

Scientific Method - Manipulated and Responding Variables

Jordan is doing a science fair project on the effects of music on the growth of tomatoes. He has two tomato plants, Plant A and Plant B, that he grows in a window and gives the same amount of water. Plant A is exposed to classical music using headphones attached to the soil. Throughout the growth period, Jordan counts the number of tomatoes produced by each plant.

Plant A = 35 Tomatoes | Plant B = 55 Tomatoes

- 1) What is the control group?
- 2) What is the manipulated variable?
- 3) What is the responding variable?
- 4) What should Jordan's conclusion be? Write this in a complete sentence!
- 5) Jordan needs to repeat the experiment, but his teacher says that he needs to improve his design. In his second experiment, what should he do different.



In the same science fair, Tina asks the question "Does caffeine increase the heart rate of an earthworm?" In Test 1, she measures the heart rate by looking at the earthworm under a microscope, the earthworm has a heart rate of 50 bpm (beats per minute). In Test 2, she places a few drops of caffeine on the earthworm's skin and measures the rate again. In this test, the heart rate is 68 bpm.

- 6) What is the manipulated variable in this experiment?
- 7) What is the responding variable in this experiment?
- 8) Tina's experiment should have included a hypothesis. In a complete sentence, suggest a hypothesis for Tina's experiment.

