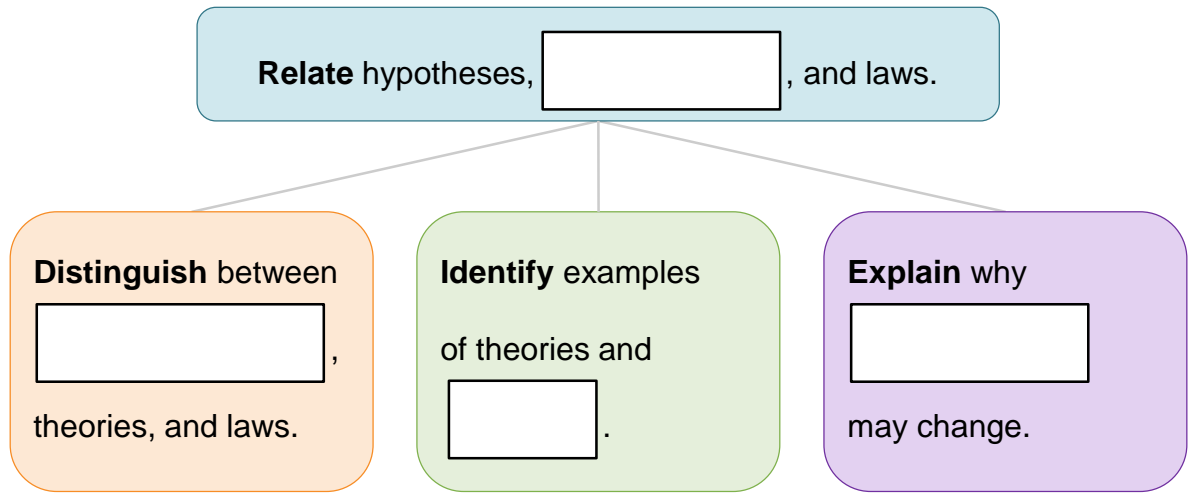




Lesson Question



Lesson Goals



Words to Know

Write the letter of the definition next to the matching word as you work through the lesson. You may use the glossary to help you.

- | | |
|---|--|
| <p>___ law</p> <p>___ theory</p> <p>___ hypothesis</p> <p>___ distinguish</p> | <p>A. to recognize the differences between objects</p> <p>B. a statement about how something behaves or functions in the natural world</p> <p>C. a well-tested, widely accepted explanation that combines several hypotheses and observations</p> <p>D. a possible explanation of or answer to a scientific question that is testable and based on prior knowledge or research</p> |
|---|--|



Scientific Inquiry

- Scientific inquiry is any used to ask and answer questions about the natural world.

- Is not just for

- Involves

- Uses similar

and

- Scientific inquiry involves:

- asking a

- performing

- collecting

- providing

- communicating

Slide

2

Hypotheses

A is a possible explanation of or answer to a scientific question that is testable and based on prior knowledge or research.

Example:

Elena is making shadow puppets on her little brother's bedroom wall. To make the animals appear as if they are coming closer, she moves her hands closer to the bedroom lamp, to make the shadow bigger. She asks the scientific question, "How does the distance between a light source and an object affect the size of the object's shadow?"

Elena's hypothesis could be:

- "If the distance between a light source and an object , then the size of the object's shadow will because the object blocks out more light."

Slide

4

Hypotheses: If . . . Then . . . Because . . . Format

When you write a hypothesis using this format, you are identifying the independent and dependent variables and explaining what will happen to them if you make some kind of a change.

- If the variable changes, then something will happen to the variable because . . . [give explanation].

In the two examples below:

- *circle the independent variable*
- *draw a box around the dependent variable*
- *put brackets [] around the explanation.*
 - If the distance between a light source and an object decreases, then the size of the object's shadow will increase because the object will block out more light.
 - If the height of a ramp increases, then the speed of a car on the ramp will increase because the car will accelerate.

Slide

6

Theories

- A is a well-tested, widely accepted explanation that combines several hypotheses and observations.
 - Can what may happen in the [future]
 - Can be or based on information or technology

8

Laws

- A is a statement about how something behaves or functions in the natural world.
 - Is based on
 - Does not observations
 - Is a statement
 - Cannot be or

Slide

11

Changes to Theories

Theories are based on experimentation.

Experimental methods .

New methods provide new .

Theories are or .

Slide

11

Atomic Theory: Development**Example**

Theories are based on many experiments and are revised over time as new information and perspectives come about.

- ~400 BCE—Democritus coined the term *atomos* for .
- 1780s—Lavoisier developed the law of .
- 1803—Dalton developed the first atomic theory of .
- 1897—Thomson discovered .
- 1911—Rutherford discovered the .
- 1913—Bohr found evidence that electrons are arranged in .
- 1926—Schrödinger's work led to the model.

All these developments lead to atomic theory, which states:

- All substances are composed of called .

Slide

11

Atomic Theory: Role of Changing Technology**Example**

Advances in technology also played an important role in the development of the atomic theory.

- Thomson used a to discover electrons.
- Rutherford blasted gold foil with , leading to the discovery of the nucleus and protons.
- Chadwick repeated Rutherford's experiment with and discovered neutrons.

Summary

Hypotheses, Theories, and Laws

**Lesson Question**

What is the relationship between hypotheses, theories, and laws?.

**Answer**

Slide

2

Review: Key Concepts: Hypotheses, Theories, and Laws**Hypothesis**

- Is based on or
- Is

Theory

- Is well-tested and
- be revised or replaced

Law

- Is a statement
- be changed or replaced

Slide

2

Review: Key Concepts: Changes to Theories

Theories are based on experimentation.

Experimental methods .

New methods provide new .

Theories are or .



Summary

Hypotheses, Theories, and Laws

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