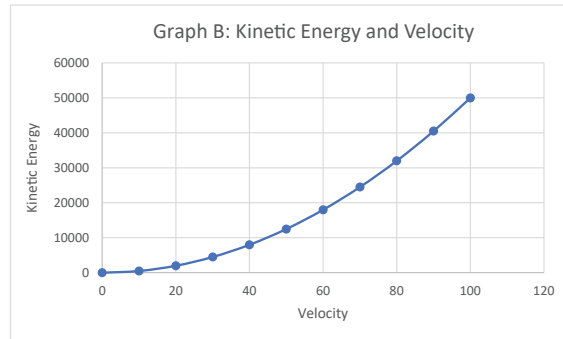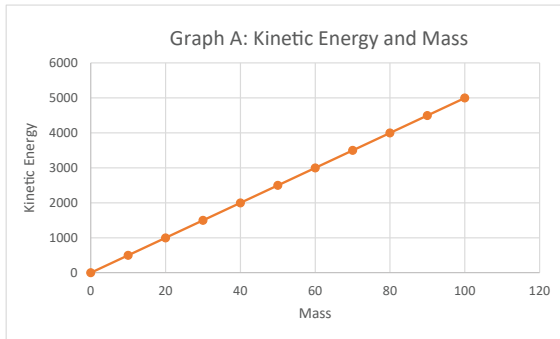# Sample Lesson #1

Kinetic Energy, Part III

Study the graphs below. Graph A shows the relationship between kinetic energy and mass when velocity remains constant. Graph B shows the relationship between kinetic energy and velocity when mass is held constant.

1. A graph of mass and kinetic energy forms a straight line starting at the origin. What does this graph tell us?

   A) Mass and kinetic energy are proportional.

   B) As mass increases, kinetic energy increases.

   C) The two variables are increasing by the same factor.

   D) all of these

2. In graph B, mass remains constant while velocity changes. Why does a graph of velocity and kinetic energy form a curved line?

   A) As velocity increases, kinetic energy increases.

   B) Kinetic energy and velocity are not proportional.

   C) Velocity and kinetic energy change by different factors.

   D) all of these

3. Compare the two graphs again. Which variable has a greater effect on kinetic energy?

   mass   velocity   both mass and velocity have the same effect

4. According to graph B, when the velocity of an object is zero, the kinetic energy of the object will be _____.

5. As the velocity of an object decreases, the object has (more / less) kinetic energy.

6. If two objects have the same velocity, the object with more mass will have (more / less) kinetic energy.

Study the graphs.
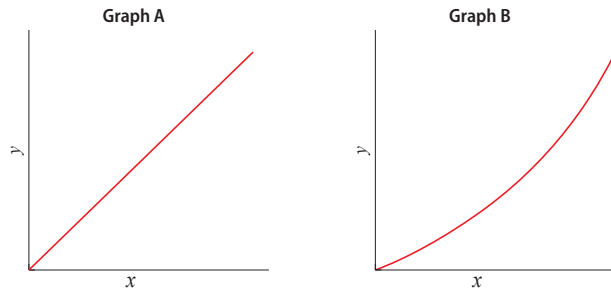
Graph A   Graph B

7. Write the letter of each graph next to the term that describes it.

   _____   proportional

   _____   not proportional

8. When two variables are proportional, they change by the same factor. Which graph would represent variables that are proportional?

   graph A   graph B

   This graph would represent the relationship between kinetic energy and (mass / velocity).

9. Sometimes, two variables do not change at a constant rate. Which graph would represent these variables?

   graph A   graph B

   This graph would represent the relationship between kinetic energy and (mass / velocity).

10. On graphs, the variable plotted on the x-axis is the (independent / dependent) variable, and the (independent / dependent) variable is plotted along the y-axis

11. A car increases its velocity from 30 km/hr to 60 km/hr. The velocity has changed by a factor of 2. By what factor has the car's kinetic energy changed?

   2   4   30   60

   If the kinetic energy of the car was originally 7,000 J, what is the car's kinetic energy after it speeds up?

   7,000 J   14,000 J   28,000 J   49,000 J

12. A(n) _____ is a possible explanation for something that a scientist has observed.

   variable   fact   hypothesis   inquiry