

Scientific Method Case Studies

#1 Oil Spill Case Study

In 2010, an explosion on an oilrig 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 and finds that the more pollution the less the plant grew.

Label: Problem, Hypothesis, Independent Variable (IV), Dependent Variable (DV), Control Group, Constants, Data, Conclusion

#2 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.

Label: Independent Variable (IV), Dependent Variable (DV), Control Group, Constants

Turtles Ahoy! (A real implementation of the scientific method)



Did you ever wonder how baby sea turtles can run down into the ocean after hatching, paddle thousands of miles across the North Atlantic, and find their way back years later to the same beach they were born?

Curious about these creatures, a biologist at University of North Carolina at Chapel Hill has discovered at least part of the answer. Baby loggerhead turtles, no bigger than a child's hand, use the Earth's magnetic fields and waves to orient themselves and direct their marathon swims. In a recent issue of Scientific American magazine, biologist Kenneth Lohmann describes experiments showing their biological compass. Working with Florida Atlantic University science researchers, Lohmann tied loggerhead turtle hatchlings (newborns) to a device and placed them in a large glass tank filled with water.

Within minutes of placing the hatchlings in total darkness, researchers observed that the turtles all swam in the same direction. In fact, most of them swam towards points located between magnetic north and east, directions that would lead them away from Florida's east coast and toward the Gulf Stream currents. The biologists also found that when they reversed the magnetic field, the turtles swam in the opposite direction- toward the southwest.

1. Circle and label the question that is going to be investigated.
2. What is the hypothesis?
3. What is the independent variable?
4. What is the dependent variable?
5. What are the constants?
6. Describe the data and analysis.
7. What is the conclusion?