Facts about Force

By Sharon Fabian

[1] Force is a word that has lots of different meanings and different uses. Just in the field of science, people use the word force when talking about several different topics. For instance, there is electrical force, the force of gravity, and the force of magnetism. Nuclear force holds atoms, and about everything else, together. Nuclear force is one of the many kinds of force used to produce energy. Another kind of force is mechanical force. When you study "force and motion" in science, mechanical force is the kind that you will usually be talking about. The word **force** means a push or a pull, or to be a little bit more scientific, it means anything that causes the shape or motion of an object to change.

[2] A football player uses force to run, kick, pass, and tackle. When he kicks the football, the speed and direction of the football change and the shape of the football changes temporarily, too.

[3] Force is needed to run a football for a touchdown. Force can also stop the runner in his tracks with a surprise tackle. The amount of force depends on the mass of the person or object producing the force. That is why large football players tend to have the advantage. The amount of force produced doesn't only depend on mass however; it also depends on acceleration, or how fast the football player can speed up. That's why being big isn't enough. A good football player has to be able to move, too.

[4] The amount of force is measured in units called newtons, named after the scientist Sir Isaac Newton. As you learn more about force and motion, you will hear more about Newton. It takes some complicated math to measure newtons of force, but in case you want to know, here is the definition of a **newton**: the force required to accelerate a one kilogram object by one meter per second squared.

[5] Even if you're not a mathematician, it may be useful to remember that the amount of force depends on two things -- mass and acceleration. Mass is similar to weight here on Earth, but it can be much different out in space or on a planet with a different amount of gravity from ours. The definition of **mass** is the amount of matter in something. **Acceleration** means a change in speed. Speeding up is acceleration. So is slowing down, but that type of acceleration is often called negative acceleration or **deceleration**. The ideas of mass and acceleration give us another, even more scientific, definition of force. This definition is the formula: force = mass times acceleration.

[6] Forces can be balanced or unbalanced. When forces are unbalanced, the one with more mass or more acceleration will move forward. When forces are balanced, the result is no movement. When two football players collide, the one who has more mass, or who is accelerating faster, will usually be the one to gain some ground. If their mass and acceleration are exactly equal, neither one will be going anywhere. Of course, it's not always that simple. There are lots of other forces that might get involved, maybe another player coming in from the side. All of the forces that are trying to move that football at once are called concurrent forces. Concurrent forces are forces that are acting at the same time. To learn more about force, you may be interested in reading about Sir Isaac Newton and his three laws of motion.

[7] So, if you ever wondered why Charlie Brown had such a hard time kicking that football, now you know. It takes force to kick a football, and force is a complicated subject.

Name _____ Science Pd. _____

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1. The word that means the amount of matter in something is (A) Acceleration (B) Newton (C) Mass (D) Force	2. The word that means a change in speed is (A) Newton (B) Force (C) Mass (D) Acceleration
3. The word for the unit used to measure force is Mass (B) Force (C) Acceleration (D) Newton	4. If you were reading a chapter in your science book called "Force and Motion" you would probably be reading about (A) Mechanical force (B) The force of gravity (C) Electrical force (D) Nuclear force
5. Sir Isaac Newton (A) Discovered three laws about force (B) Was a famous football player (C) Discovered electricity (D) Discovered football	6. A weightlifter lifting a heavy weight uses (A) Force (B) Mass (C) Acceleration (D) All of the above
7. All of the following are definitions of force EXCEPT (A) A push or pull (B) Mass times acceleration (C) A change in speed (D) Anything that causes the shape or motion of an object to change	8. Choose a sport other that football, and list three examples of force used in that sport. _____ _____