Name:_____ Date:_____ Group: _____

READING SCIENCE

Forcibly Speaking

(Lexile 1100L)

1 Every day, we are surrounded by a large variety of forces. Professional football players are able to make touchdowns and field goals because the force of gravity keeps the ball from floating away into space. A stretched rubber band snaps quickly back into place because of the elastic force that restores its shape. The school bus is able to stop at a red light because of the friction force exerted on the brakes. And bodybuilders are able to bench-press hundreds of pounds at a time because of the muscle force supplied by their biceps. These are just a small sampling of the millions of forces that allow us to function safely and effectively in every area of our daily lives.

2 A force is simply defined as a push or a pull. It is what causes an object to accelerate, decelerate, or change its direction. A force can be either balanced or unbalanced. Balanced forces are equal in size, but opposite in direction, which means that no change in the motion of the object will result. The opposing forces work to effectively cancel each other out. Unbalanced forces produce a net force on the matter they are acting upon because the forces are not equal in size or direction. Application of a net force will result in a change in an object's motion.

3 A simple method to determine if the forces acting on a body are unbalanced is by looking at its acceleration. An object will be speeding up, slowing down, or changing directions if it is accelerating. If the object is accelerating, the forces acting upon it must be unbalanced. If there is no acceleration, the forces applied to the object must be balanced.

4 One example of unbalanced forces could be a car that has run out of gasoline and must be pushed. The car will remain stationary until the force used to push it is greater than the friction between the road and the tires. A second example of unbalanced forces is when a baseball is being caught by a glove. The force the glove exerts on the ball must be greater than the force the ball exerts on the glove for the ball to come to a stop.

5 Unbalanced forces are part of everything you do. To make something, including yourself, move from one location to another, there must be a net force greater than zero, which means unbalanced forces must be present.

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1 Complete the following analogy:

Changes in acceleration:unbalanced force as _____:balanced force

A no acceleration

B stretched rubber band

C gravity

D friction

2 Which of the following is an example of an unbalanced force?

A A computer on a table

B A man leaning against a wall

C An athlete serving a volleyball

D Fruit in a bowl

3 When looking at a force diagram, how can you tell if the forces are unbalanced?

A They are equal in size and/or direction.

B The force of gravity makes them unbalanced.

C The two forces are not equal in size and/or direction.

D You can only tell that the forces are unbalanced if there is a change in motion.

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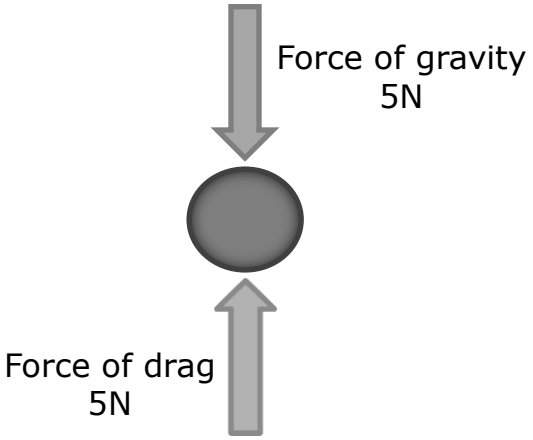

4 The diagram shows the forces acting on an object that is falling from a great height. Based on the information in the passage, what change will happen to this object's motion while it is still falling?

A The object will speed up

B The object will slow down

C The object will change direction

D No change will occur

5 The term **net force** was used in paragraphs 2 and 5. Which of the following could be a definition of net force?

A The force between sliding surfaces

B An overwhelming force

C The sum of all of the forces acting on an object

D The force on objects with large masses