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Warm-Up | Scientific Inquiry

Lesson Question

Lesson Goals

Describe the process of scientific inquiry.

Identify questions that can be answered through scientific _____.

Distinguish the three types of scientific investigations, including the benefits and limitations of each.

Distinguish between _____ and controls in a scientific investigation.

Words to Know

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

control group	the part of an experiment that does not receive the factor being tested and is used to compare _____
data	the information gathered from an _____ or a scientific investigation
dependent variable	the variable that is measured and _____ during the experiment and is dependent on the independent variable

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Words to Know

hypothesis	a possible explanation of or answer to a scientific [ ] that is based on prior knowledge or research and is testable
independent variable	the variable that is [ ] by the researcher
observation	something that is recognized or noticed by using the [ ]
scientific inquiry	any process used to ask and answer questions about the [ ] world
scientific question	a question that is based on observations and can be answered through an [ ]

How Scientists Examine Things

[ ]	Using prior knowledge to forecast what will happen next
Classifying	Grouping things together
[ ]	Creating representations of complex objects or processes
Analyzing	Looking closely at something to determine the relationship between its parts
Interpreting	Explaining what something means

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Scientific Inquiry

Scientific inquiry is any process used to ask and _____ questions about the natural world.

- Involves many possible _____
- Uses similar processes and _____
- Is not used just by scientists

Scientific Inquiry

Scientific inquiry involves:

- making **observations**.
- asking a _____.
- completing background _____.
- performing investigations.
- collecting and analyzing _____.
- providing explanations.
- communicating _____.

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Scientific Questions

A **scientific question** is a question that is based on _____ and can be answered through an investigation.

A good scientific question:

- has a _____ focus.
- addresses a gap in _____.
- does not have a simple yes or no answer.
- asks for an explanation.
- may lead to a _____ that can be tested.

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Descriptive Investigations

Descriptive investigations involve collecting _____ about a system.

- They make observations, but not _____.
- No _____ are conducted.
- A descriptive investigation includes:
  - a scientific question.
  - a _____.
  - a conclusion.

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Comparative Investigations

Comparative investigations involve collecting data for comparison.

They involve either collecting data on different _____ or features or collecting data under different conditions or at different times in order to make a comparison.

- A comparative investigation includes:
  - a scientific _____.
  - a hypothesis (possibly).
  - an _____ **variable** and a _____ **variable** (possibly).
  - a procedure.
  - a conclusion.

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Experimental Investigations

Experimental investigations involve experiments to gather _____ that supports or refutes a _____.

- An experimental investigation includes:
  - a _____ question.
  - a hypothesis.
  - independent and dependent variables.
  - a _____ **group**.
  - a procedure.
  - a _____.

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Benefits and Limitations of Scientific Investigations

	Benefits	Limitations
	• Are less expensive and less time-consuming • Usually provide large amounts of data • Can easily add knowledge	• Cannot show cause-and-effect relationships • Give results that can change over time
	• Usually provide large amounts of information • Use a wide range of variables	• Show a relationship that does not always indicate cause and effect
	• Are best for cause-and-effect relationships • Allow for control of variables • Are repeatable	• May be impractical • May not be realistic • Can make it hard to control some variables

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Results of Scientific Investigations

All [ ] types of scientific investigations may result in:

- new ideas for study.
- new [ ] or procedures for investigations.
- new [ ] to improve data collection.

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Summary | Scientific Inquiry

Lesson Question

How do scientists conduct scientific investigations?

Answer

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Review: Key Concepts

A _____ inquiry is any process used to ask and answer questions about the natural world.

- Making observations
- Asking a question
- Performing investigations
- Collecting evidence
- Providing explanations
- _____ results

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Summary | Scientific Inquiry

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Review: Key Concepts

There are three types of scientific investigations.

• Collecting data and making observations, but not comparisons	• Collecting data for comparison	• Performing an experiment to gather evidence that supports or refutes a hypothesis

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

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