Scientific Theories and Laws

SC.7.N.3.1 Recognize and explain the difference between theories and laws and give several examples of scientific theories and the evidence that supports them.

ESSENTIAL QUESTION:

How can you differentiate between scientific Theories and Laws?

Bell Ringer

A scientist spends a month observing two prairie animals, prairie dogs and ferrets, in their natural habitat. Based on his observations, the scientist states that ferrets are more active than prairie dogs. Why is his statement NOT a scientific theory?

a) It is an observation of something in nature.
b) Prairie dogs and ferrets are different species.
c) The statement is not widely accepted and supported by sufficient evidence.
d) The scientist has not conducted enough trials to draw a valid conclusion.

Ted ED Video

- Have students watch the TedEd video: *What's the Difference between a Scientific Law and Theory?* By Matt Anticole (5:11 minutes) at:
- https://www.youtube.com/watch?v=GyN2RhbhiEU

I DO Guided Notes

Theories & Laws ESSENTIAL QUESTION:

_____

_____

TRUE OR FALSE: *"If a hypothesis is supported, it becomes a theory. If a theory is proven it becomes a law".*

This is _____: Theories and Laws are different ways to look at how the world works. Theories don't become _____ and laws don't become _____.

SCIENTIFIC THEORIES

- Scientific Theories _____ how a natural phenomenon works.
- Theories are the best explanation for a phenomenon with all of the _____evidence.
- Theories can change when new _____ is presented.
- Examples of common theories:
  - Theory of _____ _____
  - Theory of _____
  - _____ Theory
  - _____ Theory

SCIENTIFIC LAWS

- Scientific laws _____a natural phenomenon or relationship that always occurs under _____ conditions.
- They can often be represented _____ and provide no explanation why a phenomenon occurs.
- Examples of Laws:
  - Law of Universal _____
  - Law of _____
  - Laws of Conservation of _____ & _____

SCIENTIFIC THEORIES VS LAWS

Both scientific theories and scientific laws are based on the results of many _____, are supported by a large amount of _____, are widely _____ by the majority of scientists in the given field of study, and can be _____ as new evidence is discovered.

TRUE? OR FALSE?

- "If a hypothesis is supported, it becomes a theory. If a theory is proven it becomes a law".

FALSE: Theories and Laws are different ways to look at how the world works. Theories don't become laws don't become theories.

Scientific Theories

- Scientific Theories explain how a natural phenomenon works.
- Theories are the best explanation for a phenomenon with all of the *available* evidence.
- Theories can change when new evidence is presented.
- Examples of common theories:
  - Theory of Plate Tectonics
  - Theory of Evolution
  - Cell Theory
  - Atomic Theory

Scientific Laws

- Scientific laws describe a natural phenomenon or relationship that always occurs under specific conditions.
- They can often be represented mathematically and provide no explanation why a phenomenon occurs.
- Examples of Laws:
  - Law of Universal Gravitation
  - Law of Superposition
  - Laws of Conservation of Mass & Energy

Scientific Theories vs Laws

Both scientific theories and scientific laws are based on the results of many investigations, are supported by a large amount of evidence, are widely accepted by the majority of scientists in the given field of study, and can be modified as new evidence is discovered.

We Do Collaborative Activity

SCIENTIFIC THEORY	BOTH	SCIENTIFIC LAW

Scientific Theory	Both	Scientific Law

Explains how a natural phenomenon works

Often becomes more limited over time.

Describes a natural phenomenon or relationship that always occurs under specific conditions

Can be modified if new evidence refutes the current statement

Supported by a large amount of empirical evidence

Widely accepted by the majority of scientists within a given field of study

Based on the results of many investigations

Revisiting the Bell Ringer

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b) Prairie dogs and ferrets are different species.
c) The statement is not widely accepted and supported by sufficient evidence. *
d) The scientist has not conducted enough trials to draw a valid conclusion.

CLOSING (Exit Ticket)

- How can you differentiate between scientific Theories and Laws?