What Is Gravity?

Isaac Newton proposed three laws of motion.

Isaac Newton

Isaac Newton, an English scientist, proposed many of the ideas we take for granted about **gravity.** Gravity is a **force,** or attraction, between any two objects or masses. You know gravity keeps you from flying off the earth. In fact, most people think of gravity as the attraction exerted by the earth on other objects. However, gravity exists between *any* two objects.

According to an old story, Newton learned about gravity while sitting under an apple tree near his mother's house. His great inspiration came when he saw an apple fall from the tree. Actually, people knew about gravity before Newton's time. However, it was Newton who stated that gravity exists throughout the universe. Thus, the law controlling the falling apple also applies to planets, stars, and other distant objects.

In addition to his theory about gravity, Newton proposed three laws to explain the behavior of moving objects. His laws combined the findings of Galileo, Kepler, and other scientists with his own observations. Newton's laws of motion and his ideas about gravity explain the motions of planets and other bodies in space. Isaac Newton's work helped build the foundation of modern science.

Gravity, Weight, and Mass

Gravity, weight, and mass are closely linked. Mass is the measure of how much matter is in a body. You know scientists use the kilogram to measure mass. One kilogram equals 1000 grams. An object's mass does not vary from one place to another. A big dog that has a mass of 30 kilograms on Earth would have the same mass on the moon, Mars, or anywhere else in the universe.

Many people incorrectly use the word *weight* when they mean *mass*. An object's **weight** is a measure of the force of attraction—or gravity—between the object and the earth. In the metric system, a **newton** is the unit used to describe, or measure, this force of attraction. A mass of 1 kilogram weighs about 10 newtons. For example, a big dog with a mass of 30 kilograms has a weight of about 300 newtons.

Isaac Newton stated that the pull of gravity depends on more than just the masses of two objects. Gravity also depends on the distance between the objects. The greater the mass or the smaller the distance, the stronger the attraction. Your weight is a measure of the attraction between a small mass—you—and a very large mass—the earth. The distance between the masses is the distance between you and the center of the earth.

Many people use "bathroom" scales, which are spring scales, to measure their weights. When you step on the scale, the spring inside changes shape. The amount of change in the spring depends on how much the earth attracts your mass.

gravity (grav′ə tē), force or attraction that exists between any two masses.

force, a push or a pull

newton (nüt′n), the unit for weight in the metric system; abbreviation: N.

weight (wāt), force that gravity exerts on a mass.