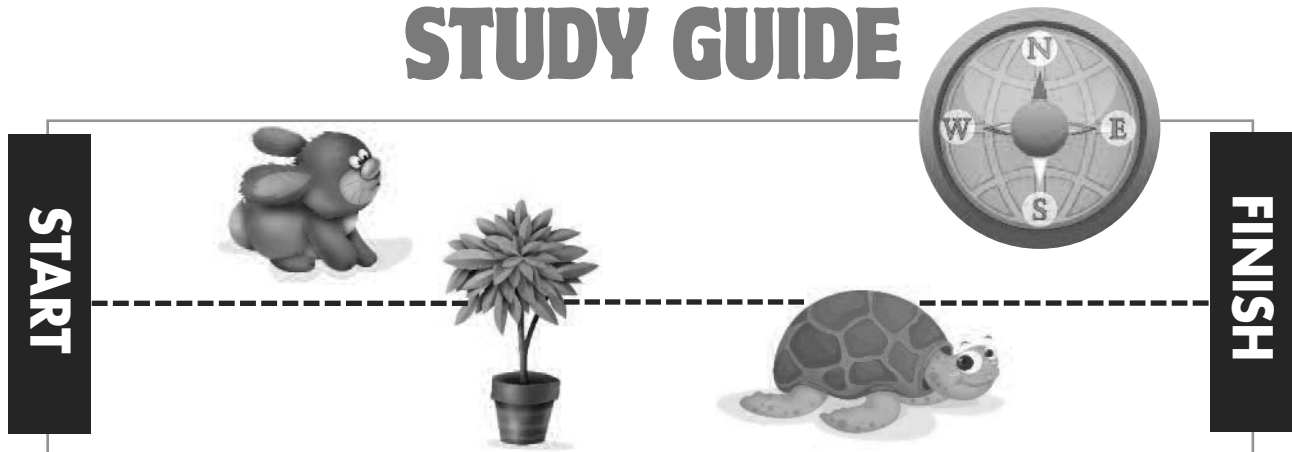


# FORCE, MOTION, AND ENERGY STUDY GUIDE

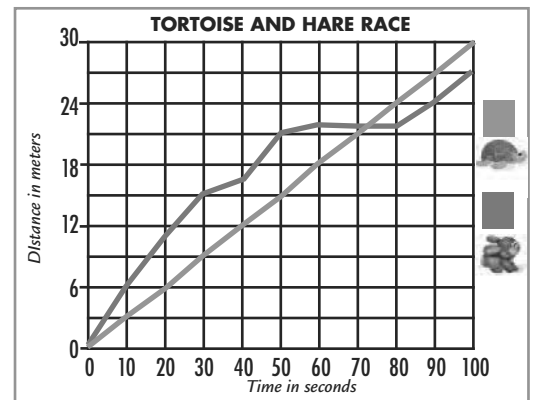


**Position** can be described by locating an object relative to another object or the background.

- The hare is east of the tortoise.
- The tortoise is behind the hare.
- The tortoise is north of the large plant.

**Speed** is a measure of motion.

- Interpret the line graph to see who won the 30 meter race. Who made it to 30 meters first?
- The graph shows that “Slow and Steady” won the race. The turtle’s speed was constant.
- You can interpret the following about the hare from this graph:
  1. He began with a faster speed than the tortoise.
  2. The hare decreased his speed after 15 meters.
  3. The hare stopped to rest after 50 seconds and started to move again 20 seconds later.



**A force is a push or a pull.** The greater the mass of an object, the less effect a force will have on it.

Examples of forces are:

- Gravity is the attraction between objects. Gravity can only be felt when at least one of the objects is massive, like Earth. Earth pulls you toward its center.
- Friction is the resistance to motion created by two objects moving against each other. Friction creates heat. Rub your hands together to feel the heat caused by friction.

Forces can cause or change motion in the following directions: up, down, forward, and backward.

Forces can also increase or decrease speed.



**Energy exists as potential or kinetic.**

- **Potential Energy** is stored energy. If an object has potential energy, it has the potential to move. Examples of objects with potential energy are a roller coaster at the top of a hill and a ball about to be dropped.
- **Kinetic Energy** is the energy of motion. Moving objects have kinetic energy. Examples of kinetic energy are a roller coaster speeding down a hill and a ball falling to Earth.