

BALL + RAMP CHALLENGE

5th Grade S.T.E.M. - Due September 24, 2019

We will explore the effect of the height of a ramp and the mass of an object on the potential and kinetic energy.

Hypothesis:

As the height of a ramp increase, potential and kinetic energy will

As the mass increases, potential and kinetic energy will

Materials:

3 balls (different mass)

Ruler

Balance

Procedure:

- 1) Weigh each ball on the balance to determine its mass (in grams).
Record the mass in the data table.
- 2) Draw a starting line from the top of the ruler.
- 3) Place one block of wood (1 book) under the end of the ruler to make a ramp. Measure the height of the ramp (m) and record it.
- 4) Place one of the balls on the starting line.
- 5) Release the ball and start the stopwatch.
- 6) When the ball used all its energy, record the time.
- 7) Measure and record the distance (in meters) that the ball traveled.
- 8) Repeat steps 4-7

9) Raise the height of the ramp with an extra block/book and repeat steps 4-7.

Trial 1

Height of the ramp: _____ (mm)

	Mass (g) (mm/ms)	Distance (mm)	Time (sec)	Velocity
Ball 1	_____	_____	_____	_____
Ball 2	_____	_____	_____	_____
Ball 3	_____	_____	_____	_____

Trial 2

Height of the ramp: _____ (mm)

	Mass (g) (mm/ms)	Distance (mm)	Time (sec)	Velocity
Ball 1	_____	_____	_____	_____
Ball 2	_____	_____	_____	_____
Ball 3	_____	_____	_____	_____

Trial 3

Height of the ramp: _____ (mm)

	Mass (g) (mm/ms)	Distance (mm)	Time (sec)	Velocity
Ball 1	_____	_____	_____	_____
Ball 2	_____	_____	_____	_____
Ball 3	_____	_____	_____	_____

WORKSHEET

1) When in this investigation did each ball have potential energy?

2) When did each ball have kinetic energy?

3) What is the relationship between energy, mass, and height (potential and kinetic energy)?

4) The velocity of an object (V) is calculated by dividing the distance (d) traveled by time (t). Using the formula $V = d/t$, calculate the velocity of each ball traveled down the ramp.

5) As the mass of the ball increased, did the ball speed up or slow down. Why or why not?

6) As the height of the ramp increased, did the ball speed up or slow down? Why or why not?
