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**9TH EDITION
PRIMARY
SCIENCE
KNOWLEDGE & UNDERSTANDING**

*NEW EDITION UPDATES BY
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Learning Matters
A SAGE Publishing Company
1 Oliver's Yard
55 City Road
London EC1Y 1SP

SAGE Publications Inc.
2455 Teller Road
Thousand Oaks, California 91320

SAGE Publications India Pvt Ltd
B 1/1 Mohan Cooperative Industrial Area
Mathura Road
New Delhi 110 044

SAGE Publications Asia-Pacific Pte Ltd
3 Church Street
#10-04 Samsung Hub
Singapore 049483

Editor: Amy Thornton
Senior project editor: Chris Marke
Project management: Deer Park Productions
Marketing manager: Lorna Patkai
Cover design: Wendy Scott
Typeset by: C&M Digital (P) Ltd, Chennai, India
Printed in the UK

© 2021 Graham Peacock, John Sharp, Rob Johnsey,
Debbie Wright, Keira Sewell, Deborah Wilkinson and
Wayne Stallard

First published in 2000 by Learning Matters Ltd.
Reprinted in 2001 (twice). Second edition published
in 2002. Reprinted in 2003 (twice), 2004 (twice), 2005
and 2006 (twice). Third edition published in 2007.
Reprinted in 2007 and 2008. Fourth edition published
in 2009. Reprinted in 2010. Fifth edition published in
2011. Reprinted in 2011 (twice). Sixth edition published
in 2012. Seventh edition published in 2014. Eighth
edition published in 2017. Ninth edition published
in 2021.

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Library of Congress Control Number: 2020942869

British Library Cataloguing in Publication data

A catalogue record for this book is available from the
British Library

ISBN 978-1-5297-1597-2
ISBN 978-1-5297-1596-5 (pbk)

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Glossary: Know your 'asteroid' from your 'wavelength'? Build your knowledge with the full online glossary of terms for science.

GLOSSARY

Acceleration: the rate of change in velocity – measured in metres per second per second.

acid: a substance which forms hydrogen ions (H⁺) when dissolved in water and has a pH of less than 7.

adaptation: a species' genetic adjustment to environmental conditions through the long-term process of natural selection.

air resistance: see friction.

algae: organisms including seaweeds currently classified as protoctists rather than plants on the basis of their life cycle rather than appearance.

alkali: a base that dissolves in water, has a pH of more than 7 and neutralises acids.

allotrope: giant structures made of the same element but with different structures and different properties.

amplitude: the amount of up and down movement in a wave. The size of the amplitude of a vibration will determine the loudness of the sound produced.

amps: a measure of the flow (current) of electricity.

Angiospermophyta: phylum of the plant kingdom. Includes flowering plants.

Animalia: kingdom. Complex, multicellular, eukaryotic organisms. Cells have no cellulose cell walls, chloroplasts or large, permanent vacuoles. Includes vertebrate and invertebrate groups. Humans are animals.

Annelida: phylum of the animal kingdom. Includes true segmented worms such as earthworms, leeches and ragworms.

aphelion: the point where a planet is furthest from the Sun.

Arthropoda: phylum of the animal kingdom. Includes spiders, centipedes, millipedes, woodlice and butterflies.

- asteroids:** small, rocky objects which orbit the Sun. Sometimes referred to as minor planets.
- atom:** smallest particle of an element consisting of electrons and a nucleus.
- atomic mass:** the sum of the number of protons and neutrons in the nucleus of any element.
- atomic number:** the number of protons in the nucleus of any element.
- autotrophs:** food producers, e.g. green plants, that use the Sun's energy to make food by photosynthesis.
- balanced forces:** will hold an object still or allow it to continue with a constant velocity.
- base:** a substance that forms hydroxyl ions (OH⁻) when dissolved in water, has a pH of more than 7 and neutralises acids.
- battery:** a group of cells.
- Big Bang:** an explosion of space and time from which the Universe emerged. This is now thought to have occurred about 14 billion years ago.
- black:** a totally black object will reflect no light.
- boiling:** the rapid change of a chemical from a liquid to a gas that involves the formation of bubbles.
- bond energy:** the energy needed between each atom in a molecule in order to hold the atoms together.
- Bryophyta:** phylum of the plant kingdom. Includes common mosses, liverworts and hornworts.
- buoyancy:** see upthrust.
- burning:** a chemical reaction that involves oxygen and that is exothermic.
- carnivore:** animal (occasionally a plant) that consumes and gains energy from other consumers, i.e. other animals, either herbivore or carnivore.
- cell:** a container of chemicals which react together producing a flow of electrons from one terminal to the other.
- cells:** microscopic building blocks and basic units of life.
- chemical formula:** the symbolic representation of a molecule or compound.
- chlorophyll:** green substance within the chloroplasts of certain plant cells. Absorbs energy in light from the Sun and makes it available to carry out photosynthesis.

Glossary

Chordata: phylum of the animal kingdom. Includes vertebrates and other organisms with a notochord or stiffening rod providing internal support.

chromosome: a long thin structure in the nucleus of each cell. Humans have 46 chromosomes, 23 of which are from the father and 23 of which are from the mother. Each chromosome is made from proteins and DNA.

circuit: components linked by wires which allow a flow of electricity.

Cnidaria: phylum of the animal kingdom. Includes jellyfish, corals and sea anemones.

colour filter: prevents certain colours of light passing through while allowing through others.

comet: chunk of ice and dust in orbit around the Sun.

community: a group of plants and animals in a particular habitat.

compound: a substance composed of two or more elements in definite proportions by weight.

compression: the squeezing together of the molecules when vibrations are set up in a gas.

conceptual understanding: an understanding of scientific ideas, e.g. force.

condensation: process of changing from a gas to a liquid.

conductor: a material which allows electricity to flow through it.

Coniferophyta: phylum of the plant kingdom. Includes conifers and firs.

conservation of energy: the total energy remains unchanged as it changes from one form to another.

covalent bonding: bonding between atoms where electrons are shared.

Darwin: the scientist who first described the theory of evolution in his book *The Origin of Species*.

day and night: the day and night cycle is caused by the rotation of the Earth about its axis once every 24 hours.

deceleration: the rate of decrease in velocity (some scientists say deceleration is negative acceleration).

decomposers: living things that get their energy from dead and decaying matter.

digestion: the physical and chemical breakdown of food.

dissolving: the process of making a solution where at least one of the chemicals is in a liquid state.

DNA: a chemical – deoxyribonucleic acid. It forms long double strands wound round each other in the form of a double helix. The strands are joined by chemical bonds.

dominant: in each pair of chromosomes there are genes which code for the same characteristic. If the genes programme for different effects, the one which is expressed in the characteristics of the organism, e.g. hair colour, is dominant.

Echinodermata: phylum of the animal kingdom. Includes starfish and sea urchins.

eclipse: the blocking off of light from one astronomical body by another.

ecology: the study of the relationship of living things in their natural environment. The natural environment will include living and non-living things.

ecosystem: an integrated unit of a community of living things and the physical environment in a certain area, i.e. a given community and its habitat. Studies of ecosystems will focus on interactions between living and non-living things and on the flow of energy and materials between these parts.

efficiency: the proportion of energy which is usefully converted.

elastic energy: energy in the change of shape of an object.

electricity: a flow of electrons from a negative to a positive terminal.

electromagnetic spectrum: a family of wave types which includes light, X-rays, radio waves, etc.

electrons: particles which surround the nucleus of an atom and have a negative charge.

element: substance consisting of one type of atom only.

endothermic reaction: a chemical reaction that takes energy from its surroundings because the total bond energy needed between atoms in the new chemicals is more than the total bond energy in the original reactants.

energy: the capacity to do work by moving or heating.

environment: the conditions existing in a habitat that will affect a particular organism.

eukaryote: eukaryotic organisms are composed of eukaryotic cells that have a well-defined nucleus containing each cell's genetic material or DNA.

evaporation: process in which a liquid changes to a gas.

evolution: the process by which organisms have changed over millions of years into different forms. There is a clear sequence, for instance, from dinosaurs to birds.

Glossary

exothermic reaction: a chemical reaction that gives energy to its surroundings because the total bond energy needed between atoms in the new chemicals is less than the total bond energy in the original reactants.

falsification: the act of testing out the validity of a theory or hypothesis through searching for negative, falsifying instances.

filament: the very fine wire in a light bulb.

Filicinophyta: phylum of the plant kingdom. Includes ferns.

fission: this occurs when an unstable nucleus splits into two fragments.

food chain: the feeding relationship in a given ecosystem which illustrates the flow of energy.

food pyramid: a representation of the relative biomass in a food chain and, hence, the relative proportions of energy transfer.

food web: a complex interaction of several or many food chains within an ecosystem.

fossil fuel: a fuel such as oil, coal or gas, which is stored in rocks. Energy is obtained when these fuels are burnt.

freezing: process of changing from a liquid to a solid.

frequency: the number of waves passing a given point each second, measured in hertz or megahertz. The frequency of a vibration determines the pitch of the sound produced.

friction: (including air or water resistance) the force which occurs between two substances and that tends to reduce movement or prevent potential movement.

fuel: a source of heat energy obtained from materials that burn.

Fungi: kingdom. Complex, eukaryotic organisms with thread-like hyphae rather than cells. Hyphae may contain one or more nuclei. Chitinous cell walls. No chloroplasts. Includes mushrooms, yeast and moulds.

galaxy: an assemblage of stars, nebulae and other interstellar material.

gas: a state of matter that completely fills its container and can be compressed.

gene: a section of a chromosome which codes for the production of a particular protein.

genetic: pertaining to genes or inherited characteristics.

giant structures: large numbers of atoms that are bonded together to make a new substance that is very difficult to break apart.

gravitational potential energy: energy due to the position of an object above the Earth's surface.

gravity: the force of attraction between all objects with mass.

habitat: the natural home of a group of plants and animals that provides all (or nearly all) the needs of the inhabitants.

heat: a form of kinetic energy.

herbivore: animal that consumes and gains energy from primary producers only, i.e. plants.

heterotrophs: organisms not capable of manufacturing their own food. Humans are heterotrophs. They get their food by eating plants and other animals.

heterozygous: a person who has two different genes for the same characteristic. One of these genes will be recessive and one will be dominant.

homozygous: a person who has two identical genes for the same characteristic.

hydrogen: the lightest gas. It is the commonest element in the Universe.

hydroxide: a compound which contains a hydroxide ion (OH).

igneous rock: rock formed from magma that is solidified.

inherit: to have genetic information passed on from a preceding generation.

insulator: a material which does not allow electricity to pass through it.

ion: an atom that has lost or gained one or more electrons and as a result has a positive or negative charge.

ionic bonding: bonding between atoms where electrons are taken or given (transferred).

isotope: atoms of the same element which have the same atomic number but different atomic mass because the number of neutrons varies.

key: device which can be used to systematically classify or identify living and non-living things. Keys come in different forms.

lichen: a symbiotic association between a fungus and an alga. Lichens grow very slowly and are usually found encrusting rocks, gravestones and roofs.

light: a form of energy which affects the nerve cells on the retina of the eye. Light travels in straight lines in waves from a source.

Glossary

lignification: process of impregnating and strengthening xylem cells with lignin. In woody plants like trees fully lignified xylem forms woody tissue.

lignin: a complex chemical compound most commonly derived from wood, and an integral part of the secondary cell walls of plants and some algae.

liquid: a state of matter that takes up the shape of its container and can be compressed a little.

loudness: the volume of a sound which is a measure of the energy used to make the sound and is determined by the amplitude of vibrations.

Lycopodophyta: phylum of the plant kingdom. Includes club mosses.

mass: the amount of matter in a substance – measured in grams or kilograms.

melting: process in which a solid changes to a liquid.

Mendel: a monk who, in the late nineteenth century, propounded the basics of inheritance through dominant and recessive genes. In 1865 he published an account of breeding peas on which the whole science of genetics is based.

metal: an element which can ionise by electron loss.

metamorphic rock: igneous and sedimentary rock that has been changed by heat and pressure.

meteoroids: particles of dust and rock fragments frequently derived from comets.

mineral: a naturally occurring chemical compound, often crystalline in structure.

mixture: different elements and compounds mixed together with no chemical reaction between them.

molecule: a group of two or more atoms bonded together.

Mollusca: phylum of the animal kingdom. Includes slugs and snails, as well as squids and octopuses.

Monera (prokaryotae): kingdom. Usually simple, unicellular or colonial, prokaryotic organisms. Cells lack a well-defined nucleus. Includes bacteria and blue-green bacteria (formerly blue-green algae).

moons: objects which orbit planets. The Earth's moon is referred to as the Moon.

mutation: a sudden alteration in the genetic information which causes a difference in the appearance of the organisms. Changes which occur only in the body cells affect only the individual concerned. If the change happens in the sex cells then the change is passed on to future generations.

natural selection: the process by which individuals of the same species compete for limited breeding opportunities and food. Those which are less well suited to the environment do not obtain mates or food and so cannot pass on their genes.

nebulae: clouds of interstellar gas, ice and dust.

Nematoda: phylum of the animal kingdom. Includes free-living or parasitic roundworms.

neutron: particle found inside the nucleus of an atom with no charge and an atomic mass of 1.

nuclear energy: energy released when a heavy nucleus splits.

omnivore: animal that consumes, and gains energy from, primary producers, as well as other consumers.

organ: group of tissues that work together to carry out a particular function.

oscilloscope: an instrument which converts sound energy into a visual, graphic display on a screen.

oxide: a compound that contains oxygen.

oxygen: a gas that comprises approximately 21 per cent of the Earth's atmosphere. It is vital for life.

pH: a hydrogen ion index measuring acidity and alkalinity.

parallel circuit: an electric circuit which provides two or more pathways for electricity.

parasite: an organism that lives in or on another and which feeds on the other without giving anything in return, often at the expense of the host's welfare.

pathogens: disease-causing micro-organisms including bacteria, viruses, fungi and protoctista.

perihelion: the point where a planet is nearest to the Sun.

phases of the Moon: how the Moon looks as it orbits the Earth. Viewed from the Earth, the Moon appears to change its shape in a cycle of phases which lasts about one month.

photosynthesis: the process by which plants manufacture their own food. Plants use carbon dioxide, water and the energy in sunlight to produce simple sugars like glucose which they can then use during cellular respiration and to produce many of the other substances they need.

pitch: the highness or lowness of a sound which is determined by the frequency of the vibrations.

planet: large spherical object which orbits the Sun.

Glossary

Plantae: kingdom. Complex, multicellular, eukaryotic organisms. Most cells have cellulose cell walls, chloroplasts and a sap-filled vacuole. All green plants are capable of photosynthesis.

Platyhelminthes: phylum of the animal kingdom. Includes free-living flatworms and parasitic tapeworms and flukes.

power: energy transferred per second.

predator: a carnivore, i.e. an animal that gets its energy from consuming other animals.

pressure: when a force acts over a given area, the pressure is a measure of the force on each unit area – measured in newtons per square centimetre or pounds per square inch (as in tyre pressure).

prey: the animal food source for predators.

primary consumer: animal that consumes, and gains energy from, primary producers, i.e. plants.

primary light source: has its own supply of energy and can be seen when there is no other source of light.

primary producer: food producer, like green plants, that uses the Sun's energy to make food, by photosynthesis.

process: a body of techniques for investigating phenomena, acquiring new knowledge, or correcting and integrating previous knowledge.

procedural understanding: an understanding of the ways in which science works, and the processes and methods used in science. This involves bringing together the skills that will be needed to carry out an investigation with an understanding of the procedures, such as designing appropriate investigations, deciding what measurements to take, how to present and interpret data, and whether or not they are valid.

Prokaryote: prokaryotic organisms are composed of prokaryotic cells. Prokaryotic cells have no well-defined nucleus. The genetic material or DNA of prokaryotic cells may cluster or appear dispersed throughout each cell.

Protista: kingdom. Usually simple, unicellular, eukaryotic organisms. Cells may appear 'animal-like' and 'plant-like'. Includes the amoeba and the paramecium. Euglena and others are capable of photosynthesis. Algae are currently classified as protocists.

proton: particle found inside the nucleus of an atom with a positive charge and an atomic mass of 1.

pupil: a protected hole in the eye through which light travels to the retina.

quality of sound: describes the effect of a sound's many component frequencies. This enables us to tell the difference between a note played by one instrument and the same note played on another instrument.

rarefaction: the moving apart of the molecules when vibrations are set up in a gas.

reaction force: the force created by a surface as the result of another force acting on it.

recessive: in each pair of chromosomes there are genes which code for the same characteristic. If the genes programme for different effect, the one which is not expressed in the characteristic of the organism, e.g. eye colour, is recessive.

reflection: an image formed in a reflective surface such as a mirror.

renewable energy: energy which comes from the Sun or the motion of the Moon such as winds, solar energy and tides.

resistance: a measure of the difficulty electricity has in passing through a conductor.

respiration: the oxidation of chemicals which supply energy when broken down. This happens in cells.

retina: the internal back wall of the eye containing nerve cells which are sensitive to light.

rusting: a chemical reaction that involves oxygen and results in the formation of an oxide.

salt: a compound in which all or part of its hydrogen has been replaced by a metal.

saturation: a liquid is saturated when it cannot dissolve any more solid.

seasons: the cycle of seasons is caused by the tilt of the Earth's axis relative to the plane of its orbit around the Sun. In the UK, this cycle includes spring, summer, autumn and winter.

secondary consumer: animal that consumes, and gains energy from, primary consumers, i.e. herbivore animals.

secondary light source: reflects or scatters light from a primary source, e.g. the Moon, a sheet of paper or a wall.

sedimentary rock: rock formed from deposits of weathered rock and, sometimes, the hard parts of organisms.

series circuit: a circuit where all the components are linked so that electricity has only one pathway through all of them.

shadow: the total or partial absence of light.

short circuit: a pathway in a parallel circuit which has no resistance – it allows electricity to flow unchecked.

Glossary

skill: the ability to use apparatus and measurements, and to engage with scientific processes in context.

Solar System: the Sun (our nearest star) together with its family of planets, moons, asteroids, comets and meteoroids.

solid: a state of matter that holds its own shape and cannot be compressed.

sound: a form of energy which is transmitted by waves of vibrations through a medium.

speed: the rate at which something moves from one place to another – measured in miles per hour or metres per second.

Sphenophyta: phylum of the plant kingdom. Includes horsetails.

star: normal stars are massive balls of hot, glowing gas. Stars change as their life cycle evolves.

sublimation: process of changing from a solid to a gas, without going through the liquid state.

suspension: where the small particles of a solid do not dissolve in a liquid.

temperature: the degree of hotness of something.

tissue: group of specialised cells that work together to carry out a particular function.

transverse wave: a wave in which parts move to and fro at right angles to the direction in which the wave is moving.

trophic levels: the different points or layers in a food chain or food pyramid.

unbalanced forces: will enable an object to accelerate or decelerate (including changing direction).

Universe: everything that exists: matter, radiation and space.

upthrust: the upwards-acting force provided by a liquid on objects which are immersed in it.

variable resistor: a device which can be made to have a range of resistance.

velocity: the speed of something in a particular direction.

vibration: a regular backward and forward movement of a physical substance.

virus: viruses invade living cells and use them to reproduce. Viruses are pathogens and generally cause harm. The nature of viruses remains uncertain.

voltage: a measure of the energy of electrical flow.

water resistance: see friction.

watt: energy transferred at the rate of 1 joule per second.

wavelength: the wavelength of a wave is the distance between similar parts of successive waves. The length of a light wave determines its colour.

weight: the force on an object due to the gravitational pull of the Earth – measured in newtons.

work: a transfer of energy as a result of a force acting through a distance; 1 joule is 1 newton moved through 1 metre.