SECTION: WHAT IS A FORCE?

1. force: a push or a pull exerted on an object in order to change the motion of the object; force has size and direction
2. newton: the SI unit for force (symbol, N)
3. net force: the combination of all of the forces acting on an object

SECTION: FRICTION: A FORCE THAT OPPOSES MOTION

1. friction: a force that opposes motion between two surfaces that are in contact

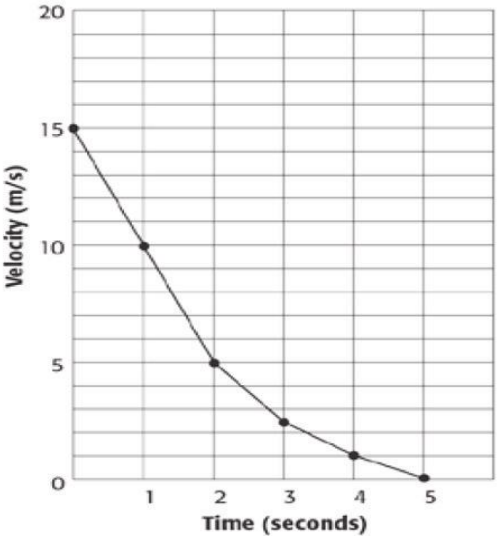
SECTION: GRAVITY: A FORCE OF ATTRACTION

1. gravity: a force of attraction between objects that is due to their masses
2. weight: a measure of the gravitational force exerted on an object; its value can change with the location of the object in the universe
3. mass: a measure of the amount of matter in an object

Section Review

SECTION: MEASURING MOTION

1. Sample answer: Motion is the change in position of an object relative to a reference point. Acceleration is the change in velocity over time.
2. Sample answer: The cat is moving with a speed of 1 m/s. The cat is moving with a velocity of 1 m/s to the east.
3. C
4. D
5. Speed does not include direction; velocity does.
6. the distance traveled and the time taken to travel that distance
7. Acceleration is the rate at which velocity changes.
8. 1.5 m/s
9. 3 m/s^2
10. It would be important to know the velocity because velocity includes direction. Knowing only the speed of a tornado would not tell the direction that the tornado is traveling. Knowing a tornado's direction of travel would allow people to avoid or escape its path.
11. The graph should show that the wolf has negative acceleration (slows down) until it comes to a stop.



SECTION: WHAT IS A FORCE?

1. Sample answer: A force is a push or a pull that can change the motion of an object. The net force is the combination of all forces acting on an object.
2. D
3. Unbalanced forces occur when the net force on an object is not 0 N; balanced forces occur when the net force equals 0 N. Unbalanced forces cause a change in an object's motion; balanced forces cause no change.
4. Sample answer: Pulling on the door of a cabinet causes the door to open.
5. Sample answer: A book resting on a table has balanced forces acting on it.
6. For any push to occur, something has to receive that push. So, the force of the push acts on the object receiving the push. The same is true for any pull.
7. 10 N east
8. If you do not know the directions of the forces, you won't know whether to add the forces or to subtract them.
9. Sample answer: Your feet push on the pedals, your body pushes down on the seat, and your fingers pull on the brakes.

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