**Chapter 4: Newton’s First Law of Motion-Inertia**

The term, laws of motion, generally refers to \_\_\_\_\_\_\_\_\_\_\_\_\_statements originally devised by English physicist \_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_(1642–1727) in the 1680s. These laws, along with Newton's law of\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, are generally considered to be the ultimate solution to a problem that had troubled scholars for more than 2,000 years: \_\_\_\_\_\_\_\_\_\_\_.

**History – Greek Philosopher Aristotle (384-322 B.C.)**

* Aristotle \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ that some forms of motion were "\_\_\_\_\_\_\_\_\_\_\_\_."

-Rocks fall toward the ground because the ground is a \_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_ for rocks to be.

-Objects rise into the air when they are \_\_\_\_\_\_\_\_\_\_\_\_ because the Sun is \_\_\_\_\_, and so it is natural for heat to \_\_\_\_\_\_\_\_\_.

-Planets & stars move in perfect \_\_\_\_\_\_\_\_\_\_\_\_ around the earth, because earth is in its “\_\_\_\_\_\_\_\_\_\_\_” \_\_\_\_\_\_\_\_\_\_\_\_\_\_ place.

* Aristotle \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ that other forms of motion were “\_\_\_\_\_\_\_\_\_\_\_\_”. “Violent” motions had an \_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_, that is, something was pushing or pulling the object to make it move. Without an external \_\_\_\_\_\_\_\_\_\_\_ or \_\_\_\_\_\_\_\_\_\_, all objects would stay in their “natural” resting place.

Examples: a horse pulling a cart, wind pushing a ship

Aristotle's thinking about motion \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Western thought for 2,000 years. Unfortunately, his ideas were not really very productive. Scholars tried continually to improve on the concepts of \_\_\_\_\_\_\_\_\_\_\_\_\_\_ and \_\_\_\_\_\_\_\_\_\_\_\_\_ motion—without much success.

**History – Italian Astronomer Copernicus (1473-1543 )**

* Astronomer, Nicolaus \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, formulated a theory that the earth and other planets moved \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ the sun. He based this on his \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ of planet and star movements.
* Copernicus’ theory was very controversial at the time because people \_\_\_\_\_\_\_\_\_\_\_ to \_\_\_\_\_\_\_\_\_\_\_ that the earth was the \_\_\_\_\_\_\_\_\_\_\_\_\_\_ of the universe.

Copernicus did his work in \_\_\_\_\_\_\_\_\_\_\_\_\_ to avoid \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. His theory was only published at the end of his life.

**History – Italian Astronomer & Physicist Galileo (1564-1642)**

In the early 1600s, Italian astronomer & physicist \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ proposed a whole new way of looking at the problem of \_\_\_\_\_\_\_\_\_\_\_\_\_\_. Since asking \_\_\_\_\_\_\_things move had not been very productive, Galileo said, perhaps physicists should focus simply on \_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_ they move. A whole new philosophy of \_\_\_\_\_\_\_\_\_\_\_ (the science of matter and energy) was created and, in the process, the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ of physics itself was born.

Galileo made many scientific discoveries. He is probably most famous for spreading the fact that the planets revolve around the \_\_\_\_\_\_\_\_and not the\_\_\_\_\_\_\_. Because he openly supported this view of the solar system, Galileo was tried and lived under \_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_.

We are most interested in Galileo’s ideas on\_\_\_\_\_\_\_\_\_\_. He was the first to realize and convince people that a force is \_\_\_\_\_necessary for an object to keep \_\_\_\_\_\_\_\_. Galileo used the ideas of \_\_\_\_\_\_\_\_\_\_\_, \_\_\_\_\_\_\_\_\_\_\_\_\_, & \_\_\_\_\_\_\_\_\_\_ to explain how things move.

**Sir Isaac Newton**

* Born in the year that \_\_\_\_\_\_\_\_\_\_\_\_\_\_ died.
* Had formulated his \_\_\_\_\_\_\_\_\_\_\_ of \_\_\_\_\_\_\_\_\_\_\_\_\_ by the age of 24.

**INERTIA** – The reluctance of any object to change its \_\_\_\_\_\_\_\_ of \_\_\_\_\_\_\_\_\_.

**Newton’s First Law also called the Law of \_\_\_\_\_\_\_\_\_\_\_\_\_:**

**An object at rest stays at \_\_\_\_\_\_\_\_ and an object in motion stays in \_\_\_\_\_\_\_\_\_\_ with the same \_\_\_\_\_\_\_\_\_ and in the same \_\_\_\_\_\_\_\_\_\_\_\_\_\_ *unless* acted on by an \_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_.**

**Practice: Pg. 56 #s 1, 2, Restate Newton’s First Law in your own words.**