GLOSSARY OF SCIENTIFIC TERMS IN *THE MYSTERY OF MATTER*

Term	Definition	Section
acid	A substance that has a pH of less than 7 and that can react with metals and other substances.	1
air	The mixture of oxygen, nitrogen, and other gasses that is consistently present around us.	1
alchemist	A person who practices a form of chemistry from the Middle Ages that was concerned with transforming various metals into gold.	1
Alchemy	A type of science and philosophy from the Middle Ages that attempted to perform unusual experiments, taking something ordinary and turning it into something extraordinary.	1
alkali metals	Any of a group of soft metallic elements that form alkali solutions when they combine with water. They include lithium, sodium, potassium, rubidium, cesium, and francium.	3
alkaline earth metals	Any of a group of metallic elements that includes beryllium, magnesium, calcium, strontium, barium, and radium.	3
alpha particle	A positively charged particle, indistinguishable from a helium atom nucleus and consisting of two protons and two neutrons.	5, 6
alpha decay	A type of radioactive decay in which a nucleus emits an alpha particle.	6
aplastic anemia	A disorder of the bone marrow that results in too few blood cells.	4
apothecary	The person in a pharmacy who distributes medicine.	1
atom	The smallest component of an element that shares the chemical properties of the element and contains a nucleus with neutrons, protons, and electrons.	1, 2, 3, 4, 5, 6
atomic bomb	A bomb whose explosive force comes from a chain reaction based on nuclear fission.	6
atomic number	The number of protons in the nucleus of an atom. This number gives each element its identity.	5, 6
atomic weight	The total weight of an atom, which is approximately equal to the number of protons and neutrons, with a little extra added by the electrons. The stability of the nucleus, and hence the atom's radioactivity, is heavily dependent upon the number of neutrons it contains.	3, 4, 5
battery	A device used to generate electrical energy.	2
beta particle	A fast-moving electron or positron emitted as part of radioactive decay.	5, 6
beta decay	A type of radioactive decay in which a proton is transformed into a neutron, or a neutron is transformed into a proton.	6
calxes	The ashy or powdery substance that remains when a metal or mineral has been subjected to combustion by heat.	1

carbonation	Saturation with carbon dioxide, as in the manufacture of soda water.	1
cathode ray	A beam of fast-moving electrons that travels through a tube that contains a vacuum or a low-pressure gas.	5
caustic potash	Also known as potassium hydroxide, a white, corrosive, solid compound used in bleaches, soaps, and detergents.	2
caustic soda	Also known as sodium hydroxide, a white, corrosive, solid compound that is toxic and is used to make chemicals and soaps and to refine petroleum. (See lye.)	2
chain reaction	When applied to nuclear reactions, a process in which the splitting of atoms by neutrons releases more neutrons that, in turn, causes more atoms to split.	6
chemical bond	An attraction between atoms that results in the formation of substances that contain two or more atoms.	2
chemical formula	Chemical symbols and subscripts that show the relative proportions of elements present in a compound.	1, 3
combustible	Able to burn.	1
combustion	The act or process of burning.	1
compound	A substance consisting of atoms of two or more different elements joined by chemical bonds.	2, 3
crucible	A container made of materials that resist great heat.	1, 2
crystal	A solid composed of atoms, ions, or molecules arranged in a regular pattern.	3
cyclotron	A device that accelerates particles by the use of a constant magnetic field.	6
density	A measure of the mass of a substance per unit volume.	3
diffraction	The spreading of waves around obstacles in their path. An example is the spreading of X-rays around regularly spaced atoms of a crystal; if the diffracted X-rays are directed onto a photographic film they provide information about the structure of the crystal.	5
dosimeter	An instrument that a person wears in order to measure and indicate his or her exposure to ionizing radiation.	4
effervescence	The property of giving off gas bubbles, bubbling up, or foaming.	2
electricity	A form of energy resulting from the presence and flow of electric charge. Electromagnetism is the force that causes the interaction between electrically charged particles; the areas in which this happens are called electromagnetic fields.	2, 4, 5
electrolysis	A process in which a chemical change, especially decomposition, is brought about by passing an electric current through a solution of electrolytes so that the ions move toward the negative and positive electrodes and react with them.	2
electron	The lightest electrically charged particle in the atom.	2, 3, 5, 6

electrostatic generator	Devices that generate or store high voltages by accumulating static electric charge.	2
element	A pure chemical substance consisting of one type of atom distinguished by its atomic number, which is the number of protons in its nucleus. Familiar examples of elements include gold, iron, copper, carbon, mercury, sodium, calcium, hydrogen, nitrogen, and chlorine.	1, 2, 3, 4, 5, 6
eloquence	Being good with words and expressing things in a pleasing or persuasive manner.	2
energy level	One of a series of probable locations around an atom where electrons having specific energy values may be found. Energy levels are correlated with rows in the Periodic Table.	3, 5
fission	The splitting of a large nucleus into smaller pieces.	6
fixed air	A chemical compound (chemical formula CO_2) composed of two oxygen atoms covalently bonded to a single carbon atom.	1
force	Any of various factors that cause a body to change its speed, direction, or shape.	2
frequency	Number of waves crests that move past a given point in a given unit of time.	5
gamma rays	High-energy electromagnetic waves that can be emitted during radioactive decay.	5
gas	An air-like substance that expands to fill the space it is in.	1
Geiger counter	An electronic instrument that detects and measures nuclear radiation, such as X-rays or gamma rays.	5
Geissler tube	A type of cathode-ray tube in which the electrons are produced by a glow discharge in a low-pressure gas. The cathode rays are beams of fast-moving electrons that travel through the tube.	5
globules	A tiny ball or globe; especially a drop of liquid.	2
gold	A soft, yellow precious metal with an atomic number of 79.	1
halogens	Any of the five nonmetallic elements with similar properties: fluorine, chlorine, bromine, iodine, and astatine.	3
heat	A form of energy resulting from the movement of particles.	2, 6
intermolecular bond	An attractive force between molecules.	2
ionization	The process of converting an atom into an ion by adding or removing charged particles such as electrons.	4
isotope	Any of two or more forms of an element having the same number of protons but a different number of neutrons in the nucleus.	4, 6
liquid	A substance that is neither a solid nor a gas, composed of molecules that can move about. It has no fixed shape but, instead, has a characteristic readiness to flow and, therefore, takes on the shape of	1

	any container.	
luster	A sheen or soft glow, especially that of a partly reflective surface.	2
lye	An alkaline solution, often a mix of potassium or hydroxide or sodium, generally used for cleaning. See definition of caustic soda above.	2
magnet	An object that attracts certain metals and attracts and repels other magnets.	5
magnetism	Phenomena associated with magnets.	4
mass	A measure of the amount of matter contained in or constituting a physical body.	1, 3, 4, 5
mass number	Total number of protons and neutrons in the atomic nucleus that is used to characterize isotopes.	6
matter	A general term for the substance of which all physical objects consist. Typically, matter includes atoms and other particles which have mass. A common way of defining matter is as anything that has mass and occupies volume.	1, 2, 4, 5, 6
metal	Any of the elements with a positive electrical charge, typically shiny and a good conductor of heat.	1, 2, 3
millirems (mrem)	A unit that measures the effect of ionizing radiation upon a particular person.	4
molecule	A group of two or more atoms linked together by sharing electrons in a chemical bond.	2
neutron	A heavy, neutral particle in an atom’s nucleus that accounts for almost all of each atom’s mass, in addition to protons.	2, 3, 5, 6
noble gases	Any of the six gases helium, neon, argon, krypton, xenon, and radon. Because the outermost electron shell of atoms of these gases is full, they do not react chemically with other substances except under certain special conditions.	3
nuclear fuel	A substance that can undergo fission in a chain reaction and provide nuclear energy.	6
nuclear reaction	Reactions in which the nuclei of atoms are changed. Fission is one kind of nuclear reaction.	6
nuclear reactor	A structure that is designed to contain and control nuclear fission.	6
nucleus/nuclei	The center core of an atom that has a positive charge and contains most of the atom's mass.	3, 5, 6
ore	Any natural combination of minerals, especially one from which a metal or metals can be profitably extracted.	1
oxygen	A colorless, odorless reactive gas that is found in air and that is necessary to maintain life.	1, 2, 3
periodic law	The principle that the properties of the chemical elements recur periodically when the elements are arranged in increasing order of their atomic numbers.	3

Periodic Table	A table in which the chemical elements are arranged in order of increasing atomic number. Elements with similar properties are arranged in the same column (called a group), and elements with the same number of electron shells are arranged in the same row (called a period).	3, 4, 5, 6
phlogiston	The substance thought by early chemists to be given off as smoke and flame when something is burned.	1, 2
phosphorus	An element that emits phosphorescence. Phosphorescence is a light given off at low temperatures that is caused by the absorption of radiation (as X-rays or ultraviolet light) and continues for a noticeable time after the radiation has stopped.	1
pitchblende	The common term for uraninite, a brown to black mineral that is a source of uranium and radium.	4
prism	A transparent object that refracts (bends) light.	3, 5
proton	The positively charged particles found in the nucleus of every atom.	2, 5, 6
radiation	Electromagnetic waves and particles moving at great velocity emitted by a source. Radiation that is energetic enough to ionize atoms in the body is called ionizing or high-energy radiation.	4
radiation sickness	Illness caused by substantial exposure to ionizing radiation, which includes symptoms of bleeding, sores, fatigue, stomach upset, hair loss, and damage to blood-forming tissues.	4
radioactive decay	The process by which a nucleus of an unstable atom breaks apart and releases energy by emitting ionizing radiation (electromagnetic waves and particles). The emission is spontaneous in that the atom decays without any interaction with another particle from outside the atom.	4, 5
radioactive/ radioactivity	The quality of giving off of rays or particles by the breaking apart of atoms of certain elements (such as uranium).	4, 5, 6
radioisotope	An isotope of an element that is radioactive	6
rust	Best known as a reddish-brown or reddish-yellow coating on iron or steel created by the chemical reaction of oxygen (in air or water) with iron, creating iron oxide.	1
solid	A substance that is firm and stable in shape, not liquid or fluid.	1
spectroscopy	The study of the interaction between matter and radiated energy. Spectroscopy originated through the study of visible light dispersed according to its wavelength by a prism.	5
spectrum/spectra	The range of colors of wavelength energy sent out from a light source when viewed through a prism.	3, 5
transmutation	The conversion of one chemical element into another either through nuclear reactions (in which an outside particle reacts with a nucleus) or through radioactive decay (where no outside particle is needed).	4
transuranic element	An element in the Periodic Table with a higher atomic number than uranium.	6

valence electrons	Electrons in an atom's outermost energy level.	3
voltaic pile	An early type of primary cell used to generate direct current, consisting of a stack of paired disks of dissimilar metals separated by acid-saturated cloth or paper.	2
wavelength	The distance between one peak or crest of a wave and the next peak or crest.	5
X-rays	A band of electromagnetic radiation produced by the bombardment of a substance by a stream of electrons moving at great velocity. X-rays are capable of penetrating opaque or solid substances, ionizing gases and body tissues through which they pass, or, through extended exposure, destroying tissue and affecting photographic plates and fluorescent screens.	4, 5