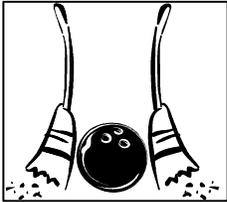Name: _____ Period: _____ Date: _____

Learning to Draw Force Diagrams

Each situation below has a description and a sketch or cartoon. <u>In the blank space to the right</u> of each cartoon, draw a diagram showing the forces that act on the <u>underlined object</u>. For now, we will only deal with horizontal *or* vertical forces, not both in the same situation. Remember:
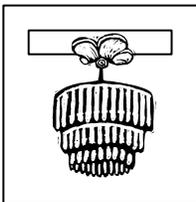
- Newton's First Law: an object will accelerate *if and only if* the forces on it are unbalanced.
- Most forces require *physical contact* between two objects. The *only exceptions* that we will study are gravity and electric/magnetic forces. You can't push an object you aren't touching!
- *Label* your forces so readers will know what object is responsible for exerting them.

Don't show forces acting on the other objects – just the <u>underlined</u> one.
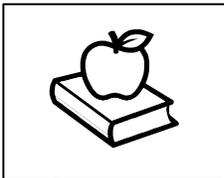
1. Horizontal: A <u>bowling ball</u> rests on the ground. Students push in opposite directions with brooms, and the strengths of their pushes are equal. The ball just sits there.
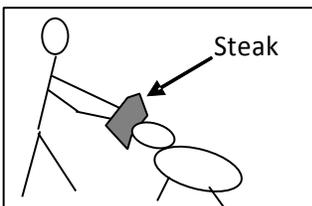
2. Vertical: A <u>chandelier</u> is hanging from the ceiling by a chain, and does not show any sign of movement.
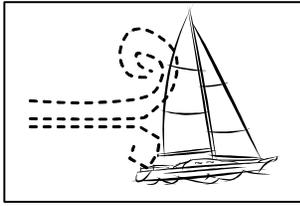
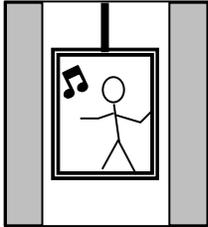3. Vertical: An <u>apple</u> sits, motionless, on top of a book.

4. Horizontal: A dog found a juicy <u>piece of steak</u>, and the man is trying to pull it back from the dog. Neither the dog nor the man is winning right now.
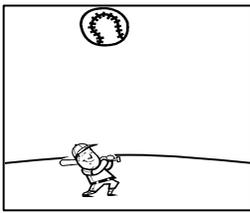
Steak

5. Horizontal: A <u>sailboat</u> picks up speed as a big gust of wind comes along and pushes the boat through the water.

6. Vertical: An <u>elevator</u> speeds up as it starts heading downstairs.

7. Vertical: The batter at a baseball game has just hit a foul ball. Right now, the <u>ball</u> is flying straight up and getting slower as it climbs.

8. Horizontal: A curling thrower has just released her team's <u>stone</u> down the very slippery ice sheet. The stone slides along the ice at a constant velocity, with the thrower watching on.

9. Horizontal: A truck with a rope and a man are trying to get a <u>car</u> out of some deep snow. The car is moving at a constant speed to the right.

(Snow)