SCIENCE

Substantive and Procedural Knowledge

YEAR 5

🌍 Year 5 – Earth and Space

Lesson 1: The Solar System

Substantive Knowledge
The Solar System consists of the Sun and planets orbiting it.
Planets vary in size, composition, and distance from the Sun.
Procedural Knowledge
Identify the planets and their order from the Sun.
Use models or diagrams to represent the Solar System.
Vocabulary
Solar System, planet, orbit, Sun, moon, star, asteroid, comet, gravity, rotate
Greater Depth
Compare planet characteristics (size, atmosphere).
Explain orbits and rotation in relation to day and night.

Lesson 2: Earth's Rotation and Day/Night

Substantive Knowledge
Earth rotates on its axis, causing day and night.
Rotation takes approximately 24 hours**.**
Procedural Knowledge
Model Earth's rotation using globes and light sources.
Observe and explain day/night cycle.
Vocabulary
rotate, axis, day, night, Earth, sunlight, shadow, hemisphere, time, orbit
Greater Depth
Explore time zones and why they differ.
Explain how rotation affects shadows**.**

Lesson 3: The Moon and Phases

Substantive Knowledge
The Moon orbits Earth and has phases caused by sunlight reflection.
Phases include new moon, crescent, quarter, gibbous, full moon**.**
Procedural Knowledge
Observe and sequence moon phases.
Create models showing phases.
Vocabulary
orbit, new moon, crescent, quarter full moon, sunlight, reflect,

Greater Depth
Investigate why lunar eclipses occur.
Explain how moon phases affect tides.

Lesson 4: The Earth and Sun's Relationship

Substantive Knowledge
Earth orbits the Sun, causing seasons.
Tilt of Earth's axis causes variation in sunlight.
Procedural Knowledge
Model Earth's orbit and tilt to explain seasons.
Record temperature or daylight changes during seasons.
Vocabulary
orbit, tilt, axis, season, sunlight, hemisphere, temperature, equator, solstice, equinox
Greater Depth
Explore differences in seasons between hemispheres.
Explain the impact of seasons on living things.

Lesson 5: Day Length and Shadows

Substantive Knowledge
Length of day changes through the year due to Earth's tilt.
Shadows change length and direction based on the Sun's position.
Procedural Knowledge
Measure and record shadow lengths at different times.
Relate shadow changes to Sun's position.
Vocabulary
shadow, sunlight, length, direction, position, time, Earth, tilt, rotate, day
Greater Depth
Predict shadow lengths throughout the day/year.
Explain how sundials work.

Lesson 6: Recap and Investigate

Substantive Knowledge
Consolidate understanding of Earth, Sun, Moon relationships.
Use knowledge to explain phenomena.
Procedural Knowledge
Plan and conduct investigations or presentations on Earth and Space.
Use diagrams, models, or digital tools.
Vocabulary
investigate, model, explain, observe, Solar System, rotation, orbit, phase, shadow, season
Greater Depth
Explore current space missions or discoveries.
Create detailed presentations explaining Earth and space concepts.

Year 5 – Properties and Changes of Materials

Lesson 1: Properties of Materials

Substantive Knowledge
Materials have properties like hardness, solubility, transparency, conductivity, and magnetism.
Procedural Knowledge
Test and describe properties of common materials.
Group materials based on their properties.
Vocabulary
property, material, hardness, solubility, transparency, conductivity, magnetism, flexible, brittle, opaque
Greater Depth
Explain why materials have specific properties based on structure.
Explore uses of materials based on their properties.

Lesson 2: Solubility and Mixing

Substantive Knowledge
Solubility is the ability of a material to dissolve in a liquid.
Some materials dissolve fully, some partially, and some not at all.
Procedural Knowledge
Conduct solubility tests with various materials and liquids.
Record observations and results.
Vocabulary
solubility, dissolve, solution, liquid, solid, mixture, filter, sediment, transparent, opaque
Greater Depth
Investigate factors affecting solubility (temperature, stirring).
Explore saturation and supersaturation.

Lesson 3: Separating Mixtures

Substantive Knowledge
Mixtures can be separated by filtering, sieving, evaporating, or magnetism.
Different methods suit different types of mixtures.
Procedural Knowledge
Perform separation techniques to separate mixtures.
Choose appropriate methods for different mixtures.
Vocabulary
mixture, separate, filter, sieve, evaporate, magnet, residue, solution, sediment, method
Greater Depth
Explain the science behind separation techniques.
Design a method to separate a complex mixture.

Lesson 4: Reversible and Irreversible Changes

Substantive Knowledge

Some changes to materials are reversible (e.g., melting), others are irreversible (e.g., burning).

Chemical reactions cause irreversible changes.

Procedural Knowledge

Observe and classify changes as reversible or irreversible.

Discuss chemical vs physical changes.

Vocabulary

reversible, irreversible, change, chemical reaction, physical change, burn, melt, freeze, dissolve, reaction

Greater Depth

Explore everyday examples of irreversible changes.

Explain chemical reactions in simple terms.

Lesson 5: Investigating Changes of State

Substantive Knowledge

Heating and cooling cause changes of state in materials.

Changes of state are physical and reversible.

Procedural Knowledge

Conduct experiments to observe melting and freezing.

Record times and temperatures.

Vocabulary

heat, cool, melting, freezing, temperature, state, physical change, reversible, solid, liquid

Greater Depth

Investigate factors influencing rates of melting/freezing.

Explain changes using particle theory.

Lesson 6: Applying Knowledge of Materials

Substantive Knowledge

Material properties influence their practical uses.

Choosing materials depends on their properties and the task.

Procedural Knowledge

Evaluate materials for specific uses.

Justify material choices based on properties.

Vocabulary

evaluate, property, material, use, suitable, task, choose, durability, strength, flexibility

Greater Depth

Design and test a product using appropriate materials.

Consider sustainability and environmental impact in choices.

Year 5 – Forces

Lesson 1: What Are Forces?

Substantive Knowledge
Forces are pushes or pulls that can cause motion or change shape.
Gravity is a force pulling objects towards Earth.
Procedural Knowledge
Identify forces acting in different situations.
Demonstrate pushes and pulls.
Vocabulary
force, push, pull, gravity, friction, motion, weight, contact, non-contact, resistance
Greater Depth
Explain gravity as a non-contact force.
Discuss forces in everyday life.

Lesson 2: Gravity and Weight

Substantive Knowledge
Gravity gives objects weight.
Weight is the force due to gravity acting on mass.
Procedural Knowledge
Measure weight using scales.
Understand difference between mass and weight.
Vocabulary
gravity, weight, mass, scale, force, measure, pull, Earth, kilogram, newton
Greater Depth
Explain weight differences on other planets.
Investigate how gravity varies with distance.

Lesson 3: Friction

Substantive Knowledge
Friction is a force that opposes motion between surfaces.
Different surfaces create different amounts of friction.
Procedural Knowledge
Investigate friction using ramps and various materials.
Measure effects of friction on movement.
Vocabulary
friction, surface, motion, oppose, resistance, smooth, rough, force, slow, stop
Greater Depth
Explain how friction produces heat.
Explore friction reduction in engineering.

Lesson 4: Air and Water Resistance

Substantive Knowledge
Air and water resistance are forces that slow moving objects.
Resistance depends on shape and surface area.

Procedural Knowledge
Conduct experiments with parachutes or boats.
Observe effects of resistance on speed.
Vocabulary
air resistance, water resistance, drag, force, slow, surface area, shape, movement, fluid, obstacle
Greater Depth
Investigate streamline shapes to reduce resistance.
Explain resistance in sports and vehicles.

Lesson 5: Magnetic Forces
Substantive Knowledge
Magnets exert forces that can attract or repel.
Magnetic forces act without contact.
Procedural Knowledge
Explore attraction and repulsion with magnets.
Investigate magnetic materials.
Vocabulary
magnet, magnetic force, attract, repel, pole, north, south, contact, field, metal
Greater Depth
Explain magnetic fields with iron filings.
Explore Earth's magnetic field and compass use.

Lesson 6: Forces in Action
Substantive Knowledge
Forces affect motion and can act in combination.
Balanced and unbalanced forces determine movement.
Procedural Knowledge
Observe forces acting on objects.
Predict motion based on force balance.
Vocabulary
force, balanced, unbalanced, motion, push, pull, gravity, friction, resistance, movement
Greater Depth
Analyse forces in sports or machines.
Design experiments to explore force effects.

👱⚕ Year 5 – Animals Including Humans

Lesson 1: Human Life Cycle
Substantive Knowledge
Humans go through stages: baby, child, adolescent, adult, elderly.
Physical and emotional changes occur at each stage.
Procedural Knowledge
Sequence stages of human development.
Discuss changes and needs at each stage.

Vocabulary
life cycle, baby, child, adolescent, adult, elderly, development, change, growth, puberty
Greater Depth
Compare human life cycles with animals.
Discuss influences on human development.

Lesson 2: Puberty and Changes
Substantive Knowledge
Puberty causes physical and emotional changes.
Changes differ between boys and girls.
Procedural Knowledge
Identify changes during puberty.
Discuss feelings and healthy habits.
Vocabulary
puberty, change, hormones, development, growth, emotions, body, reproduction, health, adolescence
Greater Depth
Explain hormone roles in puberty.
Promote positive wellbeing strategies.

Lesson 3: Nutrition and Balanced Diet
Substantive Knowledge
A balanced diet contains the right nutrients: carbohydrates, proteins, fats, vitamins, minerals, water, fiber.
Nutrition affects health and growth.
Procedural Knowledge
Identify food groups.
Plan a balanced meal.
Vocabulary
nutrition, balanced diet, carbohydrate, protein, fat, vitamin, mineral, fiber, health, water
Greater Depth
Investigate dietary needs for different ages or activities.
Explore food labels and nutritional content.

Lesson 4: Digestive System
Substantive Knowledge
The digestive system breaks down food to absorb nutrients.
Organs include mouth, stomach, intestines.
Procedural Knowledge
Label digestive organs.
Describe the digestion process.

Vocabulary
digestive system, stomach, intestine, mouth, digestion, nutrient, absorb, enzyme, saliva, oesophagus
Greater Depth
Explain roles of enzymes in digestion.
Investigate digestion in different animals.

Lesson 5: Teeth and Their Functions
Substantive Knowledge
Humans have different types of teeth: incisors, canines, molars.
Teeth have roles in biting, tearing, and chewing.
Procedural Knowledge
Identify and name teeth types.
Explore tooth care and hygiene.
Vocabulary
tooth, incisor, canine, molar, bite, tear, chew, enamel, decay, hygiene
Greater Depth
Study tooth decay causes and prevention.
Compare teeth of different animals.

Year 5 Science – Living Things and Their Habitats

Lesson 1: Life Cycles of Mammals
Substantive Knowledge
All living things have life cycles that include birth, growth, reproduction, and death.
Mammals give birth to live young and feed them with milk.
Procedural Knowledge
Describe the stages of a mammal's life cycle.
Compare with other animals using diagrams.
Vocabulary
life cycle, mammal, birth, growth, reproduction, death, stages, live young, parent, nurture
Greater Depth
Compare the life cycles of two different mammals (e.g. elephant vs. dog).
Discuss how environments affect mammal life cycles.

Lesson 2: Life Cycles of Amphibians and Insects
Substantive Knowledge
Amphibians (like frogs) and insects (like butterflies) go through metamorphosis.
Insects may have a complete or incomplete metamorphosis.
Procedural Knowledge
Sequence the life cycle of a frog and a butterfly.
Identify and label each stage clearly.

Vocabulary
amphibian, insect, metamorphosis, larva, pupa, adult, tadpole, frogspawn, caterpillar, lifecycle
Greater Depth
Compare metamorphosis in amphibians and insects.
Predict how environmental changes might impact each stage.

Lesson 3: Life Cycles of Birds and Reptiles
Substantive Knowledge
Birds and reptiles lay eggs.
Offspring hatch and grow through stages before becoming adults.
Procedural Knowledge
Explore similarities and differences in their life cycles.
Organise information using diagrams or charts.
Vocabulary
bird, reptile, hatch, egg, chick, scales, feathers, cold-blooded, grow, develop
Greater Depth
Compare and contrast the life cycles of a bird, reptile, and mammal.
Consider how parenting behaviours differ across species.

Lesson 4: Plant Life Cycles
Substantive Knowledge
Plants grow from seeds or bulbs.
Key stages include germination, growth, pollination, fertilisation, and seed dispersal.
Procedural Knowledge
Sequence the life cycle of a flowering plant.
Identify and explain the function of each stage.
Vocabulary
germination, pollination, fertilisation, seed dispersal, growth, flower, seed, plant, stem, root
Greater Depth
Investigate different types of seed dispersal.
Compare plant life cycles from different environments (e.g. rainforest vs. desert).

Lesson 5: Reproduction in Plants
Substantive Knowledge
Some plants reproduce sexually (via seeds) and others asexually (runners, bulbs).
Flowers are reproductive organs.
Procedural Knowledge
Identify flower parts and their functions in reproduction.
Label diagrams and describe the process.
Vocabulary
reproduction, stamen, pistil, pollen, ovary, asexual, runner, bulb, flower, seed

Greater Depth
Compare sexual and asexual reproduction in plants.
Explore advantages and disadvantages of both methods.

Lesson 6: Comparing Life Cycles

Substantive Knowledge
Life cycles vary greatly between species but share common elements.
All involve birth, growth, reproduction, and death.
Procedural Knowledge
Create a comparison chart or Venn diagram of several life cycles.
Identify key similarities and differences.
Vocabulary
compare, contrast, lifecycle, reproduction, birth, growth, adult, stages, differences, similarities
Greater Depth
Draw conclusions about life cycle adaptations based on environments.
Explain how life cycles support species survival.

🧪 Year 5 – *Scientists and Inventors* (Twinkl PlanIt)

Lesson 1: David Attenborough – Biodiversity and Conservation

Substantive Knowledge
Sir David Attenborough is a naturalist who has helped people understand and care for the natural world.
Biodiversity means the variety of life and is important for healthy ecosystems.
Procedural Knowledge
Identify and classify different species in a local habitat.
Discuss the impact of human actions on biodiversity.
Vocabulary
biodiversity, conservation, habitat, species, nature, environment, ecosystem, naturalist, wildlife, impact
Greater Depth
Create a documentary-style presentation explaining local biodiversity.
Debate: Should people always put the environment before profit?

Lesson 2: Margaret Hamilton – Space Programming

Substantive Knowledge
Margaret Hamilton wrote the computer code for the Apollo moon landings.
Coding and problem-solving were vital for space exploration.
Procedural Knowledge
Explore basic algorithms or sequences in computing.
Identify problems and create logical steps to solve them.
Vocabulary
code, space, moon, rocket, program, astronaut, problem, logic, Apollo, engineer

Greater Depth
Write and explain a sequence of instructions (e.g., for a robot or task).
Reflect: Why is coding important beyond space missions?

Lesson 3: Leonardo da Vinci – Scientific Observations

Substantive Knowledge
Leonardo da Vinci used observation and drawing to explore the human body, flight, and machines.
His ideas linked art and science.
Procedural Knowledge
Record detailed observational drawings of natural objects.
Ask scientific questions based on observations.
Vocabulary
observe, record, draw, sketch, design, invention, flight, anatomy, curiosity, notebook
Greater Depth
Create your own invention inspired by nature and explain its parts.
Analyse: What qualities made da Vinci both a scientist and an artist?

Lesson 4: Jane Goodall – Primates and Observation

Substantive Knowledge
Jane Goodall studied chimpanzees in the wild and discovered they use tools.
Her work changed our understanding of animal behaviour.
Procedural Knowledge
Record observations of animal behaviour (real or video).
Use data collection to identify patterns.
Vocabulary
chimpanzee, behaviour, observe, record, pattern, tool, wildlife, study, nature, scientist
Greater Depth
Write a research diary in the style of Jane Goodall.
Explain: What makes an observation different from an opinion?

Lesson 5: Stephen Hawking – Black Holes and Space-Time

Substantive Knowledge
Stephen Hawking studied black holes and the nature of the universe.
He made complex science understandable to many people.
Procedural Knowledge
Use models to represent complex ideas (e.g., space, gravity).
Ask and research deep scientific questions.
Vocabulary
space, black hole, gravity, time, universe, scientist, theory, question, star, energy
Greater Depth
Create a poster explaining one of Hawking's big ideas in simple terms.
Reflect: Why is it important to share science in ways everyone can understand?

Lesson 6: Invention or Discovery Challenge

Substantive Knowledge

Inventors create tools or devices; scientists make discoveries about the world.
Problem-solving, curiosity, and testing are vital in both fields.

Procedural Knowledge

Plan, carry out, and reflect on an independent invention or discovery project.
Present findings or designs clearly to an audience.

Vocabulary

invent, discover, test, plan, improve, explain, design, problem, solution, investigate

Greater Depth

Record each stage of your project in a logbook or digital portfolio.
Present your work to another class or adults and answer their questions.

SCIENCE

Substantive and Procedural Knowledge

YEAR 6

🔬 Year 6 – Living Things and Their Habitats

Lesson 1: Classifying Living Things

Substantive Knowledge
Living things can be grouped based on shared characteristics.
Classification helps scientists organize biodiversity.
Procedural Knowledge
Use classification keys to identify animals and plants.
Group living things based on observable traits.
Vocabulary
classification, species, genus, family, characteristics, habitat, kingdom, identify, group, organism
Greater Depth
Create your own classification key for local species.
Explore scientific classification hierarchy beyond basic groups.

Lesson 2: Microorganisms

Substantive Knowledge
Microorganisms include bacteria, viruses, fungi, and protozoa.
Some microorganisms cause disease; others help humans.
Procedural Knowledge
Observe microorganisms using microscopes or images.
Discuss roles of microorganisms in ecosystems and health.
Vocabulary
microorganism, bacteria, virus, fungus, protozoa, microscope, disease, beneficial, harmful, infection
Greater Depth
Investigate how antibiotics work.
Explore roles of microorganisms in food production.

Lesson 3: Life Cycles of Animals

Substantive Knowledge
Different animals have varied life cycles (e.g., amphibians, insects, mammals).
Some undergo metamorphosis.
Procedural Knowledge
Sequence and compare animal life cycles.
Use diagrams and models.

Vocabulary
life cycle, metamorphosis, egg, larva, pupa, adult, reproduce, development, amphibian, insect
Greater Depth
Explore evolutionary advantages of metamorphosis.
Investigate life cycles of unusual animals.

Lesson 4: Adaptations and Evolution

Substantive Knowledge
Adaptations are features that help organisms survive in their environment.
Evolution is the gradual change in species over time.
Procedural Knowledge
Identify adaptations in animals and plants.
Discuss how adaptations help survival.
Vocabulary
adaptation, evolution, survival, environment, species, natural selection, trait, camouflage, habitat, offspring
Greater Depth
Examine case studies of adaptation and evolution.
Debate natural selection and survival challenges.

Lesson 5: Human Impact on Habitats

Substantive Knowledge
Human activity can damage or protect habitats.
Conservation efforts aim to preserve biodiversity.
Procedural Knowledge
Investigate local human impacts on habitats.
Discuss ways to reduce harm.
Vocabulary
habitat, conservation, pollution, deforestation, biodiversity, ecosystem, endangered, protect, impact, human activity
Greater Depth
Propose solutions for local conservation.
Study global environmental efforts.

Lesson 6: Investigate Living Things

Substantive Knowledge
Combine classification, adaptation, and environmental knowledge.
Use scientific methods to study living things.
Procedural Knowledge
Plan and conduct a habitat survey or classification study.
Record and present findings.
Vocabulary
investigate, survey, classification, adaptation, habitat, data, observation, record, scientific method, organism

Greater Depth
Use technology (apps, microscopes) to enhance investigation.
Analyse data statistically.

Year 6 – Evolution and Inheritance

Lesson 1: Inheritance Basics

Substantive Knowledge
Offspring inherit characteristics from parents.
Genes control inherited traits.
Procedural Knowledge
Identify inherited and acquired traits.
Use family trees to trace traits.
Vocabulary
inheritance, gene, trait, offspring, characteristic, DNA, heredity, dominant, recessive, variation
Greater Depth
Explain dominant and recessive traits.
Discuss how DNA influences traits.

Lesson 2: Variation Among Species

Substantive Knowledge
Variation exists within and between species.
Variation is important for survival.
Procedural Knowledge
Observe and record variations.
Compare differences within groups.
Vocabulary
variation, species, characteristic, diversity, environment, survival, mutation, trait, population, adaptation
Greater Depth
Explore genetic and environmental causes of variation.
Investigate mutation effects.

Lesson 3: Natural Selection

Substantive Knowledge
Natural selection explains how species evolve.
Traits that help survival are passed on.
Procedural Knowledge
Model natural selection using examples or simulations.
Discuss survival advantages.
Vocabulary
natural selection, evolution, survival, adaptation, trait, reproduce, environment, species, offspring, selective pressure

Greater Depth
Debate evidence for evolution.
Explore human impact on natural selection.

Lesson 4: Fossils and Evolutionary History

Substantive Knowledge
Fossils provide evidence of past life and evolution.
Species change over millions of years.
Procedural Knowledge
Examine fossil images and data.
Sequence fossils chronologically.
Vocabulary
fossil, evolution, extinct, species, adaptation, paleontology, evidence, sediment, ancient, trace
Greater Depth
Explore famous fossil discoveries.
Understand carbon dating basics.

Lesson 5: Genetic Variation and Mutation

Substantive Knowledge
Mutations cause new traits.
Most mutations are harmless, some harmful or beneficial.
Procedural Knowledge
Discuss mutation examples.
Understand mutation's role in variation.
Vocabulary
mutation, gene, DNA, variation, beneficial, harmful, harmless, offspring, inheritance, change
Greater Depth
Explore modern genetics research.
Discuss ethical issues.

Lesson 6: Investigating Inheritance and Evolution

Substantive Knowledge
Synthesize knowledge of inheritance and evolution.
Use data to understand evolutionary processes.
Procedural Knowledge
Design an investigation on inherited traits or variation.
Present scientific conclusions.
Vocabulary
investigate, data, inheritance, evolution, trait, variation, evidence, hypothesis, gene, offspring
Greater Depth
Critically analyse scientific data.
Use genetic simulations or software.

Year 6 – Light

Lesson 1: How Light Travels

Substantive Knowledge
Light travels in straight lines.
Light reflects from surfaces.
Procedural Knowledge
Investigate light reflection using mirrors.
Predict paths of light rays.
Vocabulary
light, reflection, ray, straight line, surface, mirror, shadow, transparent, opaque, translucent
Greater Depth
Explain reflection angles using physics terms.
Explore refraction basics.

Lesson 2: Shadows

Substantive Knowledge
Shadows are formed when light is blocked.
Shadow size changes with light source distance.
Procedural Knowledge
Observe and measure shadow size at different distances.
Record findings.
Vocabulary
shadow, light source, opaque, size, distance, reflect, transparent, translucent, blocking, shape
Greater Depth
Model how the Sun's position affects shadows.
Explore sundials and shadow clocks.

Lesson 3: Reflection and Mirrors

Substantive Knowledge
Reflection is bouncing of light off surfaces.
Mirrors reflect light in predictable ways.
Procedural Knowledge
Use plane mirrors to explore reflection angles.
Draw ray diagrams.
Vocabulary
reflection, angle, incident ray, reflected ray, mirror, surface, bounce, light, image, plane mirror
Greater Depth
Calculate reflection angles.
Explore curved mirrors and lenses.

Lesson 4: Transparent, Translucent, and Opaque

Substantive Knowledge
Materials can be transparent, translucent, or opaque.
These affect how light passes through.
Procedural Knowledge
Test materials for light transmission.
Classify materials.
Vocabulary
transparent, translucent, opaque, light, transmission, material, shadow, block, filter, surface
Greater Depth
Explain how light scattering causes translucency.
Explore uses of these materials.

Lesson 5: How We See

Substantive Knowledge
Light enters the eye, allowing vision.
The eye's lens focuses light on the retina.
Procedural Knowledge
Label parts of the eye.
Model how light travels through the eye.
Vocabulary
eye, retina, lens, pupil, light, vision, focus, cornea, iris, optic nerve
Greater Depth
Explore eye defects and corrections (e.g., myopia).
Study how other animals see.

Lesson 6: Investigate Light

Substantive Knowledge
Light properties can be investigated scientifically.
Combine reflection, shadows, and materials knowledge.
Procedural Knowledge
Design and carry out light experiments.
Record and analyse data.
Vocabulary
investigate, reflection, shadow, light, material, transparent, opaque, experiment, data, analysis
Greater Depth
Use light meters or digital sensors.
Explore advanced optics concepts.

🌡️ Year 6 – Electricity

Lesson 1: What Is Electricity?

Substantive Knowledge
Electricity is a form of energy.
It flows through circuits to power devices.
Procedural Knowledge
Identify electrical appliances.
Discuss safety with electricity.
Vocabulary
electricity, energy, circuit, power, appliance, safety, current, wire, battery, switch
Greater Depth
Explore how electricity is generated.
Investigate static electricity.

Lesson 2: Simple Circuits

Substantive Knowledge
Circuits need a power source, wires, and a load (e.g., bulb).
Circuits can be open or closed.
Procedural Knowledge
Build simple circuits.
Test circuit components.
Vocabulary
circuit, power source, battery, wire, bulb, switch, open circuit, closed circuit, conductor, insulator
Greater Depth
Explore conductors and insulators deeper.
Investigate series and parallel circuits.

Lesson 3: Circuit Components

Substantive Knowledge
Components include bulbs, switches, buzzers, motors.
Each component has a function.
Procedural Knowledge
Identify components and test their functions.
Draw circuit diagrams.
Vocabulary
component, bulb, switch, buzzer, motor, circuit, wire, battery, conductor, insulator
Greater Depth
Design circuits for specific purposes.
Explore circuit symbols and schematic diagrams.

Lesson 4: Conductors and Insulators

Substantive Knowledge
Conductors allow electricity to flow.

Insulators prevent flow.
Procedural Knowledge
Test materials for conductivity.
Classify materials.
Vocabulary
conductor, insulator, electricity, current, material, flow, wire, resistance, safety, test
Greater Depth
Investigate resistance and its effect on circuits.
Explore superconductors briefly.

Lesson 5: Investigating Circuits
Substantive Knowledge
Variables affect circuit function.
Scientific method helps investigate electricity.
Procedural Knowledge
Plan and conduct circuit experiments.
Record results.
Vocabulary
investigate, variable, circuit, function, battery, bulb, switch, conduct, test, result
Greater Depth
Explore how voltage affects brightness/speed.
Use meters to measure current and voltage.

Lesson 6: Electrical Safety
Substantive Knowledge
Electricity can be dangerous if misused.
Safety rules protect users.
Procedural Knowledge
Identify electrical hazards.
Discuss and promote safety rules.
Vocabulary
electricity, safety, hazard, risk, danger, protect, appliance, conduct, insulate, shock
Greater Depth
Explore real-life case studies.
Discuss safe use of electricity in daily life.

🧠 Year 6 Science – Animals Including Humans

Lesson 1: The Human Circulatory System
Substantive Knowledge
The circulatory system consists of the heart, blood, and blood vessels.
It transports oxygen, nutrients, and waste throughout the body.
Procedural Knowledge
Label diagrams of the circulatory system.
Describe the function of each part using scientific vocabulary.

Vocabulary
heart, blood, arteries, veins, capillaries, circulation, oxygen, nutrients, waste, pump
Greater Depth
Explain how blood flows through the heart and body in detail.
Model or map the double circulation route (lungs and body).

Lesson 2: The Heart and Pulse
Substantive Knowledge
The heart is a muscle that pumps blood through the circulatory system.
Pulse rate increases with exercise due to increased oxygen demand.
Procedural Knowledge
Measure and record pulse before and after exercise.
Draw conclusions and explain findings.
Vocabulary
pulse, heartbeat, rate, blood, vessel, oxygen, exercise, circulatory, lungs, measure
Greater Depth
Explore how fitness affects resting pulse rates.
Create and interpret a line graph of pulse changes over time.

Lesson 3: Blood and Its Components
Substantive Knowledge
Blood is made up of red cells (carry oxygen), white cells (fight infection), platelets (clotting), and plasma (liquid).
Each component has a key role in keeping the body healthy.
Procedural Knowledge
Create a model or diagram showing the components of blood.
Match each component to its function.
Vocabulary
blood, red cells, white cells, plasma, platelets, oxygen, immune, clotting, transport, disease
Greater Depth
Explain how blood components work together during injury or infection.
Research and present on blood transfusions or blood types.

Lesson 4: Healthy Lifestyles
Substantive Knowledge
Diet, exercise, sleep, and avoidance of harmful substances all contribute to a healthy lifestyle.
Poor lifestyle choices can damage the heart and circulatory system.
Procedural Knowledge
Analyse lifestyle scenarios and discuss their health impacts.
Create a health campaign poster.
Vocabulary
lifestyle, diet, exercise, alcohol, smoking, sleep, balance, heart disease, fitness, wellbeing

Greater Depth
Explore long-term effects of lifestyle choices on the circulatory system.
Debate or write persuasively about healthy living initiatives.

Lesson 5: Nutrient Transport

Substantive Knowledge
The digestive system breaks down food into nutrients, which are absorbed and transported by the blood.
Oxygen and nutrients are delivered to cells for energy and growth.
Procedural Knowledge
Sequence the journey of a nutrient from ingestion to cell delivery.
Illustrate or narrate this journey.
Vocabulary
nutrient, digestion, absorption, blood, transport, oxygen, cells, energy, circulation, system
Greater Depth
Link learning from circulatory and digestive systems.
Explain how body systems interact for survival.

Lesson 6: Investigating Exercise and Pulse

Substantive Knowledge
Exercise increases heart rate to deliver more oxygen to muscles.
Regular exercise strengthens the heart and improves circulation.
Procedural Knowledge
Design and conduct an investigation into how different exercises affect pulse rate.
Collect, record, and interpret data.
Vocabulary
investigation, variable, fair test, record, measure, pulse, rate, increase, data, conclusion
Greater Depth
Identify potential anomalies and explain them.
Suggest improvements for the investigation and relate findings to health advice.