Name: _____

Class: _____

Module 1 – Crash Prevention
Lesson 1 – Physics and Reaction Time
Laboratory Exercise
Grade 6 - 8

Learning Objective

A major factor in car crashes is the driver's reaction time to obstacles on the road. In this lab you will be measuring the reaction time of your partner.

Observations

What are some instances where reaction time can influence car crashes?

Hypothesis

Create a hypothesis statement about how age may influence reaction time.

Materials & Procedure

1. Acquire a metric ruler.
2. Have your partner place their arm across the desk with their hand hanging off the desk.
3. Hold the ruler vertically by the 30 cm end. The 0 cm end should be between your partner's outstretched thumb and pointer finger.
4. Drop the ruler without notice and have your partner catch it between their thumb and forefinger. Record the distance the ruler fell in meters. (in order to convert centimeters to meters, divide the number of centimeters by 100)
5. Repeat 5 times with your partner.
6. Repeat the procedure while texting with your dominant hand. If time allows, repeat this procedure again while texting with your non-dominant hand.
7. Calculate the reaction time in seconds with the formula below.

Data table

Student	Length dropped (m)	Time (seconds)	Adult	Length dropped (m)	Time (seconds)
Trial 1			**Trial 1**		
Trial 2			**Trial 2**		
Trial 3			**Trial 3**		
Trial 4			**Trial 4**		
Trial 5			**Trial 5**		

In order to calculate reaction time, the following formula is used.

$$Time = \sqrt{\frac{2 * d}{a}}$$

Where:
$Time =$ the individual's reaction time (in seconds)
$d =$ distance dropped (in meters)
$a = 9.8 \frac{m}{s^2}$ (acceleration of gravity)

Conclusion

Based on your data, form a conclusion as to whether your hypothesis was supported or rejected and explain.

Questions

1. What was your independent variable?
2. What was your dependent variable?
3. What are some factors that should be held constant in your experiment?
4. How does reaction time change with age?
5. What are some factors that may cause reaction times to change as you age?
6. What are some other variables, besides age, that could influence reaction times of drivers?
7. How can reaction time impact crashes?
8. What are some existing technologies that help combat poor reaction times by the driver?
9. What is a future transportation technology that can help combat poor reaction times by the driver? (Think of things like how future roads, signs, traffic signals, or vehicles could play a role)