

Unit 7: Forces and Motion

Content Outline: History of Motion (7.1)

- I. Aristotle (367 B.C.)
 - A. He was a great Greek Scientist and Philosopher
 - B. He was a student of Plato, another great Greek Scientist and Philosopher.
 - C. He proposed two main concepts associated with *motion (movement of objects)*.
 1. **Geocentrism** – this is the belief that the planets and Sun revolved around Earth.
 - a. “geo” refers to “earth”; “centrism” refers to “center”
 2. **Free Fall** – Objects that have more mass fall at faster rates than do lighter things.
- II. Galileo Galilei (1564-1643)
 - A. It was a great Italian Physicist and Astronomer.
 - B. He is known as the “Father of Modern Science”.
 - C. He helped to disprove Aristotle’s 2 claims of motion.
 1. **Heliocentrism** – this is the accepted belief that all the planets in our solar system revolve around the Sun.
 - a. “helio” refers to the “sun”.
 2. **Free Fall** – All objects, in a vacuum (no air resistance), fall at the same rate, regardless of mass of the object.
- III. Sir Isaac Newton (1643-1727)
 - A. He was born on Christmas (December 25, 1643) in England.
 - B. He is probably the *greatest scientist* that has ever lived.
 - C. He helped to create the field of Newtonian Physics.
 1. This field involves force, energy, gravity, and motion of objects.
- IV. **Gravity**
 - A. This is a *natural phenomenon* by which *all* physical bodies *attract* each other. This would be like your body or a car being attracted by the earth.
 - B. The *attraction* between objects is *directly* proportional to the mass of an object.
 1. So the more mass (usually larger object) the greater the pull on the less mass (usually smaller object).
 - C. Gravity gives *weight* to objects & causes them to *fall toward Earth* when dropped.
 1. **Weight**
 - a. This is the *pull of gravity* on an object.
 - b. It is measured in units called **Newtons (N)**.
 - c. The formula for Weight is: $W = mg$
 - i. $W = \text{weight}$
 - ii. $m = \text{mass of the object}$
 - iii. $g = \text{force of gravity} = 9.8 \text{ m/sec}^2$
 - D. Gravity is the *weakest* of the four *fundamental forces of nature*: (gravity, electromagnetic, weak nuclear, and strong nuclear) “Nuclear” is associated with atoms. Electromagnetic is associated with Energy and electrons.
 1. The *larger* an object; the *more powerful* the pull of gravity, such as on a planet level.
- V. Archimedes (287 B.C.)
 - A. Ancient Greek Mathematician and Physicist.
 - B. Proposes the concept of *buoyancy* in his *Archimedes Principle*.
 1. **Buoyancy** (“floating”)
 - a. This is an *upward force* that is contrary to gravity.
 - b. It usually associated with objects in liquids or gases.