

### Scientific Method

**What is the “scientific method”?** It is a \_\_\_\_\_ that is used to find \_\_\_\_\_ to questions about the world around us. Note that there is \_\_\_\_\_

**What is a hypothesis?** It is an \_\_\_\_\_ based on observations and your knowledge of the topic.

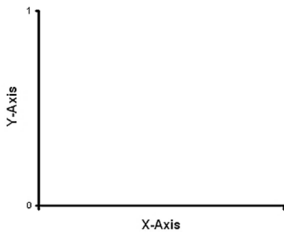
**What is data?** It is \_\_\_\_\_ gathered during an experiment.

### Variables in Scientific Experimentation

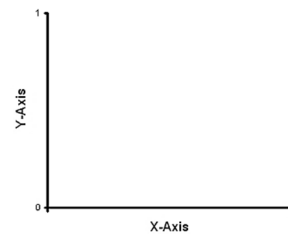
- **Independent Variable**=the variable that \_\_\_\_\_ (the scientist) \_\_\_\_\_  
When graphing, this appears on the \_\_\_\_\_
- **Dependent Variable**=the variable that \_\_\_\_\_ due to the \_\_\_\_\_.  
It is what \_\_\_\_\_. When graphing, this appears on the \_\_\_\_\_
- **Constants**=variables that are \_\_\_\_\_
- **Control Group**= \_\_\_\_\_

**Patterns in Data:** When appropriate, data can be plotted as a scatterplot and a trend (pattern or relationship) may be observed between the two variables

- **Direct Relationship**=  
as one variable \_\_\_\_\_,  
the other variable \_\_\_\_\_



- **Inverse Relationship**=  
as one variable \_\_\_\_\_,  
the other variable \_\_\_\_\_



# Scientific Method

\_\_\_\_\_

What do you want to know or explain? Use observations you have made to write a question that addresses the problem or topic you want to investigate.

\_\_\_\_\_

What do you think will happen? Predict the answer to your question or the outcome of the experiment.

\_\_\_\_\_

How will you test your hypothesis? Develop a procedure for a reliable experiment and address safety rules.

\_\_\_\_\_

Follow the steps in your procedure to perform your experiment. Record data and observations!

\_\_\_\_\_

Is the data reliable? Does your data and observations from the experiment support your hypothesis?

Yes

No

**Is your data inaccurate or the experiment flawed?**

Yes

\_\_\_\_\_

Rewrite your procedure to address the flaws in the original experiment.

No

\_\_\_\_\_

Write a conclusion that summarizes the important parts of your experiment and the results.

## Scientific Method and Experimental Design Practice:

**Krusty Krabs Breath Mints:** Mr. Krabs created a secret ingredient for a breath mint that he thinks will “cure” the bad breath people get from eating crabby patties at the Krusty Krab. He asked 100 customers with a history of bad breath to try his new breath mint. He had 50 customers (Group A) eat a breath mint after they finished eating a crabby patty. The other 50 (Group B) also received a breath mint after they finished the sandwich, however, it was just a regular breath mint and did not have the secret ingredient. Both groups were told that they were getting the breath mint that would cure their bad breath. Two hours after eating the crabby patties, thirty customers in Group A and ten customers in Group B reported having better breath than they normally had after eating crabby patties.



1. What was Mr. Krabs' hypothesis?
2. What is the independent variable in this experiment?
3. What is the dependent variable?
4. Which people are in the control group?
5. Were there any variables held constant in this experiment?
6. What should Mr. Krabs' conclusion be?
7. Why do you think 10 people in group B reported feeling better?



**Marshmallow Muscles:** Larry was told that a certain muscle cream was the newest best thing on the market and claims to double a person's muscle power when used as part of a muscle-building workout. Interested in this product, he buys the special muscle cream and recruits Patrick and SpongeBob to help him with an experiment. Larry develops a special marshmallow weight-lifting program for Patrick and SpongeBob. He meets with them once every day for a period of 2 weeks and keeps track of their results. Before each session Patrick's arms and back are lathered in 2 pumps of the muscle cream, while Sponge Bob's arms and back are lathered with 2 pumps of the regular lotion. The results are shown in the table below.

<b>Time</b>	<b>Patrick</b>	<b>SpongeBob</b>
Initial Amount	18	5
After 1 week	24	9
After 2 weeks	33	17

1. What is the scientific question being explored in this experiment?
2. What is the independent variable in this experiment?
3. What is the dependent variable?
4. Which person is the control group?
5. Were there any variables that were held constant in this experiment?
6. What should Larry's conclusion be?

## Reaction Time Activity

**Question:** Does a person's sense of touch or hearing have a faster reaction time than their sense of sight?

**Hypothesis:** \_\_\_\_\_  
\_\_\_\_\_

### Procedure:

1. **Sight.** The catcher puts their fingers on the "starting position". The dropper drops the ruler without any cues. The catcher tries to grab the ruler once it is dropped. Record the results.
2. **Sound.** The catcher puts their finger back at the "starting position" and closes his/her eyes. The student who drops the ruler says "now" and drops the ruler at the same time. Once the catcher hears "now", they try to grab the ruler. Record the results.
3. **Touch.** The catcher puts their fingers back at the "starting position" and closes his/her eyes. The student who drops the ruler taps the catcher on the arm and drops the ruler at the same time. Once the catcher's arm is touched, they try to grab the ruler. Record the results.
4. Repeat steps 1-3 three times.
5. Find the averages of all your times.

**\*\*Note: DO NOT do all three trials for one sense at once** (Do trial 1 for sight, sound, and touch, then do trial 2 for sight, sound touch, then trial 3)

### Data Table:

Trial	Sight	Sound	Touch
1			
2			
3			
Average			

**Questions:**

1. What was the independent variable in this activity? Explain.
2. What was the dependent variable in this activity? Explain.
3. What were some variables that were held **constant**?
4. Which trial would you consider your “**control**” group? Why?
5. Based on your group’s results, what should your conclusion be? Please support your response using the data you collected.