

Forces in Nature

1. State an everyday life example in which a force causes an object to
 - a. decrease its speed
 - b. become compressed
 - c. become stretched
2. You are facing eastward, standing in front of a gate that can swing. In what direction is your force if you pull on the gate? Push on the gate?
3. Assume you are given an empty matchbox, a magnet, a metal paper clip, an elastic, and a balloon. Come up with 2 ways you could make the matchbox move with or without touching the matchbox with the given materials. (Hint: You may place items in the box)
4. List the fundamental forces in order from the strongest to the weakest.
5. In what way is gravitational force unique among the fundamental forces?
6. Which of the fundamental forces do you notice most often in your everyday activities? Give some examples to illustrate your answer.
7. Draw a sketch to show the force of gravity, the normal force, tension, and friction in each case.
 - a. A toboggan is on a horizontal surface being pulled by a rope that is also horizontal.
 - b. A toboggan is being pulled by a rope up a hill with the rope parallel to the hillside.
8. Describe, with examples, the difference between a “contact” force and an “action-at-a-distance” force.
9. For each situation described below, draw a system diagram and an FBD (free body diagram). Be careful when deciding what forces are acting on each object. If you cannot think of a cause for the force, the force may not even exist.
 - a. A binder is resting on your desk.
 - b. A *tennis ball* is falling through the air from the server’s hand. Neglect air resistance.
 - c. A fully loaded *dog sled*, moving slowly along a flat, snowy trail, is being pushed horizontally by the sled owner while being pulled horizontally by dogs attached to it by rope.