# Newton's First and Second Laws (pages 349–352)

## The First Law of Motion (pages 349–350)

***Key Concept:*** **Isaac Newton's first law of motion states that an object at rest will remain at rest, and an object moving at a constant velocity will continue moving at a constant velocity, unless it is acted upon by an unbalanced force.**

- Isaac Newton studied motion in the 1600s.

- Newton's first law of motion says that a moving object will not speed up, slow down, or stop unless it is acted on by an unbalanced force. It also says that an object that is not moving will not start moving unless it is acted on by an unbalanced force.

- Objects resist a change in motion. This is called **inertia** (in UR shuh). All objects have inertia. The more mass an object has, the more inertia it has.

*Answer the following questions. Use your textbook and the ideas above.*
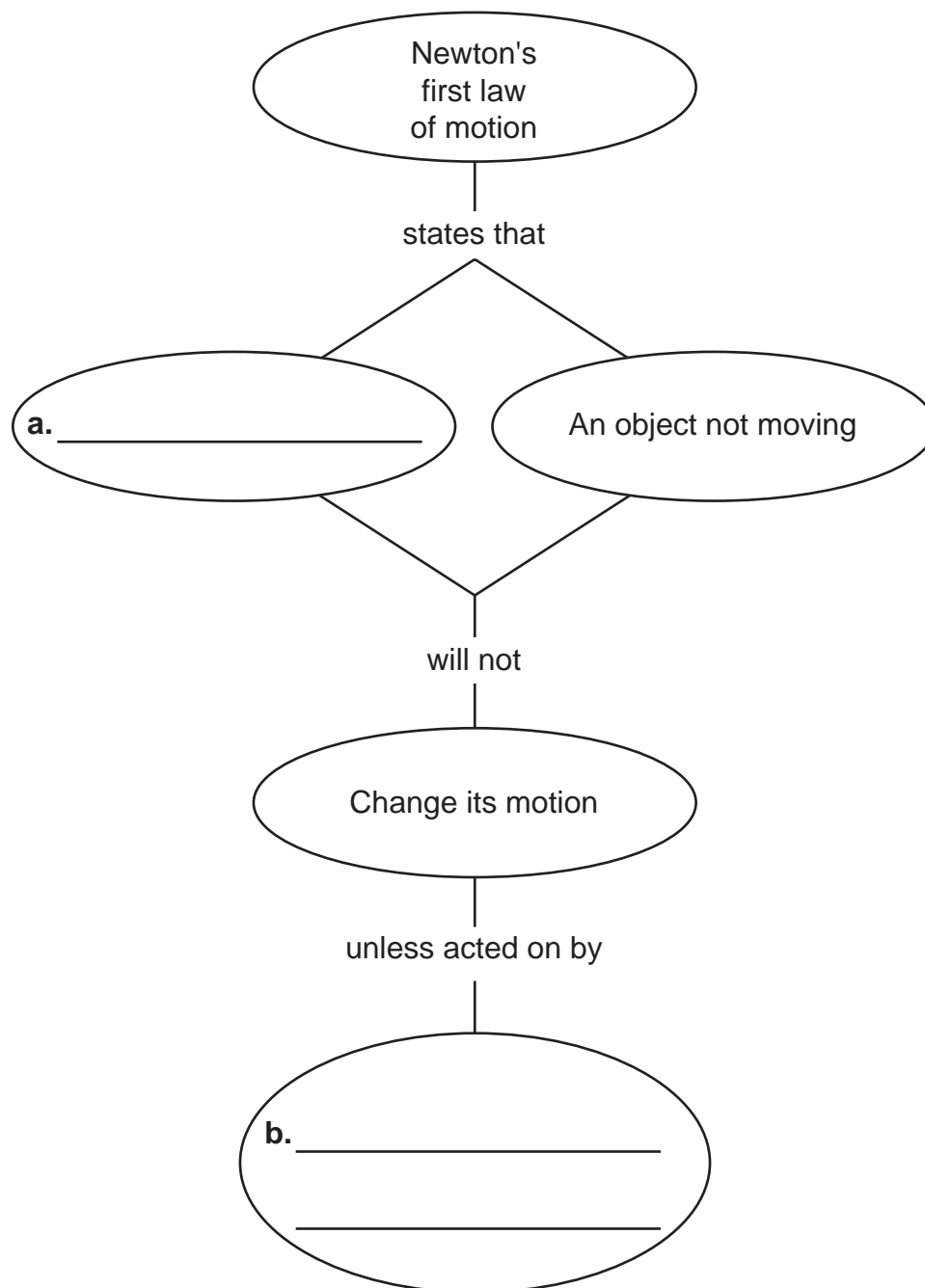
**1.** Look at the two pictures. Circle the letter of the picture that shows the object with greater inertia.



**a.**          **b.**
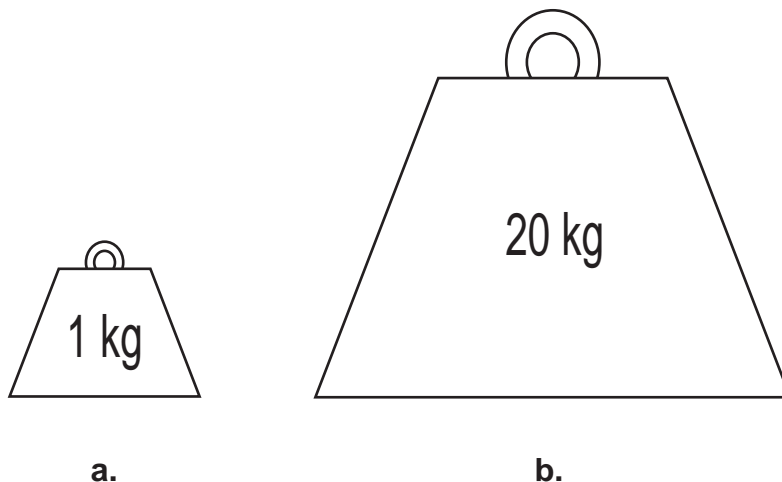
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**2.** Read the words in the box. Use the correct words to fill in the blanks in the concept map about Newton's first law.

| A moving object    Inertia    An unbalanced force |
| --- |

Newton's first law of motion

states that

a. _____

An object not moving

will not

Change its motion

unless acted on by

b. _____
_____

# The Second Law of Motion (pages 350–352)

***Key Concept:* According to Newton's second law of motion, acceleration depends on the object's mass and on the net force acting on the object.**

- An unbalanced force changes an object's motion. Changing motion is acceleration.

- Newton's second law of motion says that an object's acceleration depends on two things: the size of the force and the mass of the object.

- Newton's second law can be shown in this equation:

$$\text{Acceleration} = \frac{\text{Net Force}}{\text{Mass}}$$

*Answer the following questions. Use your textbook and the ideas above.*

**3.** Is this sentence true or false? An object's acceleration depends on its mass and the size of the force acting on it. _____

**4.** A student used this formula to find the acceleration of an object:

$$\text{Acceleration} = \frac{15\,\text{N}}{5\,\text{kg}}$$

   **a.** How much force is acting on the object?

   _____

   **b.** What is the object's mass? _____

   **c.** What is the object's acceleration? Show your work below. _____ m/s$^2$