

IMPORTANT TERMS:

- Equilibrium
- Force
- Friction
- Inertia
- Kilogram
- Law of inertia
- Mass
- Net force
- Newton
- Newton's first law
- Normal force
- Support force
- Weight

EQUATIONS:

$$F_g = mg$$

$$1 \text{ kg} = 2.2 \text{ lbs}$$

$$1 \text{ N} = 10 \text{ kg}$$

UNIT I: MECHANICS

Chapter 3: Newton's First Law of Motion-Inertia

I. Aristotle on Motion (3.1)

A. Aristotle (4th century BC– first to suggest _____ causes motion.

1. Divided motion into two types

a. _____ **Motion**– said to be either straight up or down. Objects would seek their natural resting place (boulder fall to ground, smoke rise)

b. _____ **Motion**-was “imposed” motion. Result of forces that pushed or pulled. (this motion had an external force)

2. Objects in natural resting places could not move by themselves. (had to be pushed or pulled)

B. Before 16th century though Earth must be in its natural resting place (a force large enough to move it was unthinkable)

II. Copernicus and the Moving Earth (3.2)

A. Nicolaus Copernicus (1473-1543)- said Earth and other planets move around sun.

1. Worked on his idea in secret to escape persecution

2. Wrote book **De Revolutionibus** about his work (reached him on the day of his death)

III. Galileo on Motion (3.3)

A. Foremost scientist of-

1. supported _____ – heliocentric theory (planets rotate around sun)

2. Resulted in house arrest for his thinking

B. Said force was not necessary to keep an object moving

1. **Force**–

2. **Friction**– name given to the force that-

Sloped surfaces

3. Galileo argued that only when friction is present– as it usually is– a force needed to keep an object moving.
4. He stated– every material object resists change to its state of motion– called _____
5. Led the way for _____

IV. Newton's Law of Inertia (3.4)

A. **Isaac Newton** (1642-1727)- born same year that Galileo died

B. Developed famous laws of motion (replaced Aristotelian ideas that dominated for previous 2000 years)

1. **Newton's First Law of Motion**– usually referred to as the _____

Every object continues in a state of rest, or of motion in a straight line at constant speed, unless it is compelled to change that state by forces exerted upon it.

- a. Restatement of _____ ideas
- b. Simply put– **things tend-**

V. Mass-A Measure of Inertia (3.5)

A. Mass is Not Volume– entirely different concepts

1. **Volume**-a measure of-

2. Mass-measured in _____

B. Mass is Not Weight

1. Often confused with weight

2. **Mass**– measurement of amount of _____ in an object and depends on number of and kind of atoms that compose it

3. **Weight**– a measure of the gravitational force acting on the object

a. One Kilogram Weighs _____ Newtons

1). _____ (N)-SI unit of mass

2). Weight =