

# Scientific Method Case Studies



# Oil Spill Case Study

In 2010, an explosion on an oil rig caused a terrible oil spill in the Gulf of Mexico. As oil started washing up on shore, the area wildlife was drastically affected.

A scientist wonders how do different amounts of water pollution affect the height of radish plants? He thinks that the plants with the most pollution will not grow as tall. He plants ten seeds in dirt in separate cups and gives them water every day. He has mixed the water with different amounts of motor oil (as pollution). He gives each tree a different level of pollution. He continues this for several weeks, and measures the height of each plant.

# What is the PROBLEM?

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# What is the HYPOTHESIS?

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# What is the IV?

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# What is the DV?

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# What is the CONTROL GROUP?

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# What are the CONSTANTS?

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# What is the DATA?

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# What is the CONCLUSION?

In 2010, an explosion on an oil rig caused a terrible oil spill in the Gulf of Mexico. As oil started washing up on shore, the area wildlife was drastically affected.

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# Plant Hormones Case Study

A student wondered how hormones affected plant growth and wanted to test the hypothesis that rooting hormones will stimulate the production of new roots at a faster rate than would take place without rooting hormones. Two stem cuttings of equal length were taken from a geranium plant. The cut end of one plant was dipped into the hormone and then planted in wet sand. The other cutting was planted in wet sand without dipping it into the hormone. Both cuttings were given water and sunlight. After 4 weeks, both cuttings were removed from the sand and the lengths of the roots that had developed were measured and found to be the same.

# What is the IV?

A student wondered how hormones affected plant growth and wanted to test the hypothesis that **rooting hormones** will stimulate the production of new roots at a faster rate than would take place without rooting hormones. Two stem cuttings of equal length were taken from a geranium plant. The cut end of one plant was dipped into the hormone and then planted in wet sand. The other cutting was planted in wet sand without dipping it into the hormone. Both cuttings were given water and sunlight. After 4 weeks, both cuttings were removed from the sand and the lengths of the roots that had developed were measured and found to be the same.

# What is the DV?

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# What is the CONTROL GROUP?

A student wondered how hormones affected plant growth and wanted to test the hypothesis that rooting hormones will stimulate the production of new roots at a faster rate than would take place without rooting hormones. Two stem cuttings of equal length were taken from a geranium plant. The cut end of one plant was dipped into the hormone and then planted in wet sand. The other cutting was planted in wet sand without dipping it into the hormone. Both cuttings were given water and sunlight. After 4 weeks, both cuttings were removed from the sand and the lengths of the roots that had developed were measured and found to be the same.

# What are the **CONSTANTS**?

A student wondered how hormones affected plant growth and wanted to test the hypothesis that rooting hormones will stimulate the production of new roots at a faster rate than would take place without rooting hormones. Two stem cuttings of equal length were taken from a geranium plant. The cut end of one plant was dipped into the hormone and then planted in wet sand. The other cutting was planted in wet sand without dipping it into the hormone. **Both cuttings were given water and sunlight.** After 4 weeks, both cuttings were removed from the sand and the lengths of the roots that had developed were measured and found to be the same.

# Turtles Ahoy Case Study

- Read the article "Turtles Ahoy" with your elbow partner.
- Identify the steps of the Scientific Method in the article.

# DOL-Peter's Case Study

Peter heard that Venus Flytraps typically grow best in warmer/milder climates, he wondered if cooler temperatures would impact how quickly they closed. He purchased sixteen Venus Flytraps from an exotic plant store. He then placed 8 Venus Flytraps outside during the early part of winter and 8 Venus Flytraps inside his house. After allowing the Venus Flytraps to adjust to their environment for a day, Peter began his experiment. Peter used a small dowel (wooden stick) to activate the Venus Flytraps by touching their "trigger hairs." Once he did this he used a stopwatch to determine how many seconds it would take to completely close.

Identify: IV, DV, control group, constants

# DOL-Shopping Mall Case Study

A shopping mall wanted to determine whether the more expensive "Tough Stuff" floor wax was better than the cheaper "Steel Seal" floor wax at protecting its floor tiles against scratches. One liter of each type of floor wax was applied to each of the 5 test sections of the main hall of the mall. The test sections were all the same size and were covered with the same kind of tiles. Five (5) other test sections received no wax. After 3 weeks, the number of scratches in each of the test sections were counted.

Identify: IV, DV, control group, constants

# DOL-Jacob's Case Study

Jacob, a landscaper, wondered if a particular tree would grow better in the sun or in the shade.

Without collecting information or doing much research, Jacob claimed that if he could limit the amount of sunlight the tree was exposed to, then the tree would grow taller. To test this idea, Jacob planted 10 trees in a shady area and 10 trees in an area with a significant amount of sunlight. Over the next several months, Jacob watered and fertilized each tree in the exact same way. He also took measurements of the tree's height and averaged them.

Identify: IV, DV, control group, constants