

Chapter 1 Do Now #2

1. Which of the following claims would be considered a valid scientific conclusion? Explain why you chose your answer.

- A) Bees like red flowers because they are prettier.
- B) Elephants gain very little mass after they reach maturity.
- C) Two out of 100 people can communicate telepathically with each other.
- D) A monkey is happier when given bananas because they smile more than monkeys that do not get bananas.

2. The statement “bees like red flowers because they are prettier,” is **not** a valid scientific conclusion. What changes could you make to that statement that would make it a valid scientific conclusion?

Scientific Method

Section 1.2 Benchmarks

1. Describe and explain what characterizes science and its methods. **(SC.912.N.1.2)**

Benchmark 1 - (SC.912.N.1.2)

Main Idea

- **Scientific Method**

Supporting Details

- an organized plan for gathering, organizing, and communicating information.

Benchmark 1 - (SC.912.N.1.2)

Main Idea

- **Scientific Method Steps**

Supporting Details

- **1) Making Observations**
 - An **observation** is information that you obtain through your senses.
- **2) Forming a Hypothesis**
 - A **hypothesis** is a proposed answer to a question.

Benchmark 1 - (SC.912.N.1.2)

Supporting Details

- **3) Testing a Hypothesis**
 - **Manipulated (Ind.) variable** is the variable that causes a change in another.
 - **Responding (Dep.) variable** is the variable that changes in response to the manipulated variable.

Benchmark 1 - (SC.912.N.1.2)

Supporting Details

- **4) Drawing Conclusions ****
 - After collecting and analyzing data, you can make a conclusion.
 - If the data does not support the hypothesis, you can revise or propose a new hypothesis.
- **5) Developing a Theory ****
 - A **scientific law** is a statement that describes a pattern found in nature.
 - A **scientific theory** is a well-tested explanation for a set of observations or experimental results.

Benchmark 3 - (SC.912.N.3.4)

Main Idea

- Scientific Law vs. Scientific Theory



Supporting Details

- A law describes a pattern while a theory explains the pattern.
- Scientific Models
- A model is a representation of an object or event.

Scientific Method Review

Problem = What is wrong? What are they trying to fix?

Control Group = Normal Group. The group that is not getting something new.

Manipulated (Independent) Variable = What is being changed, added, or created?

Responding (Dependent) Variable = What is being affected by the change, addition, or creation?

Conclusion = Did it work?

Benchmark 1 - (SC.912.N.1.2)

A local doctor is treating a group of 100 patients for an unknown illness. The doctor has created a new “special medicine” that he believes will make the patients feel better. He has 50 of them in Group A take the new “special medicine.” While he has the other 50 in Group B take a pill that looks like the “special medicine,” but it is just filled with sugar. One week later 25 people in Group A feel better, while 5 people in Group B report feeling better.

- What is the problem?
- Which people are in the control group?
- What is the manipulated (independent) variable?
- What is the responding (dependent) variable?
- What should the doctor’s conclusion be?

Benchmark 1 - (SC.912.N.1.2)

A farmer is having issues with insects attacking his crop of corn. The farmer believes spraying his crops with water and vinegar will cause the insects to leave his crops alone. He sprays the first 250 rows of corn with water only. He sprays the last 250 rows of corn with water and vinegar. After two months 12% of the crops sprayed with water only were attacked by insects, while 15% of the crops sprayed with water and vinegar were attacked.

- What is the problem?
- Which crops are in the control group?
- What is the manipulated (independent) variable?
- What is the responding (dependent) variable?
- What should the farmer's conclusion be?

Benchmark 1 - (SC.912.N.1.2)

Kevin wanted to know if adding peat moss to sand would affect its ability to hold water. He filled container A with 200mL of sand only. He filled container B with half sand and half peat moss. He added water to each container and measured the amount of water absorbed in each container. He dried the sand and peat moss and repeated this experiment multiple times. At the end of the experiment container A absorbed an average of 74.4mL of water and container B absorbed an average of 110mL of water.

- What is the problem?
- Which container is the control group?
- What is the manipulated (independent) variable?
- What is the responding (dependent) variable?
- What should Kevin's conclusion be?

Activity 1 – Scientific Method

- You and your table partner will complete the worksheet titled Identify the Controls and Variables.
- Each person must turn in their own work.

Scientific Method Review

Problem = What is wrong? What are they trying to fix?

Control Group = Normal Group. The group that is not getting something new.

Manipulated (Independent) Variable = What is being changed, added, or created?

Responding (Dependent) Variable = What is being affected by the change, addition, or creation?

Conclusion = Did it work?

Section 1.2 Benchmarks

2. Explain that scientific laws are descriptions of specific relationships under given conditions in nature, but do not offer explanations for those relationships.
(SC.912.N.3.3)

Benchmark 2 - (SC.912.N.3.3)

- A **scientific law** is a statement that summarizes a pattern found in nature.
- A scientific law **describes** an observed pattern in nature **without attempting to explain it**.
- The **explanation** of such a pattern is provided by a **scientific theory**.

Activity 2 – Scientific Method

- You and your table partner will complete the worksheet titled Scientific Method in Action.
- Each person must turn in their own work.

Section 1.2 Benchmarks

3. Recognize that theories do not become laws, nor do laws become theories; theories are well supported explanations and laws are well supported descriptions.
(SC.912.N.3.4)

Section 1.2 Benchmarks

4. Describe the function of models in science, and identify the wide range of models used in science.
(SC.912.N.3.5)

Benchmark 4 - (SC.912.N.3.5)

Main Idea

- **Scientific Models**

Supporting Details

- A **model** is a representation of an object or event.
- Scientific models make it easier to understand things that might be too difficult to observe directly.
 - If new data shows that a model is wrong, then it must be changed or replaced by a new one.

Exit Slip

Employees are working on a computer model that simulates various impacts due to a variety of hurricane situations. The model shows all the possible outcomes based on different hurricane parameters.

Why is more appropriate to use a computer model in these types of settings?

- A) A model of a hurricane is easier to see than the real thing.
- B) Modeling a hurricane's impact is a much safer way to learn.
- C) The simulated scenarios does not allow employees to make mistakes.
- D) The speed of the computer helps determine the exact outcome faster.