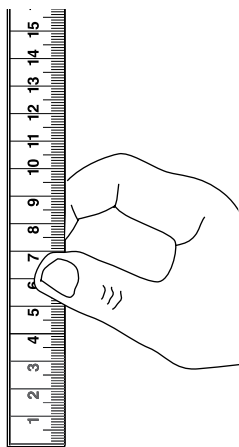


Test Your Reaction Time

Reaction time is critical in many sports. In baseball, for example, a batter has only a fraction of a second to respond to a pitched ball. Soccer goalies must have excellent reaction time to block a potential score. In this simple activity, you'll determine your own reaction time and compare it to that of others.

Stuff You'll Use: ▶centimeter-scale ruler ▶calculator ▶graph paper



What to Do:

- 1 Have a partner hold out his or her thumb and index finger. Hold the ruler so that the 0-cm mark is level between the tops of your partner's fingers.
- 2 Have your partner catch the ruler with the thumb and index finger when you release it. (Do not let your partner know when you will release the ruler.)
- 3 Record the position of the fingers on the ruler when your partner catches it. (See figure.)
- 4 Repeat steps 1–3 for at least three trials. Calculate the average.
- 5 Calculate the reaction time using the following formula: $t = \sqrt{2d/g}$ where t is the reaction time in seconds, d is the distance the ruler fell in cm (position of fingers), and g is the acceleration due to gravity (980 cm/sec^2).
- 6 Collect data for each student in the class and plot a histogram of the reaction times. *What is the mean reaction time? What is the fastest reaction time? The slowest? Do you see any relationship between those who play a lot of sports and their reaction times? How about those who play a lot of video games?*

How It Works:

Reaction time is the time that passes between the moment an observable change in the environment (called a stimulus) occurs and the response to that change. In this activity, the falling ruler represents the change in the environment and your partner catching the ruler is the response.

Reaction time is related to how fast your nervous system is able to gather, process, and respond to information in the environment. Signals from the eye pass down the optic nerve into the visual cortex of the brain where they are processed, and a response signal goes from your brain, down your spinal column, and into nerve cells telling your muscles to contract. All of this takes a measurable amount of time. Reaction time can vary with age, gender, degree of physical fitness, and other variables. For this activity, the mean reaction time for young adults is about 0.19 seconds.

More Fun?

Learn more about calculating and graphing. Terrific Science Press (www.terrificscience.org/sciencestore) offers the following books that include activities on using scientific data:

- ▶▶ [*Exploring Energy with TOYS*](#)
- ▶▶ [*Investigating Solids, Liquids, and Gases with TOYS*](#)
- ▶▶ [*Teaching Chemistry with TOYS*](#)
- ▶▶ [*Teaching Physics with TOYS EASYGuide Edition*](#)

