

## INTRODUCTION TO PHYSICAL SCIENCE

"For since the creation of the world His invisible [attributes] are clearly seen, being understood by the things that are made, [even] His eternal power and Godhead, so that they are without excuse" Romans 1:20

### Matter and Energy

- Physical science: systematic study of God's physical creation and how it works; deals primarily with matter and energy
- Matter: substance of the physical world; anything that can be tasted, touched, or smelled; all physical objects are composed of matter
  - inertia: resistance to changes in motion
  - matter also defined as anything that has inertia
- Energy: ability to do work; energy allows matter to change and cause changes
  - forms of energy: light, thermal (heat), chemical, mechanical, electrical
- Physical properties of matter: changes in matter that does not change the type of matter
  - 1) mass: amount of matter in an object
  - 2) weight: amount of gravitational pull on an object  
weight on the moon = 1/6 weight on earth
  - 3) volume: amount of space that matter takes up; objects cannot occupy the same position at the same time
  - 4) density: mass in a certain volume; indicates how highly packed the matter is; ex: box of foam pellets less dense than same box filled with sand
  - 5) temperature: hotness or coldness of an object; indirect measurement of object's thermal energy; temperature can affect other properties of density, volume, and state of matter
- States of matter: form of matter; solid/liquid/gas/plasma
- Chemical properties of matter: change in the type and identity of matter
  - takes place when two or more substances unite or break apart chemically/chemicals that make up the substance break apart or recombine
  - when a chemical change occurs, the new substance will have its own physical and chemical properties that are different from the properties of the original substance (rusty car)
- Branches of physical science:
  - 1) Physics: study of interactions between matter and energy; includes mechanics, thermodynamics, acoustics, optics, electrostatics, electrodynamics, electronics
  - 2) Chemistry: study of the composition and interactions of matter; organic chemistry, inorganic chemistry, physical chemistry, biochemistry, analytical chemistry

## The Scientific Method

- Orderly method by which scientists investigate secrets of nature
- steps:
  - 1) Observing: gathering facts to discover clues about how a process works; may include measurement, organization of data, research of other scientists
  - 2) Hypothesizing: hypothesis is a tentative explanation to describe the process; an unproven idea
  - 3) Experimenting: experiment is an artificial situation in which the scientist makes deliberate changes in the world about him and observes the results; data from experiments may either support or disprove hypothesis
- Process:
  - 1) Formulate a worthwhile question or problem
  - 2) Gather information through observation and research
  - 3) Draft a hypothesis
  - 4) Perform an experiment to test your hypothesis
  - 5) Record and analyze experiment results
  - 6) State conclusions (whether hypothesis was correct or incorrect)
- Theory: when a hypothesis passes the tests of many experiments and has the support of other scientists  
→ may be accepted as scientific law which represent man's best understanding of the process
- Predictions: specific suggestions about the outcome of a particular process  
Testability: ability to reproduce the process to determine accuracy of prediction  
Repeatability: for a hypothesis to be proven, its predictions must be repeatable over many observations and experiments  
Causality: law of cause and effect; events observed in the universe have rational causes; the same cause will always have the same effect

## Limitations of Science

- Scope of science: limited to study of created matter and energy in the present; science cannot study God because He is not bound by the laws of creation; science cannot explain man's soul, human behavior, or difference between right and wrong
- Assumptions in science; science relies on assumptions (such as causality); incorrect assumptions lead to incorrect conclusions; long-held assumptions may be treated as fact (evolution)
- Bias: human nature often leads one to see and believe what he wants to be true, not necessarily what is actually true (spontaneous generation)
- Scientists can only provide approximate descriptions of how the world works
- Reasons to study science: proper study of science will lead man to glorify God (Psalm 8) and use scientific knowledge for man's benefit (Gen 1:28)