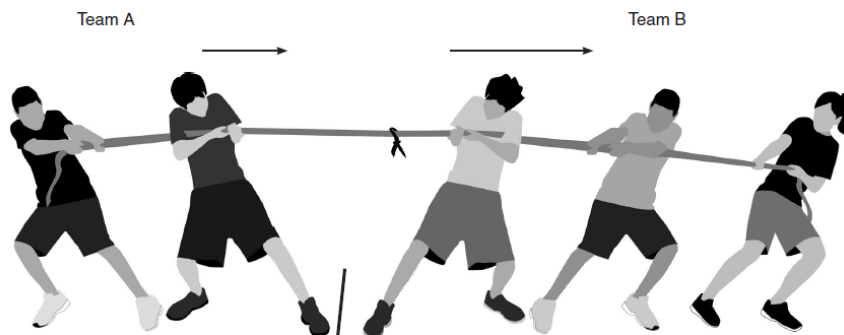


Name \_\_\_\_\_

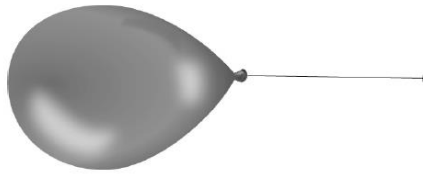
Class Period: \_\_\_\_\_

### **Objective 2: Force, Motion, and Energy**

1. A motorcycle traveling 35 mi/hr slows as it approaches a stop sign. This is an example of \_\_\_ (8.6B)
  - a. acceleration
  - b. distance
  - c. speed
  - d. velocity

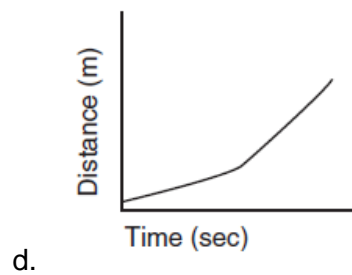
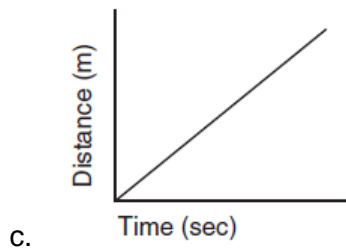
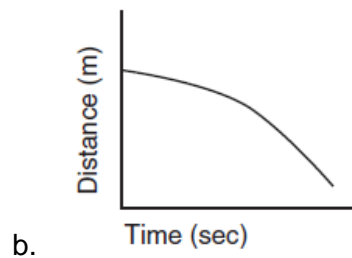
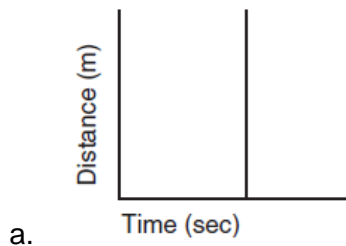


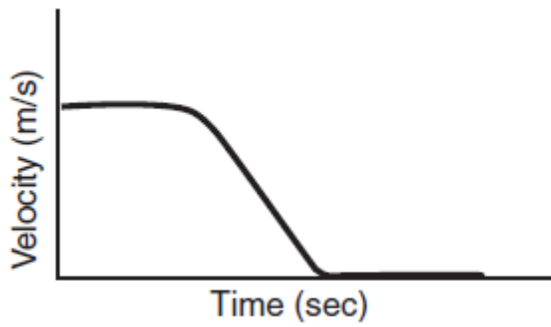
2. In the picture above, two teams of students are playing tug-of-war. Each team is pulling in the opposite direction, but both teams are moving in the same direction. Which of the following best describes the forces in this situation? (8.6A)
  - a. The forces are balanced and the net force is zero.
  - b. The forces are balanced and Team A is exerting a greater force.
  - c. The forces are unbalanced and Team A's force is greater.
  - d. The forces are unbalanced and Team B's force is greater.
3. A bike racer travels 17 mi/hr in a southerly direction. This is an example of — (8.6B)
  - a. distance
  - b. speed
  - c. velocity
  - d. acceleration



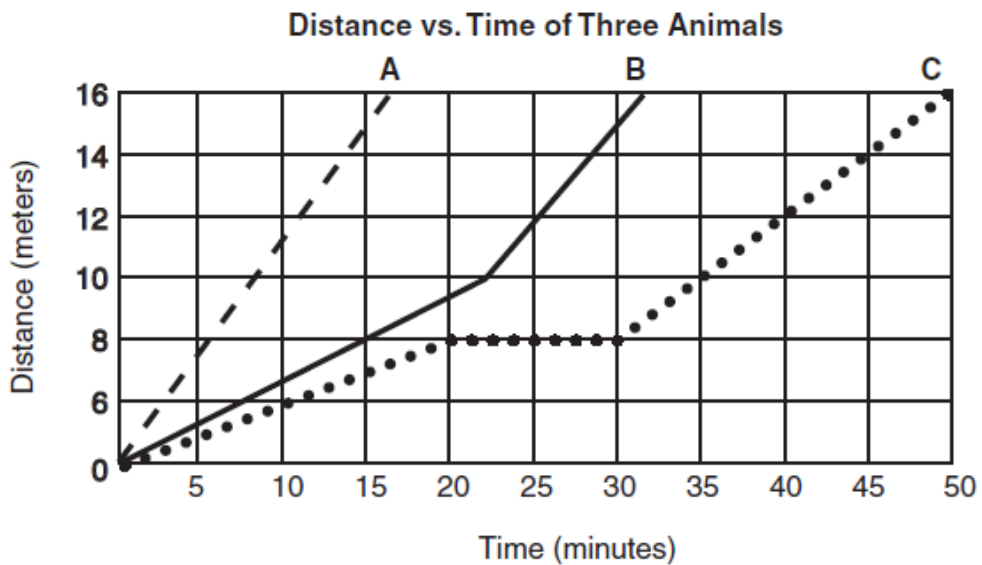
4. When the air is released from a balloon, the air moves out one end and the balloon moves in the other direction. Which statement does this situation best illustrate? (8.6C)
- a. What goes up must come down.
  - b. For every action there is an equal and opposite reaction.
  - c. The shape and size of an object affect air resistance.
  - d. The acceleration due to Earth's gravity is  $9.8 \text{ m/s}^2$ .

5. Which graph best represents a car traveling down the freeway at a constant speed? (6.8D)





6. The graph most likely applies to which activity? (6.8D)
- A basketball bouncing up and down on the ground
  - A football at rest, then kicked toward the goalpost
  - A car traveling at a constant speed, then stopping as brakes are applied
  - A person riding a bicycle in a straight line down a level road at a constant speed

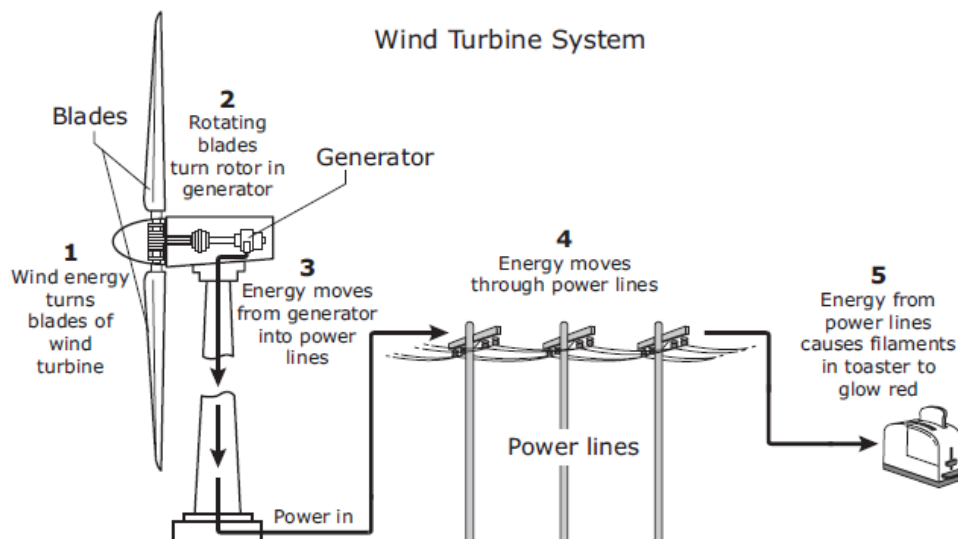


7. What is the average speed of Animal A during the race? (6.8C)
- 1 m/s
  - 5 m/s
  - 16 m/s
  - 32 m/s

Object	Mass (g)
R	250
S	180
T	225
U	290



8. A spring scale is used to pull each of the four objects. Based on the information provided, which object experiences the greatest acceleration when pulled with 8 N of force? (8.6A)
- Object R
  - Object S
  - Object T
  - Object U



9. In the diagram above, a wind turbine is transforming energy from the wind. Between which two steps in the diagram is mechanical energy being converted into electrical energy? (6.9C)
- 1 and 2
  - 2 and 3
  - 3 and 4
  - 4 and 5

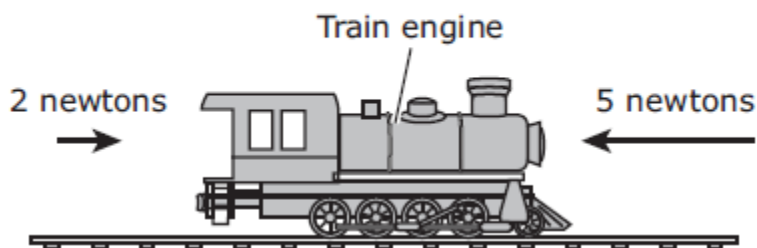
Force (N)	Acceleration (m/s <sup>2</sup> )
10	0.5
20	1.0
30	1.5
40	2.0

10. In a series of controlled experiments, a student measures the force acting on a wheeled cart and the cart's acceleration. The student's data are shown below.

Based on the recorded observations, what is the mass of the cart in kilograms? Record and bubble in your answer on the grid to the right. (8.6C)

				.		
0	0	0	0	0	0	0
1	1	1	1	1	1	1
2	2	2	2	2	2	2
3	3	3	3	3	3	3
4	4	4	4	4	4	4
5	5	5	5	5	5	5
6	6	6	6	6	6	6
7	7	7	7	7	7	7
8	8	8	8	8	8	8
9	9	9	9	9	9	9

Side View of a Toy Train Engine



11. A toy train engine rests motionless on a track. One student begins pushing the engine to the right with a force of 2 newtons. At the same time, another student begins pushing the engine to the left with a force of 5 newtons. Which of the following best describes the resulting motion of the engine? (8.6A)

- It travels left at a constant speed.
- It travels left at an increasing speed.
- It travels right at a constant speed.
- It travels right at an increasing speed.

Segment	During the race, runners . . .
A	. . . wait at the starting line for the starter's signal.
B	. . . speed up on the straight section of the track.
C	. . . change direction as they round the corner of the track.
D	. . . slow down after they cross the finish line.

12. Based on the observations, the runners do not accelerate during — (8.6B)

- a. Segment A
- b. Segments A and C
- c. Segments B and C
- d. Segments C and D

13. Which of the following best describes the energy transformation that occurs in plants during photosynthesis? (6.9C)

- a. Radiant energy is changed into thermal energy.
- b. Chemical energy is changed into thermal energy.
- c. Radiant energy is changed into chemical energy.
- d. Chemical energy is changed into radiant energy.

14. The car shown above uses three different forms of energy. Which of the following identifies the energy transformation represented by the car? (6.9C)

- a. mechanical → chemical → electrical
- b. chemical → electrical → mechanical
- c. electrical → radiant → chemical
- d. radiant → electrical → mechanical





15. A battery is placed inside a handheld lantern. When the light is turned on, the chemical energy of the battery is changed into all of the following forms of energy *except*— (6.9C)
- light energy
  - heat energy
  - mechanical energy
  - electrical energy

16. A boy pulls on his dog's leash, but the dog does not move. Since the dog did not move, no — (7.7A)

- Friction was done on the dog
- Force was done on the dog
- Pressure was done on the dog
- Work was done on the dog

17. A 50 Newton box is moved a distance of 12 meters. How much work was done on the box? Record and bubble in your answer on the grid to the right. (7.7A)

				.		
0	0	0	0	0	0	0
1	1	1	1	1	1	1
2	2	2	2	2	2	2
3	3	3	3	3	3	3
4	4	4	4	4	4	4
5	5	5	5	5	5	5
6	6	6	6	6	6	6
7	7	7	7	7	7	7
8	8	8	8	8	8	8
9	9	9	9	9	9	9

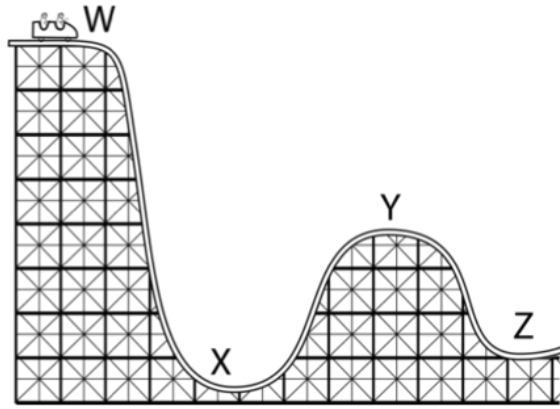
18. What happens to the potential energy of an object as it falls? (6.8A)

- Potential energy increases
- Potential energy is destroyed
- Potential energy transforms (changes) to kinetic energy
- None of the above

Height of Marble	Depth of Hole
50 cm	.5 cm
100 cm	1.0 cm
150 cm	1.5 cm

19. As they were investigating potential and kinetic energy, students dropped a marble into a tray of flour and recorded data. What was the question of the experiment? (6.8A)

- What will a marble do when it is dropped into a powdery substance?
- When an object has more potential energy, will it transform into more kinetic energy?
- Will the mass of an object affect the force of kinetic energy?
- Does a falling object have kinetic energy?



20. At which point on the roller coaster does the car have the most kinetic energy? (6.8A)

- a. W
- b. X
- c. Y
- d. Z

21. Javelinas need strong leg muscles to help provide enough force for them to accelerate to high speeds. This fast movement can help Javelinas escape from predators and reach the safety of the pack. If a javelina runs 42 meters in 6 seconds, what is its average speed? (6.8C)

- a. 6 m/s
- b. 7 m/s
- c. 48 m/s
- d. 252 m/s

22. According to Newton's Law of Inertia, a ball that is rolling across the ground will \_ (8.6C)

- a. Continue to roll indefinitely because there is no force acting on it
- b. Continue to roll unless there is an opposing force acting on it
- c. Will stop unless there is an opposing force acting on it
- d. Continue to roll regardless of the forces acting on it

Object	Mass	Acceleration
Soccer Ball	0.45 kg	5 m/s <sup>2</sup>
Tennis Ball	0.055 kg	100 m/s <sup>2</sup>
Marble	0.015 kg	1000 m/s <sup>2</sup>

23. Examine the table above. Which of the objects is producing the greatest force? (8.6C)

- a. Soccer ball
- b. Tennis ball
- c. Marble
- d. Their accelerations are all equal