



# 4 Lesson Four

## Observation, Inference, and Evidence

(Adapted from *Intrigue of the Past*, Smith et al. 1996)

### Enduring Understanding

Using the tools of scientific and historical inquiry, archaeologists study shelters and learn how people lived in them.

### Essential Question

How do archaeologists study the past?

### What Students Will Learn

- Archaeologists use observation and inference to form meaningful questions.
- Archaeologists use data and evidence to answer their questions.

### What Students Will Do

- Differentiate between observation, inference, and evidence.

### Assessment

Students will conduct an investigation of a room from a modern home to show their understanding of observation, inference, and evidence.

### Materials

#### For Each Student

- Illustration of “The Old Homestead” (page 43)
- “The Old Homestead” data collection sheet (page 44)

#### For the Teacher

- Transparency of “The Old Homestead” illustration (page 43)
- Transparency of “The Old Homestead” data collection sheet (page 44)
- Chart paper and markers for recording students’ ideas

**SUBJECTS:** social studies, language arts, science

**SKILLS:**

- **Bloom’s Taxonomy:** remember, understand, apply, analyze, evaluate
- **Facets of Understanding:** explanation, interpretation, application, self-knowledge

**DURATION:** 45 to 60 minutes

**CLASS SIZE:** any, groups of two

**NATIONAL STANDARDS:** social studies, history, language arts, science (see Appendix 3, page 154)

### Background Information

Scientists may not use exactly the same procedures in exactly the same order, but most scientists rely on a methodical application of observation, inference, and data collection to answer their questions. Any phenomenon being studied must first be observed, whether from a satellite or through a microscope or directly with the naked eye. An inference is a reason proposed to explain an observation and it often raises questions for further inquiry. A single observation can produce many plausible inferences; the scientist’s job is to determine which of the inferences best explains the observation. When scientists have completed the process of observing, inferring, asking questions, and gathering data, they use evidence to answer their questions.

Archaeologists use observation and inference to learn how people lived in the past. By making observations about objects (artifacts and sites), they infer the behavior of the people who used the objects. For example, when archaeologists find the remains of a large village (observation), they could infer that the people were farmers because a large village needs a large food supply. To find out if that is the case, they would look for evidence of farming



such as farming implements (like hoes), and food remains from crops (corncobs and squash seeds). Archaeologists might also infer that the village was a trade center and would look for imported items to find out. A single observation might generate multiple inferences each of which could be plausible. A scientist's job is to examine all the data carefully to find out which inference is the best.

**Misconception Alert!**  
**Archaeology and Excavation**

When people think about archaeology, they usually imagine archaeologists busily excavating sites in exotic places. While excavation is an important part of archaeology, it is not the only way archaeologists learn about the past. Many sites are visible on the surface and a lot can be learned just from mapping and basic recording procedures. Archaeologists also study existing collections and records in museums to learn more about sites that have already been excavated. After field work is complete, archaeologists spend much of their time in the laboratory analyzing the information and reporting their findings to archaeologists, other scientists, and the public. For every day spent in the field, archaeologists spend two to three days in the laboratory analyzing the data and interpreting the results.

**Preparing to Teach**

1. Make a copy of the "The Old Homestead" data collection sheet and illustration for each student.
2. Make transparencies of "Old Homestead" data collection sheet and illustration.
3. Prepare to share background information.
4. Set up chart paper and markers to share students' ideas.
5. Post the Word Bank words.
6. Post the essential question: "How do archaeologists study the past?"

**Word Bank**

**archaeological site:** a place where people lived and left objects behind

**evidence:** data which are used to answer questions

**inference:** a conclusion derived from observations

**inquiry:** an organized investigation to learn new information or solve a problem

**observation:** recognizing or noting a fact or occurrence

**question:** something that is asked to guide the inquiry process

**Uncover Prior Knowledge**

1. Ask students: Imagine you think your brother or sister was in your bedroom while you were gone. How would you find out? What steps would you take to investigate? How would you determine that he or she had in fact been in the room?
2. List the students' ideas on chart paper to return to in Reflect on New Knowledge.

**Discover New Knowledge**

**How do archaeologists study the past?**

Inform students that this question will guide their learning. Indicate the Word Bank words (archaeological site, evidence, inference, inquiry, observation, and question) and inform students that they will use these words as tools and define them during the lesson.

1. Distribute "The Old Homestead" illustration and data collection sheet.
2. Explain that the illustration shows an old house used and later abandoned by people. It is an imaginary example of a place archaeologists might study. Students will use the illustration as they learn to do scientific inquiry.
3. Indicate the words **observation**, **inference**, **evidence**, and **inquiry** and tell students they will learn the meaning of



- these words through an activity.
4. **Observation:** Ask students: What do you notice about The Old Homestead? Have them list six or more objects and observations on their data collection sheet. As the students are working, they may have questions about how the people lived. Encourage them to list their questions under number 2.
  5. **Inference:** Ask students: What inferences (conclusions) can we make about this place and the people who lived here based on our observations? Have them write at least two inferences for each of their observations.
  6. Tell students: Asking good questions can help us find out more about how the homestead was used and what happened there. Write these two questions on the board: Is this an old house? How long ago did people live in this house? Ask students: Which question is the better question? Why? Guide students to recognize that questions answered with yes or no are too narrow. Meaningful questions usually begin with *Where, What, Why, Who, or How*.
  7. **Questions:** If students have not written any questions under number 3, encourage them to do so. They may add more questions at this time.
  8. Students share their questions in small groups. Assist students with improving their questions, if necessary.
  9. Tell the students: We are going to use evidence to answer our questions. For example, if we asked the question, “How long ago did people live in this house?” the Model-T truck could be evidence that people lived here a long time ago.
  10. **Evidence:** Students complete step 4 on the data collection sheet using their observations and list of objects (data).
  11. Assist students with defining **observation, inference, evidence, and question** and adding them to their Word Banks.
  12. Explain to students that the illustration of the homestead is an example of an archaeological site, a place where people lived and left objects behind, and they have just conducted an inquiry much as archaeologists do. Assist students with defining **archaeological site** and **inquiry** and adding them to their Word Banks.
  13. Use the background information and the “Misconception Alert: Archaeology and Excavation” to show students that archaeologists can learn a great deal by observing sites and artifacts on the surface.

### Reflect on New Knowledge

1. Return to the Uncover Prior Knowledge chart, and as a class, review their ideas.
2. Ask students: Based on the inquiry process you just completed, would you change the investigation of who was in your bedroom? Explain.
3. On chart paper or the board, write some examples of students’ observations and inferences to show that students had different inferences for the same observation. Ask students: How do you account for the differences in inferences? Use the background information to lead a discussion on the possibility of obtaining multiple plausible inferences from a single observation.
4. Ask students: How have we used inquiry to learn about people?
5. Give students a few minutes to write what “Observation, Inference, and Evidence” means to them on their “Investigating Shelter: Understandings” sheet. You may want to collect sheets to check for understanding, and then return them to the students.

### Assessment

The assessment for Lesson Four is located on page 59. This activity will assess students’ knowledge of Lesson Four: Observation, Inference, and Evidence; Lesson Five: Classification, and Lesson Six: Context. You will need to set



up ahead of time. While the assessment takes some preparation, it is very engaging for the students and provides an active means for them

to solidify their understanding of the concepts they will need to complete the archaeological investigation of a shelter in Lesson Eight.

<i>ANSWER KEY</i>		
<b>THE OLD HOMESTEAD</b>		
<b>Object (examples)</b>	<b>Observation (examples)</b>	<b>Inferences (examples)</b>
<b>Horse shoes</b>	There are four horse shoes near the fence.	There were horses here. People were playing horseshoes.
<b>House</b>	The house has broken windows and is falling apart.	The house is old. A tornado struck.
<b>Outhouse</b>	The house has an outhouse.	The house was built before indoor plumbing was the standard. The people who lived here were poor.
<b>Model -T truck</b>	There is a Model-T truck.	The people who once lived at this house owned a Model-T truck, which must have been in the early 1900s when Model-Ts were still in use.
<b>Cow Skull</b>	There is a cow skull.	There were cows here. Someone brought a cow skull to the homestead.
<b>Tall grass</b>	The grass is very tall.	No one has been around to cut the grass for a long time. Grass grows quickly in this climate.

# The Old Homestead





Name \_\_\_\_\_

### The Old Homestead

1. In the chart below, list some of the objects that you see and make an observation and an inference for each one.

Object	Observation	Inferences (two or more)
<b>Example</b> Horse shoes	<b>Example</b> There are four horse shoes near the fence.	<b>Example</b> There were horses here. Someone was playing horseshoes.

2. What do you wonder about as you observe the homestead? Write three or more questions.

3. Think about what makes a good question. Choose your best question and write it below.

4. Answer the question in step 3. What is your evidence?