Key Terms

accuracy how close a measurement is to the correct value for that measurement

ampere the SI unit for electrical current

atom smallest and most basic units of matter

base quantity physical quantity chosen by convention and practical considerations such that all other physical quantities can be expressed as algebraic combinations of them

base unit standard for expressing the measurement of a base quantity within a particular system of units; defined by a particular procedure used to measure the corresponding base quantity

classical physics physics, as it developed from the Renaissance to the end of the nineteenth century

constant a quantity that does not change

conversion factor a ratio expressing how many of one unit are equal to another unit

dependent variable the vertical, or y-axis, variable, which changes with (or is dependent on) the value of the independent variable

derived quantity physical quantity defined using algebraic combinations of base quantities

derived units units that are derived by combining the fundamental physical units

experiment process involved with testing a hypothesis

exponential relationship relation between variables in which a constant change in the independent variable is accompanied by change in the dependent variable that is proportional to the value it already had

fundamental physical units the seven fundamental physical units in the SI system of units are length, mass, time, electric current, temperature, amount of a substance, and luminous intensity

hypothesis testable statement that describes how something in the natural world works

independent variable the horizontal, or x-axis, variable, which is not influence by the second variable on the graph, the dependent variable

inverse proportionality a relation between two variables expressible by an equation of the form $y = k/x$ where k stays constant when x and y change; the special form of inverse relationship that satisfies this equation

inverse relationship any relation between variables where one variable decreases as the other variable increases

kilogram the SI unit for mass, abbreviated (kg)

linear relationships relation between variables that produce a straight line when graphed

log-log plot a plot that uses a logarithmic scale in both axes

logarithmic scale a graphing scale in which each tick on an axis is the previous tick multiplied by some value

meter the SI unit for length, abbreviated (m)

method of adding percents calculating the percent uncertainty of a quantity in multiplication or division by adding the percent uncertainties in the quantities being added or divided

model system that is analogous to the real system of interest in essential ways but more easily analyzed

modern physics physics as developed from the twentieth century to the present, involving the theories of relativity and quantum mechanics

observation step where a scientist observes a pattern or trend within the natural world

order of magnitude the size of a quantity in terms of its power of 10 when expressed in scientific notation

physics science aimed at describing the fundamental aspects of our universe—energy, matter, space, motion, and time

precision how well repeated measurements generate the same or closely similar results

principle description of nature that is true in many, but not all situations

quadratic relationship relation between variables that can be expressed in the form $y = ax^2 + bx + c$, which produces a curved line when graphed

quantum mechanics major theory of modern physics which describes the properties and nature of atoms and their subatomic particles

science the study or knowledge of how the physical world operates, based on objective evidence determined through observation and experimentation

scientific law pattern in nature that is true in all circumstances studied thus far

scientific methods techniques and processes used in the constructing and testing of scientific hypotheses, laws, and theories, and in deciding issues on the basis of experiment and observation

scientific notation way of writing numbers that are too large or small to be conveniently written in simple decimal form; the measurement is multiplied by a power of 10, which indicates the number of placeholder zeros in the measurement

second the SI unit for time, abbreviated (s)

semi-log plot A plot that uses a logarithmic scale on one axis of the graph and a linear scale on the other axis.

significant figures when writing a number, the digits, or number of digits, that express the precision of a measuring tool used to measure the number

slope the ratio of the change of a graph on the y axis to the change along the x-axis, the value of m in the equation of a line, $y = mx + b$

theory explanation of patterns in nature that is supported by much scientific evidence and verified multiple times by various groups of researchers

theory of relativity theory constructed by Albert Einstein which describes how space, time and energy are different for different observers in relative motion

uncertainty a quantitative measure of how much measured values deviate from a standard or expected value

universal applies throughout the known universe

y-intercept the point where a plot line intersects the y-axis