



NAME

PERIOD

## GOOD EXPERIMENT or BAD EXPERIMENT Scientific Method Skills Practice

What are the rules that a good experiments must meet?

- Good experiments test only **one variable** at a time.
- Good experiments have a separate **control group** with unchanged conditions for comparison.
- Good experiments use **equal** measurements.
- Good experiments use **accurate** measurements.

Read the experiments below.

Check each experiment for all of the rules listed above.

### Experiment #1

A scientist wondered whether caffeine had an effect on the reflexes of lab rats. She gathered 31 white lab rats of the same age and size. She split the rats into two groups. In group A she put 10 rats. The two groups of rats were kept in separate cages. In group B she put 21 rats. She gave the 10 rats in group A 20 mL of pure water to drink each day. She gave the 21 rats in group B 10mL of caffeinated water to drink each day. For 90 days she collected data by measuring: the number of babies born, the condition of fur, and the rat's weight.

- Does this experiment test only **one variable** at a time?
- Does this experiment have a **control group** with unchanged conditions for comparison?
- Does this experiment use **equal** measurements?
- Does this experiment use **accurate** measurements?
- Is this a good experiment or bad experiment?

What are improvements that would make this a better experiment?



## Experiment #2

A biology student wondered if plants will grow better under a green light or under normal white light.

To test his hypothesis he gathered some plants in a box and put a green light over them. After two weeks he measured the height of the plants. The plants had an average growth of 6 inches. He then changed the green light to a white light. After two more weeks he measured the plants again and found that they had grown 4 more inches. He concluded that green light causes plants to grow better than white light.

- Does this experiment test only **one variable** at a time?
- Does this experiment have a **control group** with unchanged conditions for comparison?
- Does this experiment use **equal** measurements?
- Does this experiment use **accurate** measurements?
- Is this a good experiment or bad experiment?

What are improvements that would make this a better experiment?

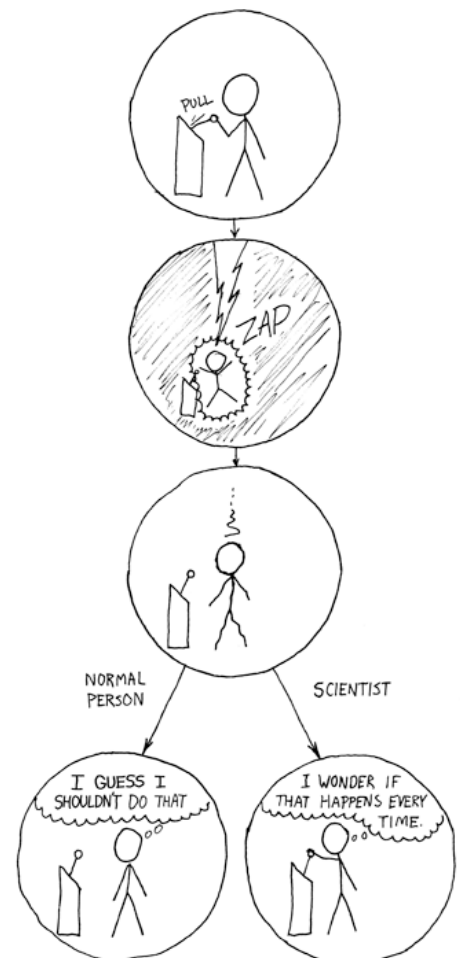


### Experiment #3

According to a science magazine earthworms are able to learn simple things. To test this idea a scientist set up a maze for earthworms. She places an earthworm at the start of a maze. If the earthworm crawls to the right, it finds itself on uncomfortable sandpaper. If the earthworm crawls to the left, it finds itself on moist soil. She repeats this experiment 10 times with the 20 earthworms she has for the experiment. She then repeats the experiment this time using a maze with soil on the right and sandpaper on the left. In a data table, the experimenter records how many times each earthworm crawls to the left or to the right.

1. What is the question she is testing?
2. Why did the researcher switch the location of the sandpaper and soil when they repeated the experiment?
3. What is the independent variable for this experiment?
5. What is the dependent variable for this experiment?

What do you think the cartoon is trying to say about scientists?





## Key Vocabulary for the Scientific Process

	Definition	Example
Accurate		
Control Group		
Data		
Dependent Variable		
Experiment		
Independent Variable		
Measurements		
Observation		
Process		
Senses		
Variable		