

Key Concept Builder 

LESSON 2

Newton's First Law

Key Concept What is Newton's first law of motion?

Directions: Work with a partner on the following thought experiments. Answer each question or respond to each statement on the lines provided.

- 1. Suppose** the universe were completely empty except for one object—a solid sphere moving through space at a speed of 100 km/s. What sort of path would the object be moving in? Explain your answer.

- 2.** How long will it take for the object to come to a stop? Explain your answer.

- 3. Imagine** another universe that is completely empty except for a large solid sphere at rest. Suddenly, an identical sphere pops into existence 1 trillion kilometers away. What will happen?

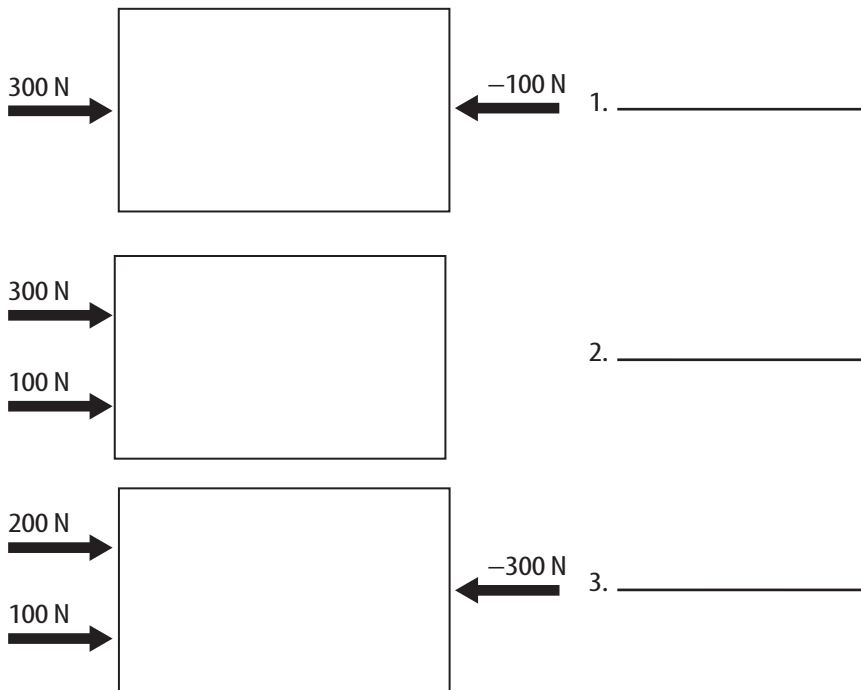
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LESSON 2

Newton's First Law

Key Concept How is motion related to balanced and unbalanced forces?

Directions: The diagrams below represent sliding forces applied to a large box. Write the net force applied to each box on the line next to each diagram.



Directions: On each line, write the term that correctly completes the sentence.

4. Because forces have directions, you must specify a(n) _____ when you combine forces.
5. A force exerted in that direction is _____, and a force exerted in the opposite direction is _____.
6. The combination of forces acting on an object is the _____.

Key Concept Builder **LESSON 2****Newton's First Law****Key Concept** How is motion related to balanced and unbalanced forces?

Balanced forces produce a lack of motion or a steady velocity. Unbalanced forces put a stationary object into motion (produce an acceleration) or change the velocity of a moving object.

Directions: *On the line before each item, write B if it represents balanced forces or U if it represents unbalanced forces.*

- _____ 1. a book lying on a table
- _____ 2. an airplane cruising in level flight
- _____ 3. a rock falling from a cliff
- _____ 4. a bridge collapsing in an earthquake
- _____ 5. a train rounding a curve at a steady speed
- _____ 6. a man sitting on a park bench
- _____ 7. the space shuttle taking off
- _____ 8. a satellite in orbit
- _____ 9. a car maintaining a constant speed on a straight road
- _____ 10. an airplane landing

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LESSON 2

Newton's First Law

Key Concept What effect does inertia have on the motion of an object?

Directions: Read the scenario. Then answer the question on the lines provided.

At a bowling alley, people bowl while a storm howls outside. Suddenly, a side door of the building is blown open and a strong wind sweeps through the alley. The wind scatters many objects, but the bowling balls rolling down the lanes are unaffected.

1. Why did the wind entering the bowling alley scatter many objects but have no effect on the bowling balls?

Directions: On each line, write the term that correctly completes each sentence.

2. The tendency of an object to resist a change in its motion is called _____.
3. That tendency and the force of _____ affect an object's motion.