

SCENARIO #1 - Maggie's Plant Experiment

In this exercise you will read the following scenario and identify the parts of the scientific method in it.

Maggie read that some plants grow better if the soil is acidic. She can't believe that a plant can grow when exposed to acid. Maggie decides to test if the plants she has will grow better when acid is added to the soil. She puts potting soil in two planting containers and transplants two of her geraniums that seem about the same size into the pots. She puts the pots in the same location so that they both get the same sunlight each day, are at the same temperature and she makes sure they get the same amount of water. However, Maggie puts a tablespoon of vinegar in the water she gives to one of the plants. She measures the growth of the plants every week for five weeks and records the results in a data table below:



Week	Height of Plants in Container with Vinegar (cm)	Height of Plants in Container without Vinegar (cm)
1	10.0	10.0
2	12.4	11.5
3	14.8	13.0
4	18.0	15.7
5	21.4	17.8

1. Hypothesis: _____
2. Dependent Variable: _____
3. Independent Variable: _____
4. Constants: _____
5. Control Group: _____
6. Experimental Group: _____

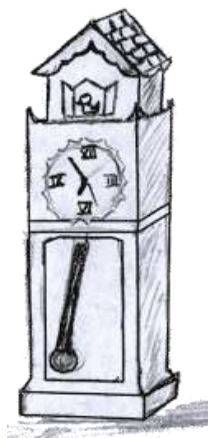
SCENARIO #2 - Donna's Pendulum Experiment

In this exercise you will read the following scenario and identify the parts of the scientific method in it.

Donna has observed that her father can control the speed of their grandfather clock by adjusting the height of the weight on the end of the pendulum. Donna thinks that the pendulum will move faster when the weight is lowered, and wants to test her idea. Donna gets a stopwatch and measures the time it takes for the pendulum to swing twenty times when the weight is moved to its lowest position. Donna begins to move the pendulum up by 1 cm and continues to measure the time for twenty swings of the pendulum. Donna records her data.

Position	Time (seconds)
1	23.23
2	21.56
3	20.33
4	19.00
5	18.02

1. Hypothesis: _____
2. Dependent Variable: _____
3. Independent Variable: _____
4. Constants: _____
5. Control Group: _____
6. Experimental Group: _____



SCENARIO #3 -- Al's salt water experiment

In this exercise you will read the following scenario and identify the parts of the scientific method in it.



Al wonders if adding salt to water will affect how long it takes the water to freeze. Al thinks that salt water will freeze more quickly than fresh water. He decides to check his hypothesis by conducting an experiment. Al takes two ice trays and fills one with distilled water and the other with distilled water that has two tablespoons of salt added. He makes sure he puts exactly the same amount of water in each ice tray. Al takes the trays and puts them side by side in the freezer. Al checks the ice trays every 10 minutes to see if the water in each tray has begun to freeze. Al finds that after 20 minutes the water in the ice tray without the salt has started to form ice, while the ice tray with the salt water is still completely liquid.

1. Hypothesis: _____
2. Dependent Variable: _____
3. Independent Variable: _____
4. Constants: _____
5. Control Group: _____
6. Experimental Group: _____

SCENARIO #4 - Christian's Cart Experiment

In this exercise you will read the following scenario and identify the parts of the scientific method in it.

Christian wonders if a heavier cart will roll faster down-hill than a lighter one. He formulates a hypothesis and then decides to conduct an experiment. First, he finds a smooth ramp and a cart. He makes sure that the wheels of his cart roll freely. He set the ramp against a chair so one side of the ramp was 0.5 m off the ground. Next, he measures the distance the cart will travel down the ramp. He leaves about 10 cm at the top of the ramp and draws a line to mark the release position of the car. He then measures the distance the cart will travel down the ramp and has a stopwatch to time how long it will take to reach the bottom of the ramp. He starts the experiment by measuring the time it takes the cart to roll down the hill without any weight on it. For the next five trials he adds a 1 kg mass to the cart each trial. The times of the trials were 1- 27s, 2- 32s, 3- 30s, 4- 29s, 5- 30s. When comparing the data points, he decides to allow for a 5 second "fudge factor" since he may not have released the cart at precisely the exact same spot each time. He finds that adding mass to the cart does not affect the time it takes to roll down the ramp since all of his times were within 5 seconds of each other.



1. Hypothesis: _____
2. Dependent Variable: _____
3. Independent Variable: _____
4. Constants: _____
5. Control Group: _____
6. Experimental Group: _____

SCENARIO #5 - Cattails



A Scientist noticed that cattails grew only in swampy parts of his backyard. He decided to try to find out why. He went to the library and found out the following facts: Cattails are not found in deserts, Cattails are usually found in many swamps, Cattails sometimes grow in rivers and streams. The scientist thought for awhile, then said, " I think I have figured out the answer. Cattails need a lot of water to grow." He then went into his yard and dug up 100 cattails. He divided them into four groups. Each group contained 25 cattails. All of the groups were grown in the same type of soil, they all received the same amount of light, and they were all kept at the same temperature. There was only one difference between the groups. Group 1 received 4 mL of water a day. Group 2 received 3 mL of water a day. Group 3 received 2 mL of water a day. Group 4 received 1 mL of water each day. Every day he went out and measured the plants. After 30 days he observed that the plants in group 1 had grown an average of 8 cm. The plants in group 2 had grown an average of 4 cm. The plants in group 3 had grown an average of 2 cm. The plants in group 4 had grown an average of only 1 cm. He then decided that the amount of water that a cattail receives affects its growth. Plants that receive more water, grow more. The scientist then repeated his experiment using another 100 cattails.

1. Hypothesis: _____
2. Dependent Variable: _____
3. Independent Variable: _____
4. Constants: _____
5. Control Group: _____
6. Experimental Group: _____

SCENARIO #6 - Candy Connection

Mr. Lehman wanted to know whether or not his students would do better on a quiz if he promised them candy. He went to the library and read several studies about the effect of giving food to lab animals. He found out that if animals were given food as a reward for doing something, they usually did better the more reward they were given. He guessed that the more candy that his students were promised, the better they would do on the quiz. He had all of his classes participate in the experiment. There were four groups in all. Each group had the same amount of boys and girls, they were all given the same quiz, they were all the same age, the same ability, and they were all from the same background. The first group was not promised any candy if they did well on the quiz. The second group was promised 1 candy bar if they did well on the quiz. The third group was promised 2 candy bars if they did well on the quiz. The fourth group was promised 3 candy bars if they did well on the quiz. Group #1 got an average of 70% on the quiz. Group #2 got an average of 80% on the quiz. Group #3 got an average of 90% on the quiz. Group #4 got an average of 95% on the quiz. Mr. Lehman then decided that the more candy a group was promised, the better they did on quizzes. He then repeated the experiment with different students.

Using the information provided in the scenario, fill in the data table:



GROUP	Number of Candy bars Promised	Test Average (%)

SCENARIO #6 - Candy Connection (continued)

1. Hypothesis: _____
2. Dependent Variable: _____
3. Independent Variable: _____
4. Constants: _____
5. Control Group: _____
6. Experimental Group: _____

SCENARIO #7 - Sunflower Seeds

Mr. Toowise was having a difficult time getting his students to get good grades on quizzes. He was trying to think of a way that he could positively reward his students. He read an article that said that lab rats that were rewarded with sunflower seeds ran through a maze faster than rats that were not rewarded with sunflower seeds. Mr. Toowise stated, "I think that the more sunflower seeds I promise my students, the better they will do on a quiz." He divided the class into three groups. Group one was promised zero sunflower seeds if they did well on the next quiz. Group two was promised 25 sunflower seeds if they did well on the next quiz. Group three was promised 50 sunflower seeds if they did well on the next quiz. Group one received an average of 70% on the quiz. Group two received an average of 73% on the quiz. Group three received an average of 71% on the quiz. He looked at his results and concluded that the amount of sunflowers promised to students does not effect their quiz scores.

Using the information provided in the scenario above, fill in the data table below:

GROUP	Number of Sunflower Seeds	Test Average (%)

1. Hypothesis: _____
2. Dependent Variable: _____
3. Independent Variable: _____
4. Constants: _____
5. Control Group: _____
6. Experimental Group: _____