

## Biology Content Standards

### *Basic Science*

#### **Domain 1: Scientific Investigation**

- 1.01 Understand the techniques used to analyze, critique, and improve scientific explanations of phenomena; understand that hypotheses must always be falsifiable and subjected to review in the light of scientific evidence obtained by experiment and observation.
- 1.02 Know how to make and record measurements of length, volume, time, temperature, mass, electrical quantities, and amount of substance, using SI units and give the numerical power-of-ten metric prefixes used with these units.
- 1.03 Understand that numerical values are associated with measurements of physical quantities and must be assigned units of measurement or dimensions; understand that every measurement requires a unit; and know how to use such units correctly.
- 1.04 Convert between units of the same measurement system (e.g., inches to yards, centimeters to meters, square feet to square miles) and given the conversion factors, make conversions between the metric and customary systems of measurement (e.g., feet to meters, kilowatts to horsepower, BTU to kilocalories and joules).
- 1.05 Express temperatures using Fahrenheit, Celsius, and Kelvin temperature scales and make conversions from one to another.
- 1.06 Demonstrate knowledge of the concepts of precision, accuracy, and error with regard to interpreting and recording numerical data acquired using a scientific instrument (human and instrument error).
- 1.07 Express numbers in scientific notation and determine significant digits in a measured or calculated quantity.
- 1.08 Understand the role of theory in the structure, function, and development of science such as the atomic theory, classical mechanics (e.g., Newtonian theory), Big Bang theory, the theory of plate tectonics, and the theory of biological evolution.
- 1.09 Evaluate a specific scientific investigation, on the basis of:
  - a. the testability of questions and hypotheses
  - b. the accuracy and reproducibility of the data acquired
  - c. the distinction between variable and controlled parameters
  - d. the distinctions among a hypothesis, a theory, and a prediction as these terms are used in science
  - e. the identification of discrepant results and the possible sources of error, including uncontrolled conditions
  - f. the numerical and non-numerical results calculated and displayed in charts, maps, tables, models, graphs, and labeled diagrams
  - g. the connections among hypothesis, tests conducted, data collected and conclusions drawn from the scientific evidence
  - h. the conclusions and their fit into the underlying theory
  - i. the questions leading to further investigations
- 1.10 Use exponential growth and decay models to describe ratio-dependent phenomena such as radioactive decay and unchecked population growth.