

**Scientific Method:**

- a) Describe the key steps of the scientific method.
1. Observation – Development of a problem or question
  2. Explanation – Formulation of hypothesis
  3. Validation – Design & perform experiment to test hypothesis
- b) Who is credited with establishing the scientific method for inquiry of the natural world? (*Note: this is not in the textbook...*)

Ans. Galileo Galilei

- c) What is the requirement for a hypothesis to be considered “scientific”?

Ans. A hypothesis must be testable to be considered “scientific”.

- d) Give an example of both a scientific and non-scientific hypothesis/statement.

Ans.

- e) Describe the difference(s) between a hypothesis and a theory.

Ans. A hypothesis is an educated guess formulated to explain a natural phenomenon. A theory is a compilation of many verified hypotheses that together provide a general model of a natural phenomenon.

- f) Describe the difference(s) between a scientific law and a theory.

Ans. A scientific law is a general observation that has no known exceptions and is therefore considered to be a fact of nature. A theory is a general description of a natural phenomenon supported by substantial evidence but nevertheless is considered only a model not a fact.

**Physical States of Matter & Classification of Matter:**

- a) Identify the 3 states of matter.

Ans. (1) solids, (2) liquids, and (3) gases {we won't consider plasmas and Bose-Einstein Condensates for the purposes of this class}

- b) Succinctly describe the 3 states of matter.

- (1) Solid – definite shape and volume
- (2) Liquid – definite volume and indefinite shape
- (3) Gas – indefinite shape and volume

- c) How is a pure substance different from a mixture?

Ans. A mixture is an impure substance, a combination of more than 1 pure substance.

- d) Describe the following:

1. homogeneous mixture – a uniform mixture, has only 1 phase
2. heterogeneous mixture – a non-uniform mixture, has more than 1 phase
3. phase – a homogeneous region of a mixture separated from other phases by a physical boundary