

**Content Practice A****LESSON 1****Gravity and Friction**

**Directions:** On the line before each definition, write the letter of the term that matches it correctly. Each term is used only once.

- |   |                            |
|---|----------------------------|
| _____ 1. a push or a pull on an object                        | <b>A.</b> noncontact force |
| _____ 2. push or pull on one object by another object         | <b>B.</b> friction         |
| _____ 3. applied without touching                             | <b>C.</b> electric force   |
| _____ 4. makes hair stand on end                              | <b>D.</b> gravity          |
| _____ 5. keeps you from floating away                         | <b>E.</b> lubricant        |
| _____ 6. makes a compass needle point north                   | <b>F.</b> force            |
| _____ 7. unit of mass   | <b>G.</b> newton           |
| _____ 8. unit of force or weight                              | <b>H.</b> contact force    |
| _____ 9. resists the motion of two surfaces that are touching | <b>I.</b> magnetic force   |
| _____ 10. reduces friction                                    | <b>J.</b> kilogram         |

**Content Practice B**

**LESSON 1**

**Gravity and Friction**

**Directions:** Answer each question or respond to each statement on the lines provided.

1. **Define** the terms below.

a. force \_\_\_\_\_

b. contact force \_\_\_\_\_

c. noncontact force \_\_\_\_\_

2. What are three noncontact forces?

\_\_\_\_\_

3. What are the units for mass and weight?

\_\_\_\_\_

4. What is the difference between mass and weight?

\_\_\_\_\_

\_\_\_\_\_

5. **Explain** how the gravitational force between two objects is affected by their mass and the distance between them.

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

6. What is friction?

\_\_\_\_\_

7. What are the three kinds of friction discussed in the lesson?

\_\_\_\_\_

\_\_\_\_\_

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**Content Practice A****LESSON 2****Newton's First Law**

**Directions:** On each line, write the term from the word bank that correctly completes each sentence. Some terms may be used more than once.

**balanced**      **constant**      **direction**      **inertia**      **motionless**  
**net force**      **reference direction**      **straight**      **unbalanced**      **velocity**

1. The combination of all forces acting on an object is the \_\_\_\_\_.
2. Because forces have a(n) \_\_\_\_\_, a(n) \_\_\_\_\_ must be specified when forces are combined.
3. Forces that combine to produce a(n) \_\_\_\_\_ of zero are \_\_\_\_\_; for a nonzero quantity, they are \_\_\_\_\_.
4. Newton's first law of motion states that if zero force is acting on an object at rest, the object will continue to be \_\_\_\_\_.
5. The same law states that a moving object subjected to zero force will continue in a(n) \_\_\_\_\_ line at a(n) \_\_\_\_\_ speed.
6. A(n) \_\_\_\_\_ set of forces cause a moving object to change its \_\_\_\_\_.
7. The tendency of an object to resist a change in its motion is called \_\_\_\_\_.

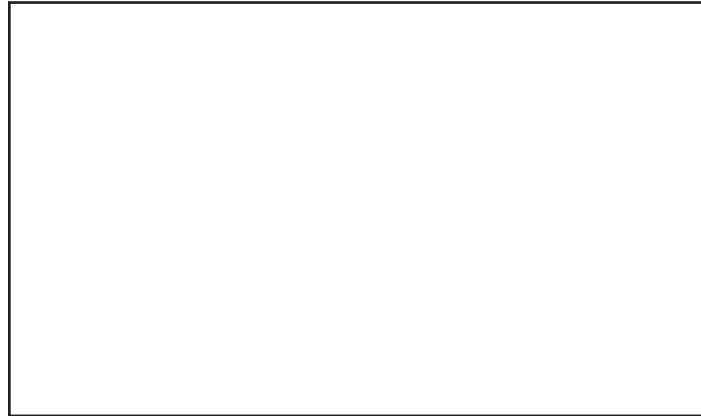
**Content Practice B**

**LESSON 2**

**Newton's First Law**

**Directions:** In the box below, draw arrows showing a positive force of 400 N and a negative force of 200 N. Use "to the right" as the reference direction. Then write the net force on the line provided.

1. net force: \_\_\_\_\_



**Directions:** Answer each question on the lines provided.

2. How much force would be needed to balance the force represented by the two arrows in the diagram above?

\_\_\_\_\_

3. What are balanced forces? What are unbalanced forces?

\_\_\_\_\_  
\_\_\_\_\_

4. What is Newton's first law of motion?

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

5. What is inertia?

\_\_\_\_\_  
\_\_\_\_\_

**Content Practice A****LESSON 3****Newton's Second Law**

**Directions:** On each line, write the term from the word bank that correctly completes each sentence. Each term is used only once.

<b>acceleration</b>	<b>center</b>	<b>centripetal force</b>	<b>direction</b>	<b>gravity</b>
<b>inertia</b>	<b>mass</b>	<b>newton</b>	<b>speed</b>	<b>straight</b>

1. An object's velocity can be changed by changing its \_\_\_\_\_, its \_\_\_\_\_, or both.
2. A change in velocity over time is called \_\_\_\_\_.
3. The increasing speed of a falling object is caused by \_\_\_\_\_.
4. One  $\text{kg}\cdot\text{m}/\text{s}^2$  can also be expressed as 1 \_\_\_\_\_.
5. Newton's second law of motion describes acceleration as force divided by \_\_\_\_\_.
6. Because of \_\_\_\_\_, an object in circular motion has a tendency to move away in a(n) \_\_\_\_\_ line.
7. The force that pulls an object in circular motion and keeps it in circular motion is \_\_\_\_\_.
8. The direction of the force that pulls an object in circular motion is toward the \_\_\_\_\_ of the circle.

**Content Practice B****LESSON 3****Newton's Second Law**

**Directions:** This diagram represents two objects above Earth, the center of which is marked with a dot. Object 1 is a satellite orbiting Earth in the direction shown by the arrow. Object 2 is an object headed toward Earth. Use the diagram to respond to the statement.

1. Add three arrows to the drawing—one showing the direction of the satellite's acceleration (label it line A), one showing the path the satellite would take if it suddenly became free of Earth's gravitation (label it line B), and a third showing the direction of object 2's acceleration (label it line C).

**Directions:** On the line before each question or statement, write the letter of the correct answer.

- \_\_\_\_\_ 2. If a force acts on a moving object in the same direction that the object is moving, what will happen to the object?
- A. It will stop.
  - B. It will speed up.
  - C. It will slow down.
  - D. It will continue moving at the same speed.
- \_\_\_\_\_ 3. After a baseball leaves the pitcher's hand, what is the main force acting on it?
- A. gravity
  - B. friction
  - C. electric force
  - D. centripetal force
- \_\_\_\_\_ 4. Newton's second law of motion states that force is equal to mass times
- A. weight.
  - B. inertia.
  - C. velocity.
  - D. acceleration.

**Content Practice A****LESSON 4*****Newton's Third Law***

**Directions:** *On the line before each statement, write T if the statement is true or F if the statement is false.*

- \_\_\_\_\_ 1. Newton's third law of motion states that when an object exerts a force on another object, the second object exerts an equal force in the same direction.
- \_\_\_\_\_ 2. The forces that two objects exert on each other are called a force pair.
- \_\_\_\_\_ 3. Forces in a force pair never cancel each other.
- \_\_\_\_\_ 4. The force that a hammer exerts on a nail is the reaction force.
- \_\_\_\_\_ 5. If an object experiences a net unbalanced force, the object accelerates.
- \_\_\_\_\_ 6. In the equation  $p = m \times v$ , the letter  $p$  stands for momentum.
- \_\_\_\_\_ 7. A bullet has more momentum than a moving ship.
- \_\_\_\_\_ 8. In collisions, momentum is seldom conserved unless an outside force acts on the colliding objects.
- \_\_\_\_\_ 9. A collision between two billiard balls is an elastic collision.
- \_\_\_\_\_ 10. A force that causes objects to gain momentum is friction.

**Content Practice B**

**LESSON 4**

### Newton's Third Law

**Directions:** Answer each question or respond to each statement on the lines provided.

1. What is Newton's third law of motion?

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2. What are the two parts of a force pair?

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3. Why don't those two parts cancel each other?

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4. **Explain** the combination of forces that enable a swimmer to move through the water.

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5. What is the equation  $p = m \times v$  used to determine? \_\_\_\_\_

6. **Determine** the momentum of a 3-kg ball moving at a speed of 4 m/s.

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7. **Explain** conservation of momentum.

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8. What are elastic and inelastic collisions?

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