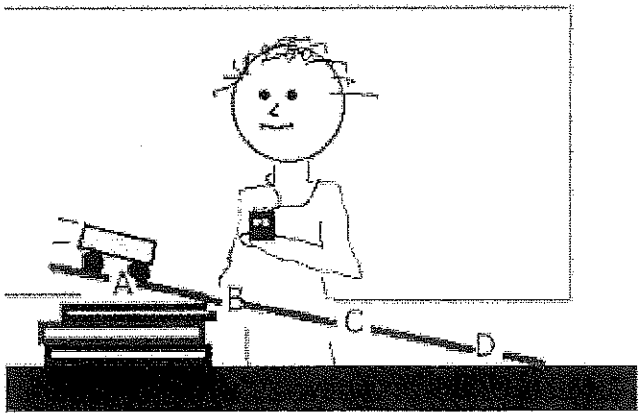
Potential and Kinetic Energy Practice Problems

Name: _____ Date: _____ Hour: _____

Kinetic Energy

1. What is the formula for calculating kinetic energy? What does each variable stand for? What units are used to measure each variable?

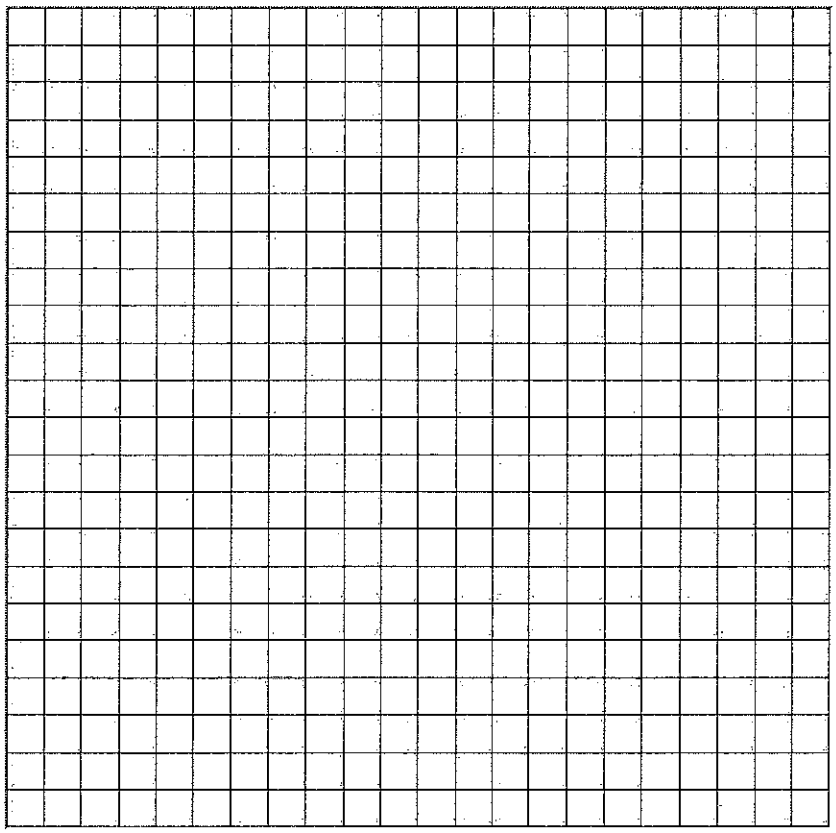
2. A 5-kg cart is moving down a ramp at 40 m/s. What is the cart's kinetic energy?



3. How does the cart's kinetic energy change as the velocity changes? Calculate the kinetic energy of the 5-kg cart for each of the velocities in the table below.

Velocity (m/s)	Kinetic Energy (J)
40 m/s	
20 m/s	
10 m/s	
5 m/s	
0 m/s	

4. Create a graph of velocity versus kinetic energy.



5. Write a claim and provide evidence from your graph to answer the following question. How does kinetic energy change as the cart's velocity changes?
   Claim:

   Evidence:

6. Using the graph, estimate how much kinetic energy the cart would have if its velocity were 30 m/s.

Gravitational Potential Energy

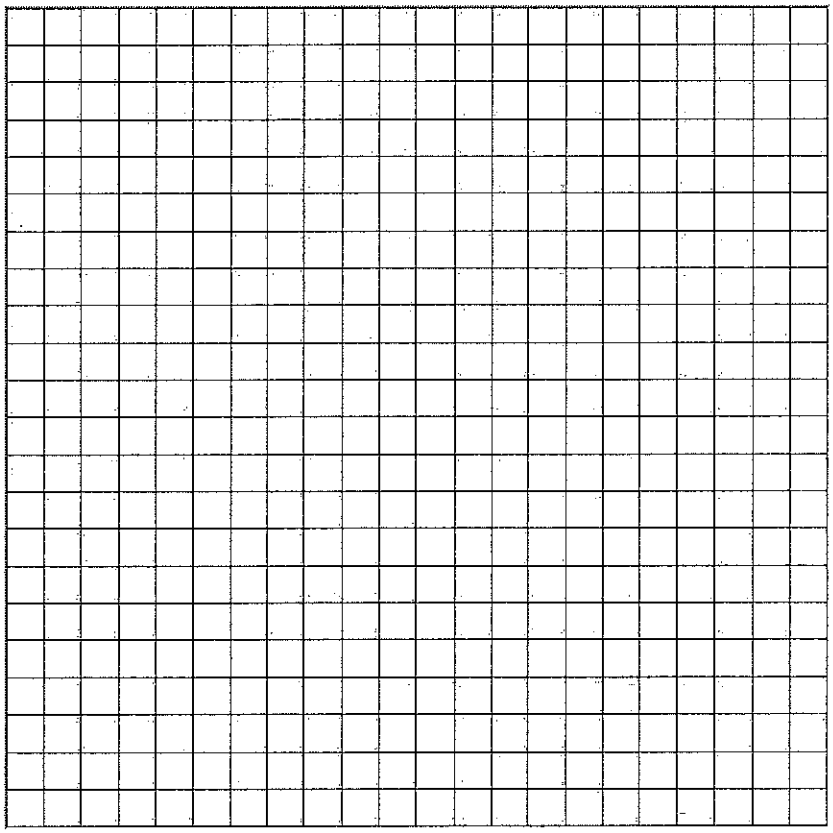
7. What is the formula for calculating gravitational potential energy? What does each variable stand for? What units are used to measure each variable?

8. A 1-kg rock is at a height of 100 meters. What is the rock's gravitational potential energy?

9. How does the rock's gravitational potential energy change when the height is changed? Calculate gravitational potential energy of the 1-kg rock for each of the heights in the table below.

Height (m)	Gravitational Potential Energy (J)
100 m	
50 m	
20 m	
1 m	
0 m	

10. Make a graph of height versus energy.



11. Write a claim and provide evidence from your graph to answer the following question. How does gravitational potential energy change as the rock's height changes?
    Claim:

    Evidence:

Mixed Practice Problems

12. A 60-kg person walks from the ground to the roof of a 74.8 m tall building. How much gravitational potential energy does she have at the top of the building?

13. The person's 30-kg daughter walks with from the ground to the roof (74.8 m). How much gravitational potential energy does the daughter have at the top of the building?

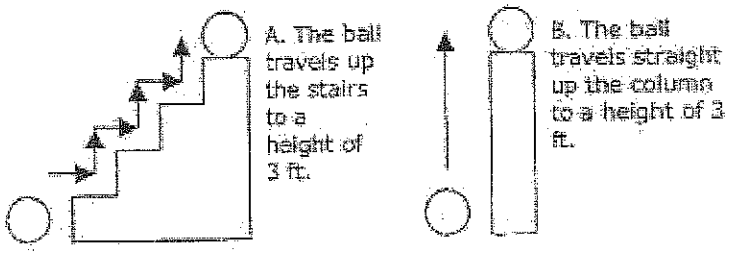
14. In questions 12 and 13, does the person or their daughter have more potential energy? Why?

15. A 70-kg man is running at a speed of 5 m/s. What is his kinetic energy?

16. A 1400-kg car is driving at a speed of 5 m/s. How much kinetic energy does the car have?

17. In questions 15 and 16, did the car or the man have more kinetic energy? Why?

18. In which scenario does the ball have more gravitational potential energy when sitting at the top. Why?



Challenge Questions

19. A car is lifted a certain distance in a service station and therefore has potential energy relative to the floor. If it were lifted twice as high, how much potential would it have?

20. Consider a ball thrown straight up in the air. At what position is its kinetic energy maximum? Where is its gravitational potential energy at a maximum?