**Force**

Name \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Date \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Item # \_\_\_\_\_

**What is Force?**

When you ride a scooter, your foot pushes against the ground. The push makes the wheels of the scooter move. When an apple falls from a tree, it is pulled to the ground by gravity. The scientific definition of force is a push or a pull in a particular direction. Force can affect motion in several ways. It gives energy to an object causing it to start moving, move faster, move slower, stop moving, change shape or change direction. Since forces cause changes in speed of an object, we can say that forces cause acceleration.

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| **What is the definition of force?** |  |
| **List the 6 ways force can affect motion.** | **1.****2.****3.****4.****5.****6.** |

**How are Forces Measured?**

Forces have size and direction. The size of a force is measured in Newtons. “N” is the abbreviation for Newton. One Newton is equal to the amount of force it would take to move an object with a mass of one kilogram a distance of one meter every second (1 N = 1 kg *x* m/s2). A spring scale can be used to measure forces. An object is attached to one end of the spring scale. The spring stretches to show how much force is pulling down on the object.

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| **What 2 factors are used to describe force?** | **1.****2.** |
| **What unit of measurement is used measure force?** |  |

**Net Forces**

Forces can exert a push or pull in any direction. It is rare for there to be only one type of force acting on any object. In fact, most objects are subject to many forces at the same time. What happens to the object depends on the strength of the forces and the direction of the forces. All of the different forces acting on an object are called net forces. Forces may work together or they may be opposite forces. Forces that work together are working in the same direction. When two forces act in the same direction on an object, they combine and the net force is equal to the sum of the two forces. Forces that are working against each other are working in opposite directions and the net force is the difference between the two forces.

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| **Explain what the phrase “net force” means and how it changes an object.** |  |
| **Explain what happens when 2 forces act on an object in the same direction.**  |  |
| **Explain what happens when 2 forces act on an object in opposite directions.**  |  |

**Balanced and Unbalanced Forces**

When multiple forces are acting on an object, the forces can be either balanced or unbalanced. If two or more opposite forces are balanced (or equal), their effects cancel each other and they do not cause a change in an object’s motion. If one force is stronger than the other force or forces, the forces are unbalanced and will cause a change in motion and/or direction. The net force is the difference of the two forces and the net force is in the direction of the greater force. When we illustrate a problem dealing with force, force is represented with arrows. The direction of an arrow shows the direction of the force. The length or width of the arrow indicates the amount or size of the force.

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| **Explain what happens to an object when 2 or more opposite forces act on it.** |  |
| **Explain what happens to an object when one force is stronger than the other force acting on an object.** |  |
| **Force is represented with \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.** * **The \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ of an arrow shows the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ of the force.**
* **The length or width of the arrow shows the amount or \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ of the force.**
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