

CHAPTER HIGHLIGHTS

Scientific Method

Vocabulary

scientific method
system
hypothesis
model
theory

- The scientific method is a logical approach to solving problems that lend themselves to investigation.
- A hypothesis is a testable statement that serves as the basis for predictions and further experiments.
- A theory is a broad generalization that explains a body of known facts or phenomena.

Units of Measurement

Vocabulary

quantity
SI
weight
derived unit
volume
density
conversion factor
dimensional analysis

- The result of nearly every measurement is a number and a unit.
- The SI system of measurement is used in science. It has seven base units: the meter (length), kilogram (mass), second (time), kelvin (temperature), mole (amount of substance), ampere (electric current), and candela (luminous intensity).
- Weight is a measure of the gravitational pull on matter.
- Derived SI units include the square meter (area) and the cubic meter (volume).
- Density is the ratio of mass to volume.
- Conversion factors are used to convert from one unit to another.

Using Scientific Measurements

Vocabulary

accuracy
precision
percentage error
significant figures
scientific notation
directly proportional
inversely proportional

- Accuracy refers to the closeness of a measurement to the correct or accepted value. Precision refers to the closeness of values for a set of measurements.
- Percentage error is the difference between the experimental and the accepted value that is divided by the accepted value and then multiplied by 100.
- The significant figures in a number consist of all digits known with certainty plus one final digit, which is uncertain.
- After addition or subtraction, the answer should be rounded so that it has no more digits to the right of the decimal point than there are in the measurement that has the smallest number of digits to the right of the decimal point. After multiplication or division, the answer should be rounded so that it has no more significant figures than there are in the measurement that has the fewest number of significant figures.
- Exact conversion factors are completely certain and do not limit the number of digits in a calculation.
- A number written in scientific notation is of the form $M \times 10^n$, in which M is greater than or equal to 1 but less than 10 and n is an integer.
- Two quantities are directly proportional to each other if dividing one by the other yields a constant value. Two quantities are inversely proportional to each other if their product has a constant value.