

# Fiction Matters Homework Teacher Key

**Definitions:** Write your own definitions to each vocabulary word listed below

Friction: \_\_\_\_\_ The resistance of motion when one object rubs against another \_\_\_\_\_

Mass: \_\_\_\_\_ A measure of a numbers of atoms in an object \_\_\_\_\_

Velocity: \_\_\_\_\_ The speed and direction of an object \_\_\_\_\_

Force: \_\_\_\_\_ Strength or energy that causes a physical action or motion \_\_\_\_\_

Stopping Distance: \_\_\_\_\_ Measured amount of space it requires to become stationary \_\_\_\_\_

**Equations:** Based off of the given equation, match the variables with their abbreviations.

$$d = \frac{v_0^2}{2\mu g}$$

**d** = \_\_\_\_\_ stopping distance \_\_\_\_\_

**v** = \_\_\_\_\_ velocity \_\_\_\_\_

**μ** = \_\_\_\_\_ coefficient of friction \_\_\_\_\_

**g** = \_\_\_\_\_ gravity \_\_\_\_\_

**Discussion Questions:** Use the space provided to answer the questions in complete sentences.

1. Explain how surface type influences the amount of friction.

\_\_\_\_\_ Answers may vary. Generally, a rougher surface causes there to be more friction  
and a smoother surfaces causes less friction. \_\_\_\_\_

---

---

---

---

---

2. Analyze how friction can be both a positive and negative part of our everyday lives. Use examples to support your statements.

POSITIVE: Answers may vary. Friction allows you to travel, play sports, write with your pencil and many more things. Without friction we would always be moving unless stopped by an outside force.

NEGATIVE: Answers may vary. Friction causes you to lose energy while traveling, playing sports and writing with your pencil. Without a stronger opposing force friction would always slow you down.

3. Hypothesize what a daily activity would be like if there were no friction. How would the activity be easier, and how would it be more difficult?

Answers may vary. When going to school without friction you would have to accurately aim and push off from your front door. You'd have to hope to not hit any objects that may change your route. This would make getting to school faster as long as you didn't run into any objects but would make it much more difficult overall and probably painful.

**Further Your Thinking:** Consider the picture below when answering the question below.

### Typical Stopping Distances



Photo from The Department of Transportation Highway Code

1. How does reaction time and distance change when your vehicle goes faster?

Answers may vary. As your car goes faster, you travel further during your reaction time, causing your stopping distance to be longer.

---

---

---

---