: “What kind of evidence would prove the “real meaning” of the work of art? Is there one “real meaning” of a work of art? Is the meaning of a work of art what the painter intends it to be? Or is the meaning what the viewer sees and thinks is it? Who gets to decide what the painting means?” Emphasize that any opinion of a work of art is valid, and any meaning or interpretation that a person forms is personally true. All opinions about works of art are valid, however some hypotheses are better supported by evidence than others. The meaning of a work of art resides in the relationship between the viewer and the work itself. It may have one meaning for one person and a different meaning for someone else. There is also the meaning that the artist intended, which is also the real meaning. This paradox has been widely debated.

**Post-Museum Visit – Reflection:** What is the difference between a hypothesis about the meaning of a work of art and a hypothesis about a scientific experiment? Sometimes scientific hypotheses have been “proven” only to be disproven later when more information was available. (A good example is the discovery of electricity, and the historical debates about what it is and how it works.)

Students can practice making hypotheses in literature (as in making a prediction: “What do you think will happen next, and why? What is your evidence?”), in science (What do you think will happen when we ...? or if we...? What is your evidence?), and History (What do you think happened as a result of that? What do you think the reaction was? What evidence makes you think that?). As you use hypotheses more frequently the students will get better at observing closely, noticing details, inquiring, and evaluating the evidence.

**Supportive Material:** “Looking Closely Process” and “Hypothesis Worksheet”

**Documentation and Assessment Options:** Pre- and post-test: Sample students’ hypotheses about the meaning of an unfamiliar object before and after this activity. Over time, as they form

hypotheses in a number of situations, you can notice changes in the strength of the evidence they cite.

**Other Works of Art in the Museum** that can connect to this lesson:

If the class is too large to comfortably work in the same room, you could work with the Summers painting and one of the following: Stella’s *Palm and Sun*, or Tobey’s *White Writing*, Frankenthaler’s painting, *Untitled*, or one of the African or Pre-Columbian objects. The Museum Educators can help you identify other objects to use.

By changing the question slightly you could focus on other paintings. For example, looking at Harnett’s *Still Life with Bottle of Olives*, and Leavitt’s *Still Life, Fruit*, you might ask “Why do you think the artist painted this? What was he trying to say to us?” The students could form hypotheses about the answer to that question. The Greek vase fragment showing *Herakles slaying the Hydra* might be interesting to use with the question “What is going on here?”

**Links to Other Curriculum:**

ELA: Predicting, making inferences in a narrative.

History & Social Sciences: evaluating information, acknowledging and taking into account differing perspectives, standards of objectivity, forming and testing hypotheses.

See also the lesson in the Theme unit “**Truth: Myth, Fact, History,**” especially the lesson “Point of View II: The Complex Truth of the Peloponnesian Wars.”

Science: The scientific process, history of science, and evolution of theories over time.

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## Looking Closely Process

1. What do you notice first? How did the artist draw your eye to that? What else do you see?
2. Look closer, what details do you notice?
3. What things in the work are related to each other? How?
4. What do you notice about the shapes? The colors? The lines? Does any part seem to express a mood?
5. Do you see any patterns or any repetition?
6. Can you find anything you didn't notice before?
7. How do you think it was made? What kinds of tools were used? What was it made out of?
8. Which part is most interesting to you? Why?

# Hypothesis Worksheet

A *hypothesis* is a guess, or an idea that explains something. It needs to be based on evidence - what you see or know about already. What do you think this work of art is about? If you are looking at a painting, what do you think it is a painting of?

Write your hypothesis below, and next to it write what you see in the work of art that makes you think this guess might be true. You may have more than one.

HYPOTHESIS	EVIDENCE