

Forces and Motion

Underlined words and phrases are to be filled in by students on the Note-taking Worksheet

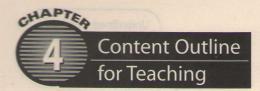
Section 1 Describing Motion

- A. Motion is relative to a reference point that is relevant for the situation.
- B. Motion involves a change of position.
 - 1. Position—how far an object is from a reference point; location
 - 2. <u>Distance</u>—the difference between the final position and the initial position if motion is in a straight line
 - 3. <u>Displacement</u>—the direction and distance between the final position and the starting position
- C. The distance traveled divided by the time needed to travel that distance is speed.
 - 1. Average speed is the total distance traveled divided by the total time.
 - 2. Motion can be plotted on a graph with time on the horizontal axis and distance on the vertical axis.
- D. Velocity—speed in a particular direction; can change as an object moves along;
- **E.** A change in velocity divided by the amount of time over which the change occurs is **acceleration**; the change in velocity can be due to a change in speed, a change in direction, or both.

Discussion Question.

How do distance and displacement differ? Distance measures straight-line position change; displacement includes the direction as well as the distance of a position change.





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Section 2 Forces

- A. Force—a push or a pull with size and direction
- **B.** The motion of an object <u>changes</u> when a force acts on it; force causes acceleration.
 - 1. The more mass an object has, the greater its **inertia**, or tendency to <u>resist</u> a change in motion.
 - 2. <u>Balanced</u> forces—two equal forces that cancel each other because they are acting in opposite directions on the same object; the object's motion does not change
 - **3.** An object's motion will change if <u>unbalanced</u> forces act on it; <u>net</u> force is the difference between two forces.
- C. Friction—a force that resists motion between two touching surfaces
 - 1. <u>Friction</u> is present in almost all motion.
 - 2. Air resistance—friction of air
- D. <u>Gravity</u>— the pull that all matter exerts on other matter; it acts between all objects that have mass
 - 1. Weight is a measure of the strength of Earth's gravitational pull.
 - 2. Mass is the amount of matter in an object.

Discussion Question.

What is the relationship between mass and inertia? Objects with greater mass have greater inertia.