

## Forces and Their Effects

Forces are all around us! A force is a push or a pull that can change how something moves, its direction, or even its shape. Some forces pull objects toward the Earth, like gravity. Others, like friction, slow things down when two surfaces rub together. When you push a door open, you are using an applied force. When an object floats in water, it experiences upthrust, which pushes it up. Air resistance and water resistance are forces that slow things down as they move through air or water. Surfaces also provide a normal force, which is the support force that acts upward on an object resting on them. Scientists often use force diagrams (also called free-body diagrams) to show all the forces acting on an object using arrows.

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### Fill in the Blank

Fill in the blank with the correct words:

1. The force that pulls objects toward the center of the Earth is called \_\_\_\_\_.
  2. When you push or pull an object, you are using an \_\_\_\_\_.
  3. The force from a surface that supports an object resting on it is the \_\_\_\_\_.
  4. \_\_\_\_\_ is the upward force that makes objects float in water or air.
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1. \_\_\_\_\_ is a force that opposes motion between two surfaces that touch.

**Word bank:** friction, gravity, upthrust, normal force, applied force

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### Multiple Choice Questions

Choose the correct answer from the choices for each question:

1. Which force acts upward on an object floating in water?
  - a) Gravity
  - b) Upthrust
  - c) Friction
  - d) Air resistance

2. What is a force diagram (free-body diagram)?
- a) A list of forces
  - b) A picture of an object only
  - c) A drawing with arrows showing forces acting on an object
  - d) A graph of speed
3. Which force slows down a car as it moves through the air?
- a) Gravity
  - b) Water resistance
  - c) Air resistance
  - d) Normal force
4. If two forces on an object are equal in size and opposite in direction, the forces are:
- a) Unbalanced
  - b) Balanced
  - c) Applied
  - d) Frictional
5. What type of force is created when you slide a book across a table and it slows down?
- a) Gravity
  - b) Upthrust
  - c) Friction
  - d) Air resistance
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### **Open-Ended Questions**

Answer the following questions in complete sentences:

1. Explain what happens to a skydiver as they fall through the air and why air resistance is important.
2. Describe a situation where upthrust and gravity are balanced. What happens to the object?
3. Why do scientists use force diagrams (free-body diagrams) when studying motion?