

Science Review

SCIENCE REVIEW

THE PERIODIC TABLE OF ELEMENTS

- The periodic table is an organizational chart for all known chemical elements. Periodicals are listed alphabetically, and by increasing atomic number.
- The table is organized into vertical columns called groups.
- The atomic number increases from left to right.
- The lightest elements are located in the upper left of the table.
- The heaviest elements are located in the lower right of the table.
- The table is organized in vertical columns called groups.
- Elements in the first group (alkali metals) have one valence electron.
- Elements in the last group (noble gases) have eight valence electrons.
- Elements within a group (family) behave in the same way.
- Elements are made of only one type of atom, and so they share the same type of matter. They cannot be broken down or decomposed into simpler substances.
- Elements are categorized as metals, metalloids, and nonmetals.
- Metals are malleable, they conduct heat and electricity well, have high melting and boiling points, and have common redox reactions when bonding with other elements.
- Nonmetals are brittle gases, they conduct heat and electricity poorly, have low melting and boiling points, and their atoms can undergo chemical change when bonding with other elements.
- Metalloids have characteristics of both metals and nonmetals.
- Some elements combine to form compounds in laboratory, and some have no known practical application.

CONCEPTS & PROCESSES

The Scientific Method

- Making careful observations of nature.
- Forming a hypothesis to explain a specific phenomenon or event.
- Performing experiments to replicate and extend the phenomenon.
- Collecting evidence through organization to support, reject, or modify the hypothesis.
- Reporting their steps with the weight of an ethics education a moral hypothesis.
- Forming a theory based on a moral hypothesis that has been proven false by experimental evidence and has proven false by experimental evidence.
- Accepting a theory as a law if it is proven to be a scientific phenomenon.

Measurement

There are two main accepted systems of measurement:

- The metric system is widely used around the world and is based on powers of 10. Common units are meter, gram, liter, degree Celsius, and second.
- The International System of Units (SI) is a standardized system of units and measures. It is based on seven fundamental units: meter, kilogram, second, ampere, kelvin, mole, and candela.
- The English system is used primarily in the United States. Common units are inch, foot, yard, mile, pound, gallon, degree Fahrenheit, and second.

Common Equations

Formula	Units	Formula	Units
Area of rectangle	length × width	$F = ma$	Force
Area of circle	$A = \pi r^2$	$E = mc^2$	Energy
Volume of object with perpendicular sides	length × width × height	$W = Fd$	Work
Volume of sphere	$V = \frac{4}{3}\pi r^3$	$P = \frac{W}{t}$	Power
Volume of cylinder	$V = \pi r^2 h$	$KE = \frac{1}{2}mv^2$	Kinetic energy
Weight	mass × acceleration of gravity	$PE = mgh$	Potential energy
Speed	distance / time	$Q = CV$	Charge
Velocity	displacement / time	$E = hf$	Energy

Scientific Notation

- Scientific notation is a shorthand for expressing very large or very small numbers. It is also called powers of 10 notation because exponential numbers are expressed in multiples of 10.
- The coefficient is a real number between 1 and 10.
- The power of 10 is positive or negative exponent, representing a very large or very small number.

Example:

4.2×10^7

coefficient power of ten

$4.2 \times 10^7 = 42,000,000$

$4.2 \times 10^{-7} = 0.0000042$

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Reviews

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