Name Date Class

Directed Reading for Content Mastery

Overview Forces

Directions: *Fill in the blanks using the terms listed below.*

rolling	**static**	**momentum**
sliding	**conservation of momentum**	**gravitational**
ma	***mv***	**opposite**
weight	**frictional**	**centripetal**
downward		

I. Newton's Second Law

A. defined as: net force acting on an object causes the object to accelerate in the direction of the net force; $F =$ _____

B. types of forces

1. _____ which opposes motion

a. _____—when neither object is moving

b. _____—when one object is sliding across another

c. _____—when one object is rolling across another

2. _____ which occurs between any two objects

a. _____ is the gravitational force exerted on an object by Earth

b. an object that is shot or thrown follows a _____ path because of the force of gravity pulling it

3. _____ which causes an object to move in a circle

II. Newton's Third Law

A. defined as: to every action force there is an equal and _____ reaction force

B. _____: a property a moving object has because of its mass and velocity; $p =$ _____

C. _____: momentum transfers from one object to another with the total momentum being conserved

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Meeting Individual Needs

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Section 1 ▪ Newton's Second Law
Section 2 ▪ Gravity

Directions: *In the blank at the left, write the letter of the term that correctly completes each statement.*

_____ **1.** Every object in the universe exerts a force on every other object. This force is called _____.
a. friction **b.** gravity

_____ **2.** The measure of the gravitational force exerted by Earth on an object is the object's _____.
a. weight **b.** mass

_____ **3.** The amount of gravitational force between two objects depends on their _____.
a. color and density **b.** mass and distance

_____ **4.** Weight is measured in units called _____.
a. newtons **b.** kilograms

_____ **5.** The greater an object's _____, the stronger the gravitational force on it.
a. mass **b.** velocity

_____ **6.** Mass is measured in units called _____.
a. newtons and kilonewtons **b.** grams and kilograms

_____ **7.** A weight reading on a scale shows the _____ exerted by the scale.
a. upward force **b.** downward force

_____ **8.** Earth exerts a stronger gravitational force than the moon because Earth has more _____.
a. mass **b.** density

_____ **9.** The masses of your hand and your notebook are quite small, so the force of attraction between them is _____.
a. zero **b.** weak

_____ **10.** An object transported from the surface of Earth to the surface of the Moon has its weight _____.
a. decreased **b.** stay the same

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Section 3 ▪ The Third Law of Motion

Directions: *Choose the term from the list below that is best described by each statement. Write the term to the left of each statement.*

conservation of momentum **reaction**
Newton's third law of motion **momentum**
velocity **mass** **action**

_____ **1.** When one object exerts a force on a second object, the second object exerts a force that is equal in size and opposite in direction.

_____ **2.** The backward "kick" of a rifle that is fired is an example of a(n) _____ force.

_____ **3.** The total amount of momentum of a group of objects does not change unless outside forces act on the objects.

_____ **4.** Air rushing out of the neck of a balloon causes the balloon to move. The air that comes from the balloon is an example of a(n) _____ force.

_____ **5.** In the equation $p = m \times v$, p represents _____.

_____ **6.** Momentum has direction because _____ has direction.

_____ **7.** Momentum is a property a moving object has because of its _____ and velocity.

Directions: *Think for a minute about Newton's third law of motion. Can you remember any event when you experienced this law? If so, draw a diagram below to show the action-reaction forces. If you can't remember an event that you experienced, try to think up one and draw it below.*

8.

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Key Terms Forces

Directions: *Determine whether the italicized term makes each statement true or false. If the statement is true, write the word* **true** *in the blank. If the statement is false, write in the blank the term that makes the statement true.*

_____ **1.** Objects fall toward Earth at a rate of 9.8 m/s^2 because of *centripetal force.*

_____ **2.** $F = ma$ represents Newton's *second* law of motion.

_____ **3.** Acceleration toward the center of a curved or circular path is called *gravitational* acceleration.

_____ **4.** In $p = mv$, p represents *position.*

_____ **5.** The force of gravity acting upon an object is the object's *mass.*

_____ **6.** *Friction* is the force that opposes motion between surfaces that touch each other.

_____ **7.** To every action force there is an equal and opposite reaction force is *the law of conservation of momentum.*

_____ **8.** According to *the law of conservation of momentum*, momentum lost equals momentum gained.

_____ **9.** The force keeping a ball on a string moving in a circle is *rolling friction.*

_____ **10.** Anything that is thrown or shot through the air is *weightless.*

_____ **11.** Microwelds are the source of *momentum* between two surfaces pressed together.

_____ **12.** Air resistance acts in the *opposite* direction to that of an object in motion.

_____ **13.** Terminal velocity is the *highest* velocity that a falling object will reach.

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