Warm-Up | Scientific Inquiry

Lesson Objectives

By the end of this lesson, you should be able to:

- Apply the scientific _____ to given scenarios.

Science Practice: Describe how the scientific _____ process uses the scientific method.

Words to Know

Fill in this table as you work through the lesson. You may also use the glossary to help you.

hypothesis	a testable _____ of a scientific _____ that is based on research and observation
observation	the act of using one's _____ to recognize something, or a piece of information gathered using the senses or _____
scientific inquiry	the process of using _____, investigations, and _____ to learn about natural phenomena
scientific method	the process of deriving a _____ and then planning an _____ using testable questions and observations of the natural world

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Lesson Question

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Scientific Inquiry

_____ : any process used to ask and answer _____ questions about _____ of the natural world

_____ : an act of recognizing and noting an occurrence using the _____

- There are many different _____ of scientific inquiry.
- Scientific inquiry uses the steps of the _____.
- Scientific inquiry is not just for _____!

The Key to Scientific Inquiry

Scientific inquiry requires:

- _____ questions.
- the collecting and analyzing of _____.
- _____.

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Creativity in Scientific Inquiry

Creativity is important for:

- _____ a question.
- _____ an experiment.
- _____ a problem.
- _____ results.

Case Study in Scientific Creativity

REAL-WORLD CONNECTION

1950s biologists:

- knew that DNA, or deoxyribonucleic acid, controls heredity.
- did not know the structure of DNA.

James Watson and Francis Crick

- _____ actual _____ of DNA using sticks and spheres.
- used _____.
- discovered the _____ structure of DNA.

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Sir Francis Bacon

PROFILE

- Was an English philosopher, [ ], and lawyer
- Used [ ] reasoning from [ ] evidence
- Emphasized the need for a [ ] for science – the [ ] (Baconian method)
- Believed that science should be [ ] and [ ]

Basis of the Scientific Method

[ ]: the process of [ ] and [ ] that scientists use to ask and answer testable questions about their observations of the natural world

[ ]: a possible [ ] of or answer to a scientific question that is based on prior knowledge or research and is [ ]

Exact processes and steps may [ ] among fields or among scientists.

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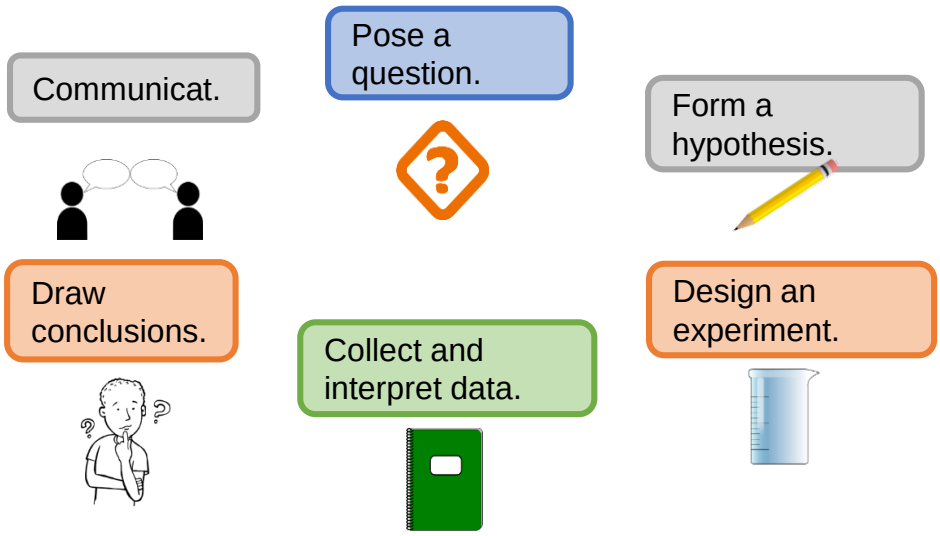
Steps of the Scientific Method

Steps of the scientific method

- Ask a _____ based on observation and research.
- Form a _____.
- Make a _____.
- Perform an _____.
- Analyze the _____ and draw conclusions.
- Accept or reject the _____.
- Record and _____ the results.

Many Ways to Use the Steps of the Scientific Method

Draw an arrow on the diagram to show how these steps can work in a cycle.



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Parts of a Lab Report: Part 1

There are different forms of writing lab reports, but typically you will see these same components.

_____: a simple _____ of your question

_____: a _____ describing what you are trying to find out by doing this experiment

_____: a question for which you can gather _____, such as “What is the effect of X on Y?”

_____: your question with a possible _____, written as “If . . . then . . . because”

Parts of a Lab Report: Part 2

_____: factors that are _____ or _____ during the experiment, including dependent and independent variables

_____: all the _____ you need to conduct the experiment

_____: the list of _____ for completing the experiment

_____: the information _____ from the experiment – organized facts and/or measurements

_____: a written description of the experimental _____, including data comparisons, errors, and whether the hypothesis was supported or not

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Parts of a Lab Report: Part 3

[ ] : any additional [ ] or prior [ ] about your question

[ ] : a description of what led you to your [ ], what you [ ] from the project, and [ ] for further research

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Summary | Scientific Inquiry

Lesson Question

How do scientists ask and answer questions about the natural world?

Answer

Slide 2

Review: Scientific Inquiry

- Scientific [ ] is the process of asking and answering questions about the natural world.
- Scientific [ ] are based on observations and research.
- Scientific questions must be [ ].

The Scientific Method

Sir Francis Bacon standardized procedures as the [ ].

Steps of the scientific method

- Ask a [ ] based on observation and research.
- Form a [ ].
- Make a [ ].
- Perform an [ ].

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Scientific Method: Continued

- Analyze the _____ and draw conclusions.
- Accept or reject the _____
- Record and _____ the results.

Writing a Lab Report

- A _____ communicates the specifics of your experiment, including the methods, data, and results.
- Lab report structure:

  Title, Purpose, _____ , Hypothesis, _____ , Materials, Procedure, _____ , Analysis, Background research, _____

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Summary | Scientific Inquiry

Use this space to write any questions or thoughts about this lesson.

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