



Forces & Motion

Name _____ Class _____ Date _____

Scientists define **force** as a push or a pull. A force is described by its strength and direction in which it exerts.

A **force** provides an object with the **energy** to move, stop moving, or change direction. **Newton (N)** is the standard unit of measure for **force**.



Sir Isaac Newton is credited with the development of **three laws** dealing with the **movement** of objects.

Newton's 1st Law of Motion

An object at rest tends to stay at rest and an object in motion tends to stay in motion with the same speed and in the same direction.



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Newton's 2nd Law of Motion
Acceleration is directly proportional to the net force acting on an object and inversely proportional to the mass of the object.

$$a = \frac{F}{m}$$

When the same force is applied to both carts, the **acceleration** of the empty cart will be greater than the acceleration of the loaded cart.

Newton's 3rd Law of Motion

For every **action** there is an equal and opposite **reaction**.



Marbles exert equal force on each other.

Both marbles change velocity and direction.

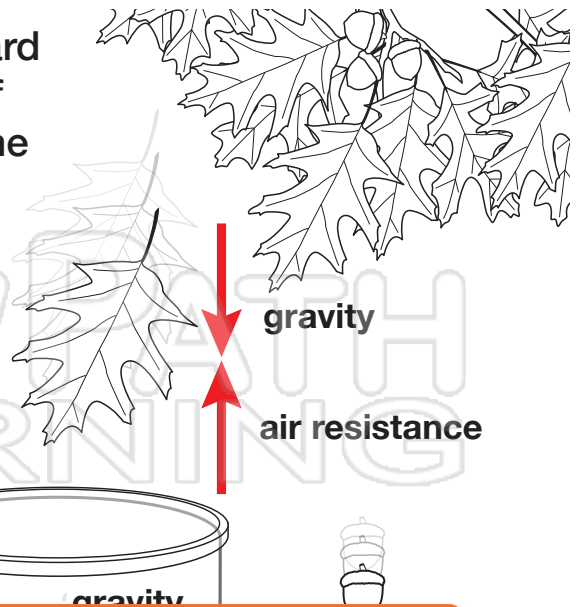


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Gravity is a type of force that pulls objects toward each other and toward the Earth. The amount of gravitational force depends upon the **mass** of the objects and the **distance** between them.

The **acceleration** of an object near the surface of the Earth due to gravity is **9.8 m/s²**. If both the acorn and leaf fall from the tree at the same time, **air resistance** will slow down the leaf and the acorn will hit the ground first. In a **vacuum**, both will reach the ground at the same time.

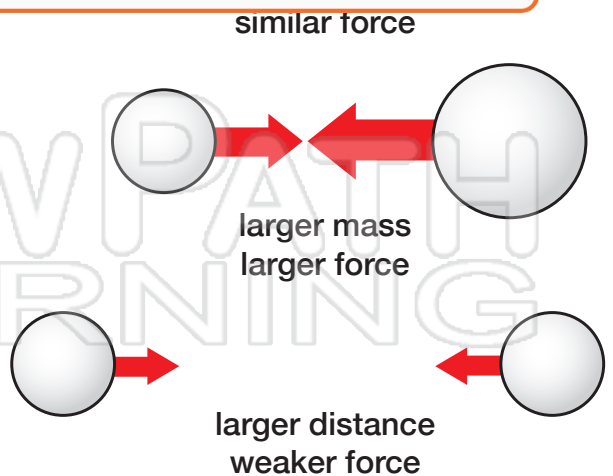




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New
All of **gravitational force** (force of attraction) on other objects. The strength of the gravitational force is dependent upon the **mass** of the objects and the **distance** between them. The larger the mass of the objects, the larger the force is between the two objects. The farther away the two objects are, the weaker the gravitational force is between them.





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Name _____ Class _____ Date _____

Fill in the blanks.

_____ is a **push or pull** upon an object. It provides an object with the _____ to move, stop moving, or change direction.

_____ is the standard unit of measure for force.

_____ is an attractive force that pulls objects together. The strength of this force is dependent upon the _____ of the objects



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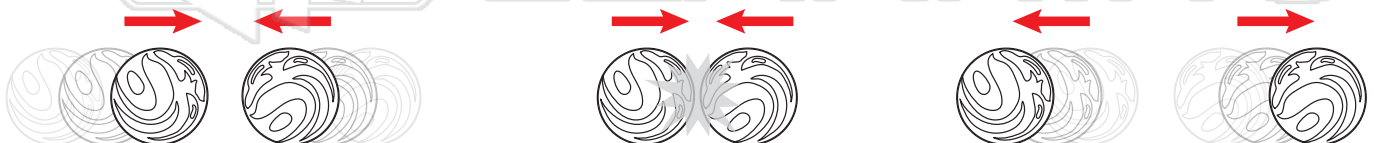
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_____ and the amount of _____ applied.



Newton's 3rd Law of Motion

For every action there is an _____ and _____ reaction.

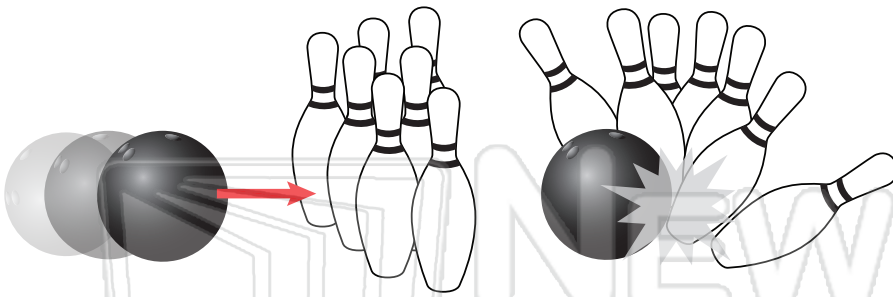




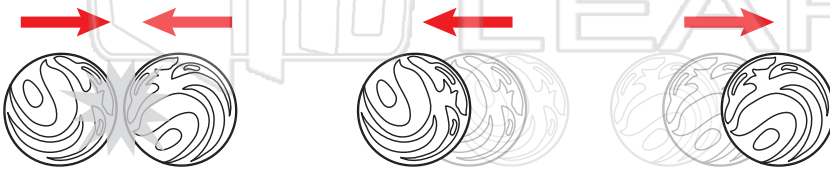
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Look at each example. Check the Law of Motion that is being illustrated.



- 1st Law of Motion
- 2nd Law of Motion
- 3rd Law of Motion

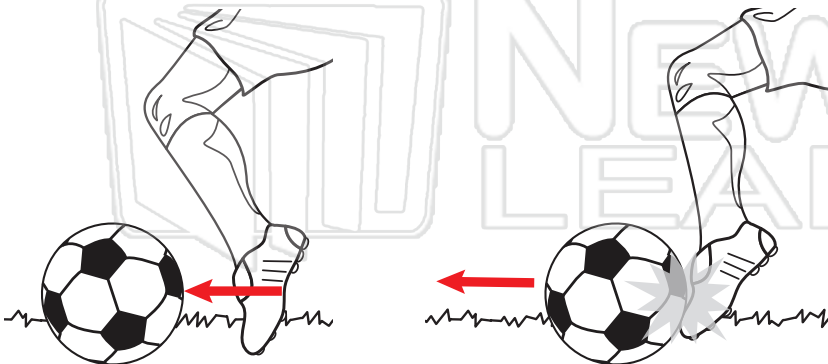


- 1st Law of Motion
- 2nd Law of Motion
- 3rd Law of Motion



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- 1st Law of Motion
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Forces & Motion

Answer Key

Fill in the blanks.

Force is a **push or pull** upon an object. It provides an object with the **energy** to move, stop moving, or change direction.

Newton (N) is the standard unit of measure for force.

Gravity is an attractive force that pulls objects together. The strength of this force is dependent upon the

mass of the objects



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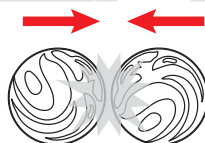
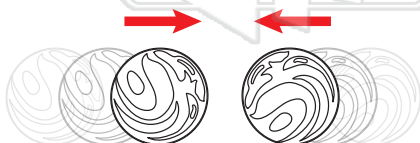
mass and the amount of force

applied.



Newton's 3rd Law of Motion

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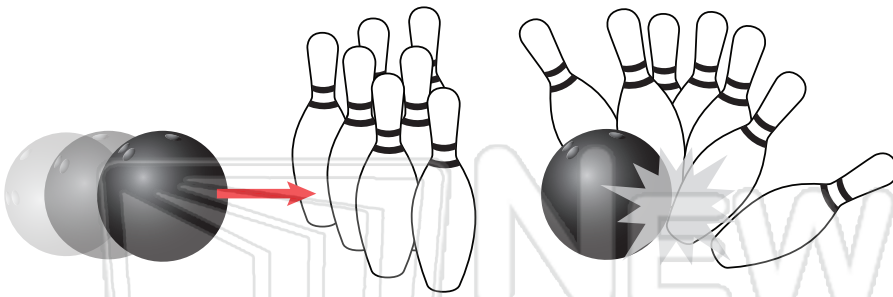




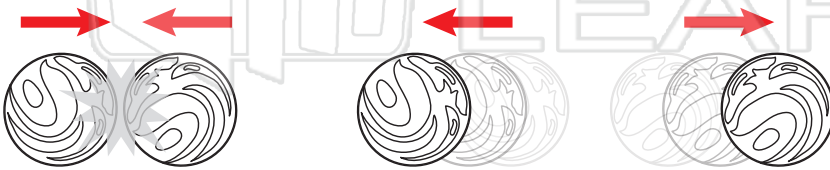
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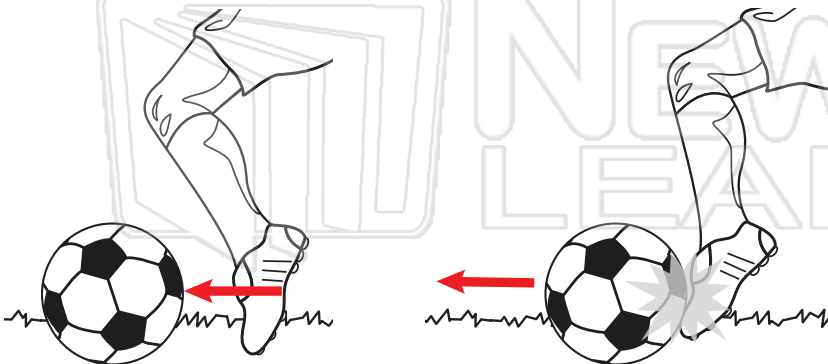


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