

Superpowers in Real Life



IMPOSSIBLE
SCIENCE

Objective: Students will be able to test their reaction time and see how different variables affect how fast they react.



Materials:

- Yard stick
- Timer
- Graph paper
- Pencils
- Apples

Procedure

1. Ask: Have you ever wondered if you could have powers like Spiderman? Today after learning a bit about the science behind some of Spiderman's powers, we'll be testing yours.
1. Watch Impossible Science video pausing after each activity to have students try (reaction time, intuition/clapping, and apple super strength).
2. Explain to students that today they will test their own reaction time, or the time between when we perceive something and when we respond to it. Ask what factors they think influence reaction time. Share answers.

Vocabulary

Reaction time: the time between when we perceive something (a stimulus) and when we respond to it.

3. Explain that reaction time is influenced by:
 - A. Perception: seeing, feeling, or hearing a stimulus. For example, when a fire drill sounds, people hear it and react, or when a driver sees an obstacle in the road, they swerve or brake to avoid it.
 - B. Processing: this is our ability to process the stimuli and understand what it means. For example, if a driver saw a dog run in the road, the eyes would send a message to the visual cortex in the brain, which would send a message to the motor cortex, then to the spinal cord, and finally to the arms and hands, which would then move the steering wheel to avoid the dog.
 - C. Response: this depends on how quickly the responder is able to move.
4. Ask students again, what might impact reaction time? Record responses and share.
5. Explain that many things can influence reaction times including:
 - How familiar the responder is to the stimulus, for example, we practice fire drills because the more familiar we are with the sound of the alarm, the faster we will be able to respond because we will have less to process and figure out.
 - The state of the responder, for example, if they are injured, under the influence of drugs or alcohol, overtired, handicapped, upset, or distracted, they may not respond as quickly.
 - Which sense is stimulated- each sense has different reaction speeds. The brain reacts faster to auditory stimuli than visual stimuli.
6. Break students into pairs and give each pair a yardstick, graph paper, and pencils.
7. One person will hold the yard stick a few feet above the ground, and have the other person hold their hand right at the base of the yardstick.
8. The person holding the yardstick will shout, "Go!" and release the yardstick.
9. The other person should try to grab the yardstick as quickly as possible.
10. Record how many inches the yardstick dropped before it was caught.
11. Convert inches to seconds and write down the conditions (ie: "First try, eyes opened")

12. Try again multiple times with varied conditions such as: eyes closed, non-dominant hand, while distracted, while singing, etc. recording each reaction time.
13. Create a bar graph of the reaction times.
14. Discuss: Which conditions produced the fastest reaction times? Why?

Assessment:

Write up a conclusion about the impact of different variables on reaction time based on the results of the yardstick experiment.

Safety Notes:

Adult Supervision Recommended

Watch the companion video here:



Lesson Plan by Whitney Gallagher based on the “Impossible Science” series.

Find more at impossiblescience.com

