

## Investigation and Experimentation

**Scientific progress is made by asking meaningful questions and conducting careful investigations.**

- a. Students will select and use **appropriate tools and technology** (such as computer-linked probes, spreadsheets, and graphing calculators) to perform tests, collect data, analyze relationships, and display data.
- b. Students will identify and communicate sources of unavoidable **experimental error**.
- c. Students will identify possible reasons for **inconsistent results**, such as sources of error or uncontrolled conditions.
- d. Students will **formulate explanations** by using **logic and evidence**.
- e. Students will solve scientific problems by using, **quadratic equations** and **simple trigonometric functions**.
- f. Students will distinguish between **hypothesis** and **theory** as scientific terms.
- g. Students will recognize the usefulness and **limitations** of **models** and **theories** as scientific representations of reality.
- h. Students will recognize the cumulative nature of scientific evidence.
- i. Students will **analyze situations and solve problems** that require combining and applying concepts from more than one area of science.
- j. Students will investigate a science-based societal issue by **researching the literature**, **analyzing data**, and **communicating the findings**. Examples of issues include irradiation of food, cloning of animals by somatic cell nuclear transfer, choice of energy sources, and land and water use decisions in California.
- k. Students will know that when an observation does not agree with an accepted scientific theory, the observation is sometimes mistaken or fraudulent (e.g., the Piltdown Man fossil or unidentified flying objects) and that the theory is sometimes wrong (e.g., the Ptolemaic model of the movement of the Sun, Moon, and planets).