SCIENCE

YEAR 1

Substantive and Procedural Knowledge

Year 1 – Plants

Lesson 1: Making Observations – Planting Beans

Substantive Knowledge
Understanding that plants grow from seeds.
Beans as an example of seed germination.
Procedural Knowledge
Observe and compare beans and plants via photos or live specimens.
Plant beans and begin a growth diary.
Record questions and observations.
Vocabulary
seed, bean, germinate, observe, record, root, shoot, growth, diary, question
Greater Depth
Experiment with two bean varieties to compare growth rate.
Pose and investigate: "Which environment encourages faster germination?"

Lesson 2: Parts of a Plant

Substantive Knowledge
Identify and name parts: root, stem, leaf, flower; plus ovary, stamen, pollen.
Procedural Knowledge
Use real or image-based specimens.
Label plant diagrams; engage in sensory exploration.
Compare parts across species.
Vocabulary
root, stem, leaf, flower, ovary, stamen, pollen, sepal, filament, absorb
Greater Depth
Investigate why each part is essential to growth.
Dissect a flower to identify internal structures.

Lesson 3: Garden and Wild Plants

Substantive Knowledge
Recognise common garden (e.g. roses, daisies) vs. wild plants.
Procedural Knowledge
Conduct outdoor plant hunts.
Record and classify plant types found locally.
Describe features using scientific terms.

Vocabulary
garden plant, wild plant, classify, identify, habitat, petal, leaf shape, environment, collect, describe
Greater Depth
Compare biodiversity between garden and wild areas.
Predict plant occurrence and test via observations.

Lesson 4: Terrific Trees
Substantive Knowledge
Recognise deciduous vs. evergreen trees. Understand seasonal changes and fruit types (nuts, cones).
Procedural Knowledge
Use visuals and field observations.
Classify trees by leaf and seasonal behaviour.
Observe seasonal changes.
Vocabulary
tree, deciduous, evergreen, leaf, bark, trunk, branch, seasonal, cone, nut
Greater Depth
Examine tree rings or bark textures to infer age/environmental conditions.
Track seasonal changes through drawings or photos.

Lesson 5: Fruit & Vegetable Plants
Substantive Knowledge
Understand which plant parts are edible (e.g. fruit vs. vegetable).
Learn how food comes from plants.
Procedural Knowledge
Sort and taste plant parts: root (carrot), fruit (tomato), leaf (lettuce).
Classify edible vs. non-edible plant parts.
Discuss plant-based nutrition.
Vocabulary
fruit, vegetable, edible, root, stem, leaf, flower, food, nutrition, classify
Greater Depth
Research a local edible plant and trace its journey from seed to table.
Test seed viability by planting seeds from different fruits.

Lesson 6: Comparing Plants
Substantive Knowledge
Apply knowledge about plant features to classify and sort varieties.
Procedural Knowledge
Sort plants using student-generated criteria.
Identify similarities and differences across specimens.
Use scientific vocabulary to justify decisions.

Vocabulary
compare, classify, criteria, similarity, difference, property, texture, size, shape, Pattern
Greater Depth
Develop a multi-tiered classification based on function, habitat, or lifecycle.
Create graphs or charts to reflect classification findings.

Year 1 – Everyday Materials

Lesson 1: What Are Objects Made From?

Substantive Knowledge
Objects are made from materials like wood, metal, plastic, glass, and fabric.
The same material can be used to make different objects.
Procedural Knowledge
Identify and name the material used to make an object.
Group objects by the material they're made from.
Vocabulary
object, material, wood, plastic, metal, glass, fabric, rubber, paper, group
Greater Depth
Justify groupings by discussing properties (e.g., "These are all smooth and waterproof").
Investigate and explain why some objects are made from a mix of materials.

Lesson 2: Properties of Materials

Substantive Knowledge
Materials have different physical properties (e.g., soft, hard, stretchy).
Properties help determine the best use for a material.
Procedural Knowledge
Test materials to explore their properties (e.g., squashing, stretching).
Use descriptive language to compare materials.
Vocabulary
hard, soft, stretchy, bendy, waterproof, absorbent, rough, smooth, shiny, dull
Greater Depth
Rank materials according to a chosen property (e.g., most to least bendy).
Link properties to uses in real life (e.g., "Raincoats are waterproof").

Lesson 3: Natural and Man-Made Materials

Substantive Knowledge
Natural materials come from plants, animals, or the earth.
Man-made (synthetic) materials are manufactured.
Procedural Knowledge
Sort materials into natural or man-made.
Identify the origin of common materials.

Vocabulary
natural, man-made, origin, wood, cotton, metal, plastic, glass, paper, wool
Greater Depth
Create flow charts showing the journey from raw material to object.
Explain the advantages/disadvantages of using man-made materials.

Lesson 4: Comparing and Grouping Materials

Substantive Knowledge
Materials can be grouped based on shared properties.
Some materials share multiple properties.
Procedural Knowledge
Compare materials using more than one criterion (e.g., waterproof and flexible).
Record findings using tables or simple graphs.
Vocabulary
compare, group, properties, sort, chart, flexible, rigid, absorbent, waterproof, opaque
Greater Depth
Develop their own classification criteria.
Suggest real-world uses for grouped materials (e.g., waterproof and soft → umbrellas).

Lesson 5: Choosing the Right Material

Substantive Knowledge
Suitability of materials depends on their properties (e.g., glass is transparent and hard).
Some objects can't be made from certain materials.
Procedural Knowledge
Match materials to appropriate objects based on properties.
Justify material choices for real-world uses.
Vocabulary
suitable, useful, property, choose, match, transparent, strong, waterproof, object, reason
Greater Depth
Design a new object (e.g., a bag) and justify material choices.
Investigate: "What if we made a window from wood?"

Lesson 6: Exploring Materials Investigation

Substantive Knowledge
Investigations can help answer questions about materials.
Fair tests are used to compare materials accurately.
Procedural Knowledge
Plan and carry out a simple test (e.g., Which material is most absorbent?).
Record and discuss results.

Vocabulary
investigation, test, fair, results, absorbent, waterproof, record, observe, compare, conclusion
Greater Depth
Develop their own test question.
Reflect on whether a test was fair and how to improve it.

Year 1 – Animals Including Humans

Lesson 1: Animals Including Humans

Substantive Knowledge
Humans are animals.
Animals are living things that can move, eat, and grow.
All animals need food and water to survive.
Procedural Knowledge
Group living things as animals or non-animals.
Discuss what animals (including humans) need to stay alive.
Vocabulary
animal, human, living, food, water, grow, move, breathe, survive, needs
Greater Depth
Compare needs of animals to those of humans.
Describe what would happen if one of the needs is not met.

Lesson 2: Animal Groups

Substantive Knowledge
Animals are classified into groups: mammals, reptiles, amphibians, birds, fish.
Each group has defining characteristics (e.g., birds have feathers and beaks).
Procedural Knowledge
Sort animals into groups based on features.
Identify animals from each group using images or models.
Vocabulary
mammal, bird, fish, reptile, amphibian, classify, features, scales, feathers, fur
Greater Depth
Spot exceptions or overlaps in classification (e.g., dolphins as mammals).
Justify animal groupings with multiple characteristics.

Lesson 3: Herbivores, Carnivores and Omnivores

Substantive Knowledge
Animals eat different types of food:
Herbivores = plants only
Carnivores = meat only
Omnivores = both
Humans are omnivores.
Procedural Knowledge

Identify what an animal eats by looking at its teeth or diet.
Sort animals into dietary groups.

Vocabulary

herbivore, carnivore, omnivore, meat, plants, diet, food, eat, group, teeth

Greater Depth

Predict an animal's diet from its body or teeth features.
Create food chains showing what animals eat.

Lesson 4: Parts of the Human Body

Substantive Knowledge

Humans have body parts like head, arms, legs, torso, and sense organs.
Body parts help us to do different things.

Procedural Knowledge

Name and label parts of the body.
Use diagrams or body outlines to identify and describe functions.

Vocabulary

head, arms, legs, hands, feet, torso, eyes, ears, nose, mouth

Greater Depth

Match body parts with their purposes (e.g., ears → hearing).
Identify which body parts are used for different sports or activities.

Lesson 5: Our Senses

Substantive Knowledge

Humans have five senses: sight, hearing, smell, taste, touch.
Each sense links to a specific part of the body.

Procedural Knowledge

Match senses to body parts (e.g., eyes → sight).
Carry out simple tests to explore senses (e.g., sound recognition, mystery smells).

Vocabulary

senses, sight, hearing, smell, taste, touch, eyes, ears, nose, tongue

Greater Depth

Investigate what happens when one sense is blocked.
Predict which senses are most useful in different scenarios.

Lesson 6: Exploring Animals Investigation

Substantive Knowledge

Animals can be compared by type, diet, features, and where they live.
Scientific questions help us learn more about animals.

Procedural Knowledge

Ask and answer questions about animals.
Observe, group, and compare animals using chosen criteria.

Vocabulary

investigate, question, compare, group, sort, observe, features, classify, research, record

Greater Depth
Develop their own animal sorting criteria.
Create a Venn diagram to show overlapping features (e.g., mammals and omnivores).

🌦️ Year 1 – Seasonal Changes

Lesson 1: The Four Seasons

Substantive Knowledge
There are four seasons: spring, summer, autumn, and winter.
Each season has distinct weather and day length patterns.
Procedural Knowledge
Name the four seasons in order.
Observe and describe changes across seasons.
Vocabulary
season, spring, summer, autumn, winter, weather, change, year, cycle, observe
Greater Depth
Explain how the length of day and night changes with the seasons.
Create a calendar wheel showing seasonal features.

Lesson 2: Signs of Autumn

Substantive Knowledge
In autumn, leaves fall, temperatures drop, and daylight hours shorten.
Some animals prepare for winter (e.g., storing food, hibernation).
Procedural Knowledge
Observe and record autumnal changes in the environment.
Collect evidence (e.g., leaves) and make predictions.
Vocabulary
autumn, leaves, fall, change, temperature, colder, hibernate, daylight, conker, acorn
Greater Depth
Compare autumnal features with another season.
Record observations using drawings and descriptive language.

Lesson 3: Signs of Winter

Substantive Knowledge
Winter is the coldest season, with short days and long nights.
Some animals hibernate or migrate during winter.
Procedural Knowledge
Record and describe winter weather.
Identify animal behaviours in winter.
Vocabulary
winter, cold, snow, frost, hibernate, migrate, daylight, dark, icy, weather
Greater Depth
Explain how animals adapt to winter (e.g., thick fur, fat storage).
Compare local winter weather with that in another part of the world.

Lesson 4: Signs of Spring

Substantive Knowledge
Spring brings warmer weather, longer days, and new plant/animal life.
Many animals have babies in spring.
Procedural Knowledge
Observe signs of spring (e.g., buds, flowers, baby animals).
Record observations through drawing or writing.
Vocabulary
spring, buds, blossom, flowers, baby, chicks, lambs, grow, warmer, daylight
Greater Depth
Track growth of a plant over several weeks.
Write a diary of observed seasonal changes.

Lesson 5: Signs of Summer

Substantive Knowledge
Summer has the longest days and the warmest weather.
Plants grow well in summer, and people often spend more time outdoors.
Procedural Knowledge
Compare summer weather with that of other seasons.
Identify how people and animals behave differently in summer.
Vocabulary
summer, sun, hot, dry, long, holidays, shade, sunscreen, flowers, growth
Greater Depth
Record how shadows change during the day in summer.
Explore the link between sunlight and temperature.

Lesson 6: Comparing the Seasons

Substantive Knowledge
Each season has specific patterns of weather, daylight, and plant/animal behaviour.
Seasons follow a regular cycle.
Procedural Knowledge
Compare two or more seasons using evidence (e.g., photos, graphs).
Create charts or diagrams to show seasonal differences.
Vocabulary
compare, pattern, chart, change, temperature, daylight, weather, observe, cycle, record
Greater Depth
Predict what the environment would look like in a chosen season.
Explain the effect of seasonal changes on human life (e.g., clothing, heating, farming).

🧪 Year 1 – *Scientists and Inventors* (Twinkl PlanIt)

Lesson 1: Who Was Archimedes?

Substantive Knowledge
Archimedes was a scientist and inventor from Ancient Greece.
He invented useful machines like pulleys and the Archimedean screw.
His inventions helped move heavy objects and water more easily.
Procedural Knowledge
Identify and describe the purpose of simple machines.
Explore how pulleys and levers work using hands-on models.
Vocabulary
Archimedes, invention, pulley, lever, wheel, screw, lift, move, machine, force
Greater Depth
Design and explain a simple machine to solve a problem (e.g., lifting a toy box).
Why do you think Archimedes' inventions are still useful today?

Lesson 2: Mae Jemison and Space Exploration

Substantive Knowledge
Mae Jemison was the first Black woman astronaut to travel to space.
She is also a doctor and scientist.
Astronauts help us learn about space and science in space.
Procedural Knowledge
Identify key achievements of Mae Jemison.
Compare life on Earth and in space.
Sequence events in her life on a timeline.
Vocabulary
astronaut, space, rocket, science, explore, orbit, planet, mission, Earth, achievement
Greater Depth
What would you invent to help astronauts in space?
Create a fact file or mini biography for Mae Jemison including key dates and achievements.

Lesson 3: Louis Pasteur and Microbes

Substantive Knowledge
Louis Pasteur discovered that germs can make us ill.
He invented pasteurisation to make food safer.
Cleanliness and hygiene help keep us healthy.
Procedural Knowledge
Explore the effects of cleanliness through simple investigations (e.g. soap and glitter germs activity).
Observe what happens over time when cleanliness varies.
Vocabulary
germs, bacteria, illness, clean, dirty, hygiene, healthy, invention, food, scientist

Greater Depth
Why is Louis Pasteur's discovery still important today?
Create a poster to show how to stay germ-free and healthy.

Lesson 4: Alexander Graham Bell and Sound

Substantive Knowledge
Alexander Graham Bell invented the telephone.
Sound travels through vibrations.
Telephones changed how people communicate.
Procedural Knowledge
Explore how sound travels using string telephones.
Describe the link between vibration and sound.
Vocabulary
telephone, sound, vibration, communication, invention, hear, speak, travel, ear, voice
Greater Depth
Why was the invention of the telephone so important?
How do modern phones differ from Bell's invention?

Lesson 5: The Wright Brothers and Flight

Substantive Knowledge
Orville and Wilbur Wright invented the first powered flying machine.
Planes use wings and engines to fly.
Their invention led to modern air travel.
Procedural Knowledge
Compare the Wright brothers' plane to modern aircraft.
Test materials for paper aeroplanes and record which fly furthest.
Vocabulary
flight, aeroplane, wings, engine, fly, invent, travel, design, lift, speed
Greater Depth
If you could invent a new way to travel, what would it be and why?
How did the Wright brothers work as a team to achieve success?

Lesson 6: Invention Challenge!

Substantive Knowledge
Scientists and inventors solve problems using ideas and tests.
Anyone can be an inventor.
Procedural Knowledge
Plan and design an invention using creativity and problem-solving.
Explain the purpose and features of the invention.
Vocabulary
invent, design, problem, solution, create, plan, build, improve, test, tool
Greater Depth
How does your invention help others?
What materials would you use to make it, and why?

SCIENCE

YEAR 2

Substantive and Procedural Knowledge

🐸 Year 2 – Living Things and Their Habitats

Lesson 1: Living or Not?

Substantive Knowledge
All living things have life processes such as movement, growth, reproduction, and response to their environment.
Things can be classified as living, dead, or never alive.
Procedural Knowledge
Identify and sort items into living, dead, or never alive.
Use observation and questioning to justify decisions.
Vocabulary
living, dead, never alive, movement, grow, reproduce, breathe, sort, classify, life process
Greater Depth
Justify classifications with scientific reasoning.
Suggest how a living thing could become dead and what happens next (decomposition).

Lesson 2: Habitats and Microhabitats

Substantive Knowledge
A habitat is a place where animals and plants live.
Microhabitats are small, specialised habitats (e.g., under logs, in leaf litter).
Procedural Knowledge
Explore outdoor areas to identify habitats and microhabitats.
Record living things found and describe conditions.
Vocabulary
habitat, microhabitat, log, leaf litter, damp, shelter, environment, observe, record, investigate
Greater Depth
Compare two microhabitats and describe the differences in conditions and animals found.
Suggest how changing a microhabitat could affect what lives there.

Lesson 3: Animals in Their Habitats

Substantive Knowledge
Animals are suited to live in their habitats based on their features and behaviours.

There is a connection between animals and the places they live.
Procedural Knowledge
Match animals to their habitats and explain why they are suited.
Sort animals by their adaptations.
Vocabulary
adaptation, camouflage, protection, fur, feathers, burrow, water, cold, desert, forest
Greater Depth
Explain what might happen if an animal's habitat changes or disappears.
Create an imaginary animal and habitat with matching features.

Lesson 4: How Living Things Depend on Each Other
Substantive Knowledge
Animals and plants depend on each other for food, shelter, and pollination.
A habitat must meet the basic needs of all living things in it.
Procedural Knowledge
Draw simple food chains or relationship maps.
Explain dependency using examples (e.g., bees and flowers).
Vocabulary
depend, food, shelter, pollinate, survive, relationship, connection, needs, support, link
Greater Depth
Predict what would happen to a habitat if one element (e.g., bees) disappeared.
Explore seasonal changes and their impact on habitats.

Lesson 5: Identifying and Grouping Animals
Substantive Knowledge
Animals can be grouped based on features (e.g., fur, wings, number of legs).
Grouping helps us understand differences and similarities.
Procedural Knowledge
Observe animals or pictures and sort them using chosen criteria.
Create tables or diagrams to represent groupings.
Vocabulary
group, sort, classify, features, scales, fur, wings, legs, tail, beak
Greater Depth
Use a branching key or Venn diagram to show more complex groupings.
Justify changes to grouping criteria based on observations.

Lesson 6: Exploring Habitats Investigation
Substantive Knowledge
Different habitats have different living things adapted to them.
Environments can change and affect the living things within them.
Procedural Knowledge
Plan and conduct a mini-investigation outdoors (e.g., compare two areas).
Record findings in tables, drawings or simple reports.

Vocabulary
investigation, record, compare, environment, change, results, habitat, microhabitat, observe, data
Greater Depth
Suggest improvements to an investigation or new questions to explore.
Reflect on how their findings could be used to protect habitats.

Year 2 – Uses of Everyday Materials

Lesson 1: What Materials Can We Find?

Substantive Knowledge
Objects are made from different materials, such as wood, plastic, glass, metal, and fabric.
The same object can be made from different materials.
Procedural Knowledge
Identify and name materials around them.
Group and describe objects based on the materials they are made from.
Vocabulary
material, object, wood, metal, glass, plastic, fabric, identify, sort, describe
Greater Depth
Explain why different materials might be used for the same object (e.g. a spoon).
Suggest better materials for specific purposes based on their observations.

Lesson 2: What Are Objects Made From?

Substantive Knowledge
Objects have properties (e.g. hard, soft, flexible) which help determine their use.
Properties help us understand how materials behave.
Procedural Knowledge
Match objects to materials and describe their properties.
Group materials based on observable properties.
Vocabulary
property, hard, soft, flexible, rough, smooth, shiny, dull, waterproof, absorbent
Greater Depth
Use precise vocabulary to describe and compare properties.
Justify groupings and identify exceptions.

Lesson 3: Why Use Materials?

Substantive Knowledge
The suitability of a material depends on its properties and the object's purpose.
Some materials are more appropriate than others for specific uses.
Procedural Knowledge
Investigate how suitable materials are for different tasks (e.g. keeping dry).
Make predictions and test material suitability.

Vocabulary
suitable, purpose, waterproof, absorbent, strong, weak, test, predict, compare, record
Greater Depth
Suggest a better material than the one used and explain why.
Evaluate how changing the shape or use of a material affects suitability.

Lesson 4: Squashing, Bending, Twisting and Stretching

Substantive Knowledge
Some materials can change shape when squashed, bent, twisted, or stretched.
Materials respond differently depending on their properties.
Procedural Knowledge
Carry out simple tests to observe how materials change shape.
Record findings using diagrams or tables.
Vocabulary
squash, bend, twist, stretch, shape, change, flexible, rigid, elastic, test
Greater Depth
Explain how a material's properties affect its ability to change shape.
Suggest everyday examples where materials are designed to change shape.

Lesson 5: Waterproof Investigation

Substantive Knowledge
Waterproof materials do not let water pass through.
Waterproof materials are important for certain objects, like umbrellas and coats.
Procedural Knowledge
Conduct a fair test to find waterproof materials.
Observe and record results accurately.
Vocabulary
waterproof, test, fair, results, absorb, dry, wet, predict, observe, investigate
Greater Depth
Evaluate the reliability of their test (e.g. were drops of water the same size?).
Suggest how real-world products are tested for waterproofing.

Lesson 6: Building Bridges Challenge

Substantive Knowledge
Strong materials are needed to support weight and span gaps.
Structures can be made stronger using specific design choices.
Procedural Knowledge
Use materials to build a bridge and test its strength.
Evaluate designs based on performance.
Vocabulary
bridge, strong, structure, test, weight, span, build, materials, support, design
Greater Depth
Modify designs based on test results to improve strength.
Explain the science behind which shapes and materials work best.

Year 2 – Animals Including Humans

Lesson 1: Animal Survival Needs

Substantive Knowledge
All animals need air, food, and water to survive.
Animals cannot survive without meeting these basic needs.
Procedural Knowledge
Identify and explain the basic needs of animals.
Sort animals based on their needs or habitats.
Vocabulary
air, water, food, survive, needs, animal, shelter, healthy, basic, life
Greater Depth
Compare the needs of humans and other animals.
Predict what might happen if an animal's needs are not met.

Lesson 2: Offspring and Growth

Substantive Knowledge
Animals, including humans, reproduce and have offspring that grow into adults.
Some offspring look like their parents; others change a lot as they grow.
Procedural Knowledge
Match adult animals to their offspring.
Observe changes in growth stages.
Vocabulary
offspring, baby, adult, grow, reproduce, life cycle, young, chick, calf, foal
Greater Depth
Order the stages in an animal's life cycle and describe changes.
Compare how different animals grow (e.g. frog vs. bird).

Lesson 3: Animal Life Cycles

Substantive Knowledge
Different animals have different life cycles.
Some animals go through big changes (e.g. metamorphosis in frogs and butterflies).
Procedural Knowledge
Sequence stages in a life cycle.
Use diagrams to explain changes.
Vocabulary
life cycle, egg, larva, pupa, adult, metamorphosis, change, grow, develop, stage
Greater Depth
Compare and contrast two different animal life cycles.
Draw their own labelled diagram of a chosen animal's life cycle.

Lesson 4: Keeping Healthy

Substantive Knowledge
Humans need food, exercise, hygiene, and rest to stay healthy.

Eating a balanced diet helps the body function properly.
Procedural Knowledge
Identify healthy habits and explain why they are important.
Sort foods into healthy and unhealthy choices.
Vocabulary
healthy, exercise, hygiene, rest, balanced diet, nutrition, clean, germs, energy, food
Greater Depth
Design a healthy lifestyle plan for a child.
Justify food choices using nutritional knowledge.

Lesson 5: Types of Food
Substantive Knowledge
Different animals eat different types of food: carnivores, herbivores, and omnivores.
An animal's teeth and digestive system help it eat certain foods.
Procedural Knowledge
Classify animals by what they eat.
Use observation to match animals to food types.
Vocabulary
carnivore, herbivore, omnivore, food, eat, meat, plants, diet, classify, sort
Greater Depth
Explain how teeth are suited to certain diets.
Create a food plan for a carnivore, herbivore, or omnivore.

Lesson 6: Exercise Investigation
Substantive Knowledge
Exercise keeps the body strong and healthy.
Heart rate increases during exercise.
Procedural Knowledge
Plan and carry out a simple investigation on the effects of exercise.
Record and interpret results using charts or drawings.
Vocabulary
exercise, heart rate, pulse, test, results, movement, healthy, record, measure, investigate
Greater Depth
Compare effects of different types of exercise.
Suggest other ways to test fitness or health.

Year 2 – Plants

Lesson 1: What Do Plants Need?
Substantive Knowledge
Plants need water, light, and a suitable temperature to grow and stay healthy.
Without these, plants may not grow well or may die.

Procedural Knowledge
Identify what plants need to grow.
Set up a test to explore one variable (e.g. light or water).
Vocabulary
plant, grow, water, light, temperature, healthy, needs, alive, die, sunlight
Greater Depth
Predict what might happen to plants missing one or more requirements.
Justify which conditions are most important and why.

Lesson 2: Plant Growth Investigation
Substantive Knowledge
Changes in a plant's environment affect how well it grows.
Growth can be measured by height, number of leaves, or colour.
Procedural Knowledge
Carry out a simple investigation to test plant growth.
Observe and record changes over time.
Vocabulary
investigation, observe, measure, change, growth, record, compare, fair test, control, variable
Greater Depth
Suggest improvements to their investigation.
Explain why a fair test is important in scientific enquiry.

Lesson 3: How Do Seeds Grow?
Substantive Knowledge
Seeds grow into plants through a process called germination.
Seeds need warmth and water to germinate.
Procedural Knowledge
Observe seed germination stages.
Record changes over time using drawings or charts.
Vocabulary
seed, grow, germinate, sprout, root, shoot, leaf, warmth, water, grow
Greater Depth
Compare germination in different seed types.
Predict what happens if one condition is removed (e.g. no water).

Lesson 4: How Do Bulbs Grow?
Substantive Knowledge
Bulbs are a type of plant storage organ that grows underground.
Like seeds, bulbs need warmth and water to grow.
Procedural Knowledge
Observe how bulbs grow.
Compare the growth of bulbs and seeds.

Vocabulary
bulb, root, shoot, underground, grow, water, warmth, sprout, compare, observe
Greater Depth
Explain the difference between growing from bulbs and seeds.
Sequence the stages of bulb growth using scientific vocabulary.

Lesson 5: Naming and Identifying Plants
Substantive Knowledge
Plants can be identified by their features (leaf shape, flower, stem, etc.).
Common plants include dandelion, daisy, buttercup, and nettle.
Procedural Knowledge
Observe and identify common plants using a checklist or ID guide.
Group and name different types of plants.
Vocabulary
identify, leaf, flower, stem, petal, plant name, dandelion, daisy, nettle, buttercup
Greater Depth
Describe how specific plant features help them grow or survive.
Create a plant guide with detailed drawings and labels.

Lesson 6: Observing Plants Outdoors
Substantive Knowledge
Plants grow in a variety of environments.
Some grow better in certain places due to sunlight, soil, and space.
Procedural Knowledge
Observe and record plants found in the local environment.
Compare where and how plants grow.
Vocabulary
observe, environment, record, wild plant, garden plant, location, sunlight, soil, compare, habitat
Greater Depth
Suggest reasons why some plants are found in one location and not another.
Create a plant map or survey results display for a local area.

🐛 Year 2 Science – Minibeasts (Living Things and Their Habitats)

Lesson 1: What is a Minibeast?
Substantive Knowledge
Minibeasts are small invertebrates like insects, spiders, and worms.
They have different body structures and live in a range of habitats.
Procedural Knowledge
Identify and describe common minibeasts.
Observe and sort minibeasts into groups based on features.

Vocabulary
minibeast, invertebrate, insect, worm, spider, antennae, legs, wings, habitat, body
Greater Depth
Compare different minibeasts using scientific vocabulary.
Sort minibeasts into multiple categories (e.g. body covering and number of legs).

Lesson 2: Minibeast Habitats

Substantive Knowledge
Minibeasts live in habitats that provide food, water, and shelter.
Different minibeasts prefer different habitats (e.g. damp soil, leaves, bark).
Procedural Knowledge
Explore the school grounds for minibeasts.
Record where they are found and consider why.
Vocabulary
habitat, shelter, soil, leaf litter, damp, log pile, tree bark, microhabitat, environment, survive
Greater Depth
Explain why a minibeast might not survive in an unsuitable habitat.
Begin to link habitat features to specific needs (moisture, darkness, food).

Lesson 3: How Do Minibeasts Move?

Substantive Knowledge
Minibeasts move in different ways: crawling, flying, jumping, wriggling.
Their movement is related to their body structure and purpose (e.g. escaping predators).
Procedural Knowledge
Observe minibeast movement.
Record and describe types of movement using correct terms.
Vocabulary
move, fly, crawl, jump, wriggle, legs, wings, fast, slow, movement
Greater Depth
Compare movement methods and suggest why they are suited to each habitat.
Group minibeasts based on how they move and explain reasoning.

Lesson 4: Minibeast Diets

Substantive Knowledge
Some minibeasts are herbivores, carnivores, or omnivores.
They find food in their habitat and may play a role in food chains.
Procedural Knowledge
Sort minibeasts based on diet.
Identify and describe simple food chains involving minibeasts.
Vocabulary
diet, herbivore, carnivore, omnivore, food, eat, leaves, nectar, prey, food chain

Greater Depth
Construct simple food chains with correct terminology.
Discuss what would happen if one part of the food chain was removed.

Lesson 5: Life Cycles of Minibeasts

Substantive Knowledge
Minibeasts like butterflies and beetles have a life cycle with stages (egg, larva, pupa, adult).
Some undergo metamorphosis.
Procedural Knowledge
Sequence the life cycle of a butterfly or similar insect.
Compare life stages and describe how the minibeast changes.
Vocabulary
life cycle, egg, larva, pupa, adult, metamorphosis, change, grow, develop, stages
Greater Depth
Compare life cycles of different minibeasts (e.g., butterfly vs. spider).
Discuss the benefits of metamorphosis for survival.

Lesson 6: Minibeast Investigation

Substantive Knowledge
Observing minibeasts in their habitats helps us learn more about them.
Scientists use observation and recording to study living things.
Procedural Knowledge
Plan and carry out a simple minibeast hunt.
Record findings using charts or tables and draw conclusions.
Vocabulary
investigation, observe, record, tally, chart, habitat, minibeast, find, explore, results
Greater Depth
Suggest improvements to the investigation method.
Look for patterns in minibeast location and explain them scientifically.

Year 2 – *Scientists and Inventors* (Twinkl PlanIt)

Lesson 1: Edward Jenner and Vaccinations

Substantive Knowledge
Edward Jenner discovered the first vaccine to protect people from smallpox.
Vaccinations help prevent illness by training the body to fight diseases.
Procedural Knowledge
Identify the importance of vaccines using historical examples.
Use sequencing to explain Jenner's discovery.
Vocabulary
vaccine, virus, protect, illness, smallpox, doctor, discovery, medicine, immune, prevent
Greater Depth

Compare life before and after vaccines—how might things have been different?
Create a comic strip showing how Edward Jenner's vaccine worked.

Lesson 2: Rachel Carson and the Environment

Substantive Knowledge
Rachel Carson was an environmental scientist who studied the effects of chemicals on nature.
Her work helped people understand pollution and protect wildlife.
Procedural Knowledge
Observe the impact of pollution on plants or habitats.
Discuss how people can help the environment.
Vocabulary
environment, pollution, protect, wildlife, nature, chemicals, conserve, recycle, habitat, scientist
Greater Depth
Suggest changes your school could make to help nature.
Create a leaflet explaining Rachel Carson's impact on our world.

Lesson 3: George Washington Carver and Plants

Substantive Knowledge
Carver found new uses for peanuts and helped farmers grow crops without harming the soil.
He promoted crop rotation and sustainability.
Procedural Knowledge
Investigate how plants grow and how soil is used.
Compare different crops and their uses.
Vocabulary
plants, soil, crops, grow, reuse, food, farm, roots, rotate, invent
Greater Depth
Plan a planting calendar to keep soil healthy throughout the year.
Write a short speech encouraging others to farm like Carver.

Lesson 4: Maria Telkes and Solar Power

Substantive Knowledge
Maria Telkes was a scientist who used the sun's energy to power homes.
Solar energy is renewable and sustainable.
Procedural Knowledge
Explore how sunlight can warm objects.
Build a simple solar oven or conduct a heat absorption test.
Vocabulary
solar, sun, heat, energy, power, light, warm, scientist, renewable, invention
Greater Depth
Design a house that uses solar energy in different ways.
Explain why solar power is better for the planet than fossil fuels.

Lesson 5: Leonardo da Vinci – Inventor and Scientist

Substantive Knowledge

Leonardo da Vinci designed machines and studied anatomy, nature, and flight.
He recorded his ideas in notebooks hundreds of years before they could be built.

Procedural Knowledge

Explore how a design becomes an invention.
Sketch and label an invention idea like da Vinci.

Vocabulary

invention, idea, draw, sketch, design, flight, wings, machine, model, explore

Greater Depth

Create your own invention idea and label its parts and purpose.
Reflect: Which of da Vinci's ideas have become real?