TEACHING GUIDE

What Lives in the Soil?
A Semester of Underground Discoveries

A complete facilitation guide for 18 sessions of spiral science inquiry — nursery level (ages 3–5)

SUBJECT
Science — Living Things & Habitats

AGE GROUP
Nursery (3–5 years)

KIT TIER
Extended Inquiry Kit

TOTAL SESSIONS
18 sessions across 3 workbook cycles

WORKBOOKS INCLUDED
3 (+ blank template for extensions)

SLIDES
25 teaching slides + activity divider

What's Inside This Guide

OVERVIEW

01 Semester Overview: Spiralling Into the Soil

Welcome to one of the most naturally compelling science inquiries you can share with young children. Soil is everywhere. Children are already drawn to it — they poke it, dig it, smell it, and ask questions about what lives inside it. This kit transforms that instinct into a structured, semester-long investigation that grows in depth and scientific precision as the weeks unfold.

The central question that anchors every session, every slide, and every workbook page is simple enough for a three-year-old to engage with and complex enough to sustain a whole semester of genuine discovery:

CENTRAL INQUIRY QUESTION

"What lives in the soil?"

This is not a question with one correct answer. Return to it at the start of every new workbook cycle. Children's answers will deepen across the semester — and that growth is the most powerful learning artefact in this kit.

The Spiral Inquiry Philosophy

This kit is built on a spiral inquiry model: each workbook does not close a topic and move on, but reopens it at a more complex level. Children's existing knowledge is always the starting point, never background noise. When you begin Workbook 2, you are not starting fresh — you are building creature knowledge on top of the sensory foundation children built in Workbook 1. When you begin Workbook 3, you are adding process understanding (decomposition, change) on top of creature knowledge. The spiral keeps growing outward.

The Semester Spiral Arc

WORKBOOK 1	WORKBOOK 2	WORKBOOK 3
Digging In: My First Look at Soil	**Who's Down There? Underground Creatures**	**The Big Change: What Happens Underground**
Sessions 1–6 · Sensory Exploration	Sessions 7–12 · Creature Classification	Sessions 13–18 · Decomposition & Interdependence

Extension Workbook 4	Extension Workbook 5	Extension Workbook 6	Extension Workbook 7
Teacher-designed	*Teacher-designed*	*Teacher-designed*	*Teacher-designed*

Dashed boxes = blank slots for teacher-commissioned extension workbooks (see Section 8: Follow-Up)

Three Learning Pillars

Every session, every slide, and every workbook activity threads through these three pillars. Teach children this language from Session 1 — they will begin to use it themselves.

Observe

Look, touch, smell, and listen very carefully. Use all of your senses. Scientists always observe first.

Name

Put a word to what you found. Our key vocabulary gives creatures, places, and processes precise names.

Wonder

Ask a new question. The best scientists are always curious. Add every wonder to the wondering wall.

Why Soil? The Case for This Inquiry

Soil is the ideal vehicle for nursery science inquiry for four specific reasons:

- **Universal accessibility.** Every school has soil somewhere — a planter, a garden bed, a potted plant base. The inquiry does not require specialist resources.
- **Multi-sensory richness.** Soil offers texture, colour, smell, and sound (crunching under fingers) — all the entry points that young children need before abstract concepts can take hold.
- **Genuine complexity beneath the surface.** The more carefully children look, the more they find. Soil genuinely rewards sustained inquiry in a way that many nursery science topics do not.
- **Emotional resonance.** Children aged 3–5 are already drawn to digging, poking, and exploring the ground. This kit meets them where they already are.

IB PYP Connections

PYP Element	Connection to This Kit
Transdisciplinary Themes	*Sharing the Planet* (soil as a living ecosystem we share with countless creatures); *How the World Works* (decomposition, water in soil, root function)
Key Concepts	*Form* (what does soil look like? what do creatures look like?); *Change* (decomposition, seasonal change); *Connection* (creature–soil interdependence)
Learner Profile	*Inquirer* (generating questions for the wondering wall); *Thinker* (classifying, reasoning about sorts); *Communicator* (vocabulary use, pair sharing)
ATL Skills	*Thinking Skills* — classification, comparison, sequencing; *Research Skills* — observation, recording; *Social Skills* — pair work, collaborative sorting

Session Structure at a Glance

Each workbook cycle runs for six sessions, giving a total of 18 sessions across the semester. Each session type serves a distinct purpose:

Session Type	Purpose	Duration
Session 1 — Provocation	Open the cycle with slides, generate hypotheses, introduce key vocabulary	20–25 min
Sessions 2–4 — Workbook Activity	Sensory experience anchors each paper-based activity; teacher scribes observations	20–25 min each
Session 5 — Outdoor / Real-World	Direct investigation with real soil, creatures, or specimens; no workbooks during exploration	25–30 min
Session 6 — Share & Reflect	Return to central question, celebrate discoveries, preview next cycle with a cliffhanger	15–20 min

> **TEACHER'S ROLE THROUGHOUT THIS KIT**
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> Your most powerful move is resisting the urge to answer children's questions immediately. When a child asks 'Why does the worm have no eyes?', your job is not to explain — it is to say: *"That is such a good question. Let's find out together."* Scribe the question on the wondering wall. Return to it. Let the inquiry do the work. Position yourself as a co-investigator, not an authority, and you will create the conditions for genuine scientific thinking to emerge.

KEY VOCABULARY — ALL EIGHT TERMS

SOIL · LIVING · HABITAT · OBSERVE · CREATURE · DECOMPOSE · ROOTS · UNDERGROUND · TEXTURE

These nine terms are introduced progressively across the 25 teaching slides. Display them on the vocabulary wall from the moment each is introduced — and never take them down. The accumulation of visible words is itself a learning artefact.

MATERIALS

02 What You'll Need: Materials for Every Workbook Cycle

Materials are organised so you can prepare one workbook cycle at a time. Don't feel you need everything ready on Day 1 — gather materials cycle by cycle as the semester unfolds. Each cycle list is split into three columns: what to prepare before the session, what each child needs at their table, and what is shared at the centre of each table group.

General Classroom Toolkit (All 18 Sessions)

Keep these available in the classroom throughout the entire semester:

- ▫ Large wax crayons in primary colours AND earth tones (brown, tan, dark red, grey, black) — one set per child
- ▫ Pencils — for upper-range children who demonstrate controlled grip
- ▫ Child-safe scissors — one pair per child
- ▫ Glue sticks (not liquid glue) — one per child
- ▫ Magnifying glasses — one per child or one per pair; minimum
- ▫ Bilingual vocabulary cards for all nine key terms — photo icon + English label + home-language label; laminated for durability
- ▫ Class wondering wall — large paper or bulletin board, minimum 60cm × 80cm, dedicated corner at child eye level (90–110cm from floor)
- ▫ Central question card — *"What lives in the soil?"* displayed permanently on the wondering wall from Session 1
- ▫ Dry-erase markers + laminated tally card for the teacher — for real-time vocabulary tracking during sessions
- ▫ Camera or tablet — for photographing workbooks, wondering wall, and children in action
- ▫ Blank 'scientist notebooks' — folded A4 paper, stapled; kept in a 'wonder drawer' at each table for free investigation drawing

TEACHER TIP — EARTH-TONE CRAYONS

Standard classroom crayon sets rarely include earth tones. Add at minimum: raw umber, burnt sienna, tan, grey, and black. These are needed from Workbook 1 Page 4 (My Soil Colour Match) onward and make the difference between a representational drawing and a purely decorative one.

What You'll Need: Materials for Every Workbook Cycle (continued)

Workbook Cycle 1 — Digging In: My First Look at Soil

Sessions 1–6. Links to ***Slides 2, 3, 4, 5, 9, 10, 18, 21***

Before Session

- Prepare two soil samples: one dark/moist, one lighter/sandy — in sealed zip bags or shallow trays
- Collect 3–5 natural loose parts: small pebble, dried leaf fragment, twig, seed
- Print and laminate soil vocabulary cards (SOIL, TEXTURE, OBSERVE)
- Prepare earth-tone colour swatches or paint chip cards for Page 4
- Collect 3 pebbles of clearly different sizes for Page 5 pattern activity

Per Child

- Digging In workbook
- Earth-tone wax crayons
- Magnifying glass
- Glue stick (from Session 4 onward)
- Sealed zip bag of soil (sensory-avoidant alternative)

Shared / Centre

- Observation tray with loose parts
- Two contrasting soil samples in trays or open zip bags
- Colour swatch / paint chip set
- 3 pebbles (small, medium, large)
- Tweezers and small brush as 'scientist tools'

What You'll Need: Materials for Every Workbook Cycle (continued)

Workbook Cycle 2 — Who's Down There? Underground Creatures

Sessions 7–12. Links to **Slides 6, 7, 8, 11, 12, 17**

Before Session

- Print and laminate creature reference cards: earthworm, beetle larva, ant, millipede, snail, woodlouse (photographs, not illustrations only)
- Prepare nature tray or sensory bin with compost + buried rubber/replica soil creatures
- Print and laminate LIVING, HABITAT, CREATURE vocabulary cards
- Prepare paper circles or sorting hoops for Page 3 legs/no-legs activity

Per Child

- Who's Down There? workbook
- Full crayon set
- Magnifying glass
- Glue stick
- Child-safe scissors

Shared / Centre

- Set of laminated creature reference cards (field guides)
- Nature tray with compost and buried creatures
- Sorting hoops or paper columns for Page 3
- Tweezers and brush as scientist tools

Workbook Cycle 3 — The Big Change: What Happens Underground

Sessions 13–18. Links to **Slides 13, 14, 17, 18, 19, 23, 24, 25**

Before Session

- Prepare a fresh apple slice and a browned apple slice (prepare 3–5 days in advance, or use the slide photograph as fallback)
- Prepare a fresh leaf and a partially decomposed leaf in a sealed bag
- Print and laminate sequencing picture cards: fresh leaf → yellowing → crumbling → soil
- Print and laminate helpers display cards: worm, snail, beetle, fungus
- Print DECOMPOSE, UNDERGROUND vocabulary cards
- Pre-cut Page 4 sequencing pictures for children with developing scissor control

Per Child

- The Big Change workbook
- Full crayon set
- Child-safe scissors
- Glue stick

Shared / Centre

- Fresh + browned apple display tray
- Fresh leaf + decomposing leaf in sealed bag
- Sequencing picture cards (loose, for physical arrangement before pasting)
- Helpers display card set

TEACHER TIP — LOCAL SOIL IS BEST

Source soil from your own schoolyard or a nearby garden where possible. Children's engagement deepens noticeably when they recognise the soil from a familiar place. “This is the same soil from our garden!” is a powerful moment of real-world connection. If using potting compost as a substitute, mention this honestly: “This is soil that was made to help plants grow — let's see what we can find in it.”

ALTERNATIVE — NO OUTDOOR ACCESS

A deep sensory bin (minimum 40cm × 60cm) filled with potting compost, with objects buried at different depths, is a full pedagogical equivalent to outdoor digging for all three workbook cycles. Set up one bin per table group of 4–5 children. Instructions for the indoor nature tray configuration are in Section 3: Setup.

SETUP

03 Getting the Room Ready: Two Setup Configurations

NON-NEGOTIABLE SEQUENCING PRINCIPLE

Hands-on experience ALWAYS comes before workbook activity. Never distribute workbooks until children have had at least 5–7 minutes of real, tactile exploration with the actual materials. Without the sensory anchor, workbook activities become abstract exercises that lose their scientific meaning. The sequence is: *Touch → Talk → Record.*

Configuration A — Outdoor Dig Setup (Strongly Preferred)

Use this configuration whenever outdoor garden access is available — even a small planter or potted plant base can substitute for a full garden bed.

BEFORE CHILDREN ARRIVE (ALLOW 10–15 MINUTES)

- ▫ Loosen approximately 30cm of soil in a 1m × 2m area, or fill a deep garden tray with compost if working in a courtyard or balcony space
- ▫ Place magnifying glasses and observation trays at the edge of the dig area — one per child or pair
- ▫ Set up a low table immediately beside the dig area for workbook access after exploration
- ▫ Position laminated creature reference cards on a weatherproof stand or clipped to a nearby fence — visible from the dig area
- ▫ Place a small easel with the central question card (*"What lives in the soil?"*) at one end of the dig area — this is the **wonder station**
- ▫ Display **Slide 2** on a portable tablet or as a printed A3 card near the wonder station
- ▫ Set out tweezers and small brushes in a clearly labelled 'scientist tools' tray
- ▫ Place one sealed zip bag of soil at the edge of each child's spot for sensory-avoidant children

DURING OUTDOOR EXPLORATION (5–10 MINUTES FREE INVESTIGATION)

Children dig, poke, smell, and observe freely. Teacher circulates using focus questions: *"What did you find? Where was it — near the top or deeper down? What does it feel like?"* Do not redirect curiosity. Let children lead. If a child finds a worm, pause the whole group and gather around it — that is a genuine scientific event.

Configuration B — Indoor Nature Tray (Full Pedagogical Equivalent)

Use this configuration when outdoor access is unavailable. It is not a lesser option — it is an equally valid entry point into the same inquiry.

BEFORE CHILDREN ARRIVE (ALLOW 10–15 MINUTES)

- ▫ Fill 2–3 large deep trays (minimum 40cm × 60cm × 15cm deep) with potting compost — one per table group of 4–5 children
- ▫ Bury objects at varying depths in each tray: a smooth pebble near the surface, a dried leaf fragment mid-depth, a small rubber worm deeper, a seed near the bottom — the depth variation is essential, connecting to **Slide 18 — Soil Has LAYERS!**
- ▫ Position magnifying glasses and tweezers beside each tray
- ▫ Stack workbooks at the edge of each table — do not place them on the tray
- ▫ Place one sealed zip bag of soil on top of each tray for sensory-avoidant children
- ▫ Display **Slide 10 — Our Word: OBSERVE** on the interactive board throughout the exploration phase

ACCOMMODATION FOR SENSORY-AVOIDANT CHILDREN (BOTH CONFIGURATIONS)

This is not a lesser option. It is an equally valid scientific entry point:

- Sealed zip bag of soil placed on top of the tray — child feels texture through the bag
- Tweezers and a small brush available as 'scientist tools' — frame these as tools that real scientists use, not workarounds
- Visual observation is fully valid — "Some scientists use their eyes very carefully and don't need to touch. You can observe just by looking."
- Never require or pressure direct soil contact

Vocabulary Wall Setup

The vocabulary wall is a permanent installation for the entire semester. Set it up before Session 1 and add to it progressively:

- ▫ Dedicated corner or bulletin board — minimum 60cm × 80cm surface area
- ▫ Child eye level: position all cards between 90–110cm from the floor
- ▫ Begin with only the central question card: *"What lives in the soil?"* — this creates anticipation
- ▫ Add vocabulary cards as each new term is introduced in the slides — never ahead of schedule
- ▫ Never remove vocabulary cards — the accumulation of words across 18 sessions is itself a documentation artefact
- ▫ Make the wall visible from both the meeting mat AND the activity tables — children should be able to reference it during workbook time without leaving their seat

Whole-Class Meeting Space

- ▫ Children sit on a mat in front of the interactive board or projector screen — enough space for the 'look closely' gesture sequence (arms wide) without bumping neighbours
- ▫ Teacher sits at child level, not standing — this is a co-inquiry, not a lecture
- ▫ Wondering wall visible from the mat — children should be able to point to it
- ▫ Workbooks always stacked face-down at the edge of tables during slide sessions — not distributed until the hands-on exploration phase is complete

Workbook 3 Cycle — Additional Setup

For the decomposition cycle, add a 'change observation' area to either configuration:

- ▫ Small display tray showing the fresh apple slice and browned apple slice side by side — covered with cling wrap to prevent handling (visual observation only for the before/after comparison)
- ▫ Fresh leaf and decomposing leaf in a sealed bag — available for handling
- ▫ Helpers display card set (worm, snail, beetle, fungus) mounted on a small stand or laid flat on the table beside the tray
- ▫ This area should be in place when children arrive — the environment itself is the first provocation

> **TEACHER TIP — THE WONDER STATION**
>
> Keep the wonder station easel (central question card) in place throughout the entire semester — it is a visual anchor that children will begin to approach independently. Update it at the start of each new workbook cycle by adding a new sub-question on a smaller card beneath the central question. For Workbook 2: *"What creatures live in the soil?"* For Workbook 3: *"What happens to things that fall into the soil?"* These sub-questions frame the inquiry without closing it.

LESSON FLOW

04 18 Session Outlines: The Full Semester Arc

These outlines are your facilitation script. A teacher with no prior planning should be able to pick up this guide and teach confidently from Session 1. Every session references the exact slides to display and the exact workbook pages to use.

Two Transition Rituals — Teach in Session 1, Repeat Every Session

RITUAL 1 — THE SOIL WONDERING SONG

Sing this to any familiar tune (e.g., "Twinkle Twinkle" rhythm). The final line is the most important — it re-anchors the central question every single session.

> *What is hiding underground?*
> *In the dark without a sound?*
> *Something wiggly, something small,*
> *Something living — find them all!*
> ***What lives in the soil today?***

Duration: approximately 45 seconds. Sing together as a class at the opening and close of every session.

RITUAL 2 — THE LOOK-CLOSELY GESTURE SEQUENCE

Teach this sequence in Session 1. Repeat it identically every session as a transition cue into scientific thinking mode.

1. **Hold up an imaginary magnifying glass** to one eye and peer through it
2. **Crouch low** as if looking very closely at the ground
3. **Stand tall and spread arms wide** — as if amazed by a discovery

Duration: approximately 30 seconds. Particularly valuable for EAL children and for re-engaging children after transitions.

Workbook 1 Cycle: Digging In — Sessions 1–6

Session 1 Provocation — Have You Ever Looked Under the Ground?

20–25 min · Whole class mat

SLIDES Display **Slide 1** as children enter, then move to **Slide 2**, **Slide 3**, **Slide 4**, **Slide 5**

WORKBOOK None this session — workbook introduced in Session 2

OPENING Sing the soil wondering song together. Lead the look-closely gesture sequence. Teach both rituals this session — children will join in quickly.

SLIDE 2 Display **Slide 2 — Have You Ever Looked Under the Ground?**

> *"Above the ground we can see everything — grass, flowers, feet! But look at this picture. What do you think is hiding down here, below the ground? Have you ever put your hands in soil? What did it feel like?"*

SCRIBE Accept 3–4 responses. Scribe children's exact words on the wondering wall using a thick marker. If a child says "worms!" write "worms". If they say "mud" write "mud". These are their first scientific hypotheses — honour them exactly.

SLIDE 3 Display **Slide 3 — What Does Soil Look Like Up Close?**

> *"Look very, very carefully at this picture. What can you see inside the soil? Can you see any colours? Any shapes? Can you see anything that looks alive?"*

SLIDE 4 Display **Slide 4 — Our Word: SOIL**. Place the SOIL vocabulary card on the wondering wall.

> *"Our special word today is SOIL. Soil is the ground under our feet. It's not just dirt — it's alive! Can everyone say SOIL?"*

SLIDE 5 Display **Slide 5 — What Do You Think Is Inside the Soil?**

> *"Now it is time for a guess — scientists call this a hypothesis. What do YOU think is living inside the soil? It can be anything — there are no wrong answers right now."*

SCRIBE Scribe all hypotheses on the wondering wall under the heading "Our Guesses". You will return to these at the end of each cycle to celebrate what children have discovered.

Session 3 Workbook Activity — Feel and Find: Two Kinds of Soil

20–25 min · Two soil samples + tables

SLIDES Slide 9 and Slide 21

WORKBOOK Digging In — Page 3: Feel and Find: Two Kinds of Soil

RITUAL + SLIDE Soil wondering song. Display Slide 9 — What Does Soil Feel Like?

> *"Today we are going to feel two DIFFERENT kinds of soil. When you touched the soil last time — was it wet or dry? Smooth or bumpy? What did it smell like? Today we have TWO kinds. Let's find out how they are different."*

EXPLORE FIRST Place both soil samples (dark/moist and lighter/sandy) in separate trays or side-by-side in one tray divided by a card. Give 5 minutes of exploration. Sealed zip-bag samples available for sensory-avoidant children.

SLIDE 21 Display Slide 21 — Our Word: TEXTURE. Add TEXTURE card to vocabulary wall.

> *"Texture is how something FEELS. Is it rough or smooth? Hard or soft? The two soils have different TEXTURES. Can you feel the difference?"*

WORKBOOK Distribute Digging In — Page 3. Read instruction aloud: "Touch both soils. Then circle the one that feels rough." Two steps: feel both, then decide and circle.

EXTENSION For upper-range children: "Can you tell me ONE more thing that is different about the two soils?" Teacher scribes the child's answer as an annotation on the workbook page.

CLOSE Look-closely gesture + soil wondering song.

Session 4 Workbook Activity — My Soil Colour Match

20–25 min · Colour swatches + tables

SLIDES Slide 3 displayed as visual reference throughout

WORKBOOK Digging In — Page 4: My Soil Colour Match

SETUP Lay earth-tone colour swatches or paint chip cards on each table alongside both soil samples. Display Slide 3 — What Does Soil Look Like Up Close? as a visual reference throughout this session.

> *"Today we are going to look at the colour of our soil very carefully. Scientists notice colours. Look at the colour swatches — which one looks most like YOUR soil? Find it, then colour your picture to match."*

WORKBOOK Distribute Digging In — Page 4. Two steps: (1) hold up swatches against soil sample to find the closest match, (2) colour the soil picture on the page using that colour.

CIRCULATE Ask: "How did you choose that colour? Does your soil look exactly like the swatch or a little different?" Accept all reasoning — the decision-making process is the learning, not the correctness of the colour.

CLOSE Soil wondering song. Ask: "Did everyone's soil look the same colour? Why do you think different soils have different colours?"

Session 5 Outdoor / Real-World — Digging and Discovering

25–30 min · Garden / nature tray (no workbooks during exploration)

SLIDES Slide 2 on tablet or printed card at wonder station; Slide 18 as verbal preview reference

WORKBOOK Post-dig only: Digging In — Page 5: Soil Has a Pattern! Big, Medium, Small

EXPLORATION PHASE Free digging and investigation (15–20 min). Children use magnifying glasses and scientist tools. Teacher circulates with focus questions: "What did you find? Was it near the top or deeper down?" — introduce the language of depth to preview Slide 18 — Soil Has LAYERS!

> *"You found that pebble near the TOP of the soil. I wonder if there are different things DEEPER down? What do you think might be hiding further underground?"*

COLLECT During exploration, collect 3 pebbles of clearly different sizes (small, medium, large) from the dig area — one set per table group.

POST-DIG ACTIVITY Return to tables. Place the three collected pebbles in the centre. Distribute Digging In — Page 5. Children arrange the physical pebbles in size order first, then draw them in order on the page. Two steps: arrange pebbles → draw.

CLOSE Look-closely gesture + soil wondering song. Ask: "Did you find any living things today? What were they?"

Session 6 Share & Reflect — What Have We Discovered So Far?

15–20 min · Whole class mat + cliffhanger

SLIDES Slide 1, then Slide 22

OPENING Display Slide 1 — What Lives in the Soil?. Soil wondering song. "Remember our big question? Let's look at it again. We have learned SO much already."

SLIDE 22 Display Slide 22 — What Have We Discovered So Far?. Point to each word on the vocabulary wall as you name it together.

SHARE Children choose their favourite page from Workbook 1 to share — they hold it up or point to it. The teacher scribes one sentence on the wondering wall from each sharing moment. "Tell me the most amazing thing you discovered."

RETURN TO GUESSES Look at the original "Our Guesses" section on the wondering wall. "Were any of our guesses right? Did we find anything we didn't guess?" Place a star (not a cross) next to any guess that turned out to be true.

CLIFFHANGER Hold up the cover of Who's Down There? Underground Creatures — don't open it yet.

> *"We know what soil looks like. We know what it feels like. We know it can have different colours and textures. But now I have a new question. WHO is living inside it? What creatures call the soil their HOME? We are going to find out in our next book. Are you ready?"*

CLOSE Add the sub-question "What creatures live in the soil?" to the wonder station beneath the central question. Look-closely gesture + soil wondering song.

Workbook 2 Cycle: Who's Down There? — Sessions 7–12

Session 7 Provocation — Who Calls the Soil Home?

20–25 min · Whole class mat

SLIDES Slide 6, Slide 7, Slide 8, Slide 11, Slide 12

SLIDE 6 Display Slide 6 — Our Word: LIVING. Add LIVING card to vocabulary wall.

> *"Before we meet the creatures of the soil, let's think — what makes something LIVING? Living things grow. They eat. They move. Can you think of something that is living? Can you think of something that is NOT living?"*

SLIDE 7 Display Slide 7 — Who Calls the Soil HOME?

> *"Look at all these animals! Which ones do you think live in the soil? Point to one. Which one surprises you the most? Which one have you seen before?"*

SLIDE 8 Display Slide 8 — Our Word: HABITAT. Add HABITAT card to vocabulary wall.

> *"A habitat is an animal's home — the place it needs to live and grow. A fish's habitat is water. A bird's habitat is the trees. What is a worm's habitat? Say it with me — SOIL."*

SLIDE 11 Display Slide 11 — Meet the Earthworm.

> *"This is an earthworm. It spends its whole life inside the soil. What do you wonder about it? What questions do you have?" Scribe 2–3 new wondering wall questions.*

SLIDE 12 Display Slide 12 — Our Word: CREATURE. Add CREATURE card to vocabulary wall.

CLOSE Look-closely gesture + soil wondering song.

Session 8 Workbook Activity — Meet the Underground Crew

20–25 min · Creature cards + nature tray + tables

SLIDES Slide 12 displayed throughout

WORKBOOK Who's Down There? — Page 2: Meet the Underground Crew

EXPLORE FIRST Nature tray available at each table with creature reference cards as 'field guides'. Give 5–7 minutes of exploration — children find buried rubber creatures and match them to reference cards. "Can you find the worm? Which card is it? How do you know?"

Session 9 Workbook Activity — Legs or No Legs? Let's Sort!

20–25 min · Creature cards + sorting + tables

SLIDES Slide 17 as pre-activity provocation

WORKBOOK Who's Down There? — Page 3: Legs or No Legs? Let's Sort!

SLIDE 17 Display Slide 17 — How Do You Think the Worm Helps the Soil? for a 2-minute discussion before the activity.

> *"Look at this worm digging through the soil. What do you notice about the worm? Does it have legs? How does it move if it has no legs? How do you think it helps the soil?" Accept all answers — you will return to the 'helping' concept in Workbook 3.*

WORKBOOK Distribute Who's Down There? — Page 3. Read instruction: "Look at each creature. Does it have legs? Sort them — legs in one box, no legs in the other box. Then draw one more creature in each box." Three steps: look, sort, draw.

CIRCULATE Listen carefully for the child's reasoning: "How did you know that one goes there?" Record the type of justification — attribute identification ("It has no legs"), analogical ("It's like a snake"), or sensory intuition ("It feels different"). See the Assessment section for how to record this.

EXTENSION For upper-range children: "Now can you sort them a DIFFERENT way? Can you make a new rule?" Possible second rule: big/small, or lives underground/lives above ground.

CLOSE Look-closely gesture + soil wondering song. Add any new questions to the wondering wall.

Session 10 Workbook Activity — How Many Legs? Let's Count!

20–25 min · Creature cards + counting + tables

SLIDES Slide 12 displayed throughout

WORKBOOK Who's Down There? — Page 4: How Many Legs? Let's Count!

EXPLORE FIRST Lay creature reference cards on tables. Children use magnifying glasses to count legs on the cards before opening workbooks. "Can you count the legs on the ant? Touch each leg as you count."

WORKBOOK Distribute Who's Down There? — Page 4. Two steps: (1) count legs on each creature illustration (use finger-pointing as one-to-one counting support), (2) circle the creature with the most legs.

EXTENSION Upper-range children: "Can you put the reference cards in order — fewest legs to most?" Children physically arrange cards on the table as a sequencing activity.

CLOSE Soil wondering song. Quick vocabulary check: point to the CREATURE card on the wall — "What is a creature? Can you name one?"

Session 11 Outdoor / Real-World — Creature Hunting

25–30 min · Garden / nature tray as field + post-dig workbook

SLIDES Slide 7 or Slide 11 on tablet at wonder station

WORKBOOK Post-exploration only: Who's Down There? — Page 5: Big, Medium, Small — Who Is Biggest?

EXPLORATION Children use creature reference cards as field guides. "Can you find a creature that matches one of your cards?" Teacher documents any real creature finds with photographs — these become classroom documentation artefacts.

POST-EXPLORATION Return to tables. Distribute Who's Down There? — Page 5. Children recall what they found and complete the size-ordering activity. "Which creature we saw today was biggest? Which was smallest?"

CLOSE Look-closely gesture + soil wondering song. Ask: "Did you find something that surprised you today?"

Session 12 Share & Reflect — Workbook 2 Close + Workbook 3 Cliffhanger

15–20 min · Whole class mat

SLIDES Slide 1, Slide 22, Slide 13

WONDERING WALL Return to the wondering wall. Read all creature questions aloud. Place a star (not a cross) next to any that have been answered. "These questions we answered — well done, scientists! These ones we haven't answered yet — let's keep them for next time."

SLIDE 13 Display Slide 13 — What Do Soil Creatures Eat? as the cliffhanger.

> *"We know WHO lives in the soil. But here is my next question: WHAT do the creatures eat? And what happens to things that fall into the soil — like this old*

Workbook 3 Cycle: The Big Change — Sessions 13–18

Session 13 Provocation — Decomposition and the Underground World

20–25 min · Change observation tray + whole class mat

SLIDES Slide 13, Slide 14, Slide 18, Slide 19

OPENING PROVOCATION Before gathering on the mat, let children see the change observation tray (fresh leaf + decomposing leaf in sealed bag) that has been set up on the table. Allow 2–3 minutes of spontaneous reaction before gathering.

> *"Look at these two leaves. They both started as the same thing — a fresh, green leaf. But something HAPPENED to this one. Look at it carefully. What do you notice? What do you think happened to it?"*

SLIDE 13 Display **Slide 13 — What Do Soil Creatures Eat?**

SLIDE 14 Display **Slide 14 — Our Word: DECOMPOSE**. Add DECOMPOSE card to vocabulary wall. This is the most cognitively complex term in the kit — allow extra time.

> *"When something decomposes, it breaks into tiny, tiny pieces and goes back into the soil. It is nature's way of recycling! The creatures we learned about — the worms, the beetles — they help things decompose. They eat the old leaves and break them down."*

SLIDE 18 Display **Slide 18 — Soil Has LAYERS!**

SLIDE 19 Display **Slide 19 — Our Word: UNDERGROUND**. Add UNDERGROUND card to vocabulary wall.

CLOSE Look-closely gesture + soil wondering song. Scribe any new questions on the wondering wall.

Session 14 Workbook Activity — What Do You Notice? (Before We Begin)

20–25 min · Apple observation tray + tables

SLIDES Slide 10 and Slide 14

WORKBOOK The Big Change — Page 2: What Do You Notice? (Before We Begin)

EXPLORE FIRST Display fresh apple on the tray. Give children 5 minutes to observe using magnifying glasses. Display **Slide 10 — OBSERVE** as a reminder.

> *"Look at this apple very carefully. Observe it! What colour is it? Does it smell? What does the skin look like? Remember — scientists observe BEFORE they make any changes."*

WORKBOOK Distribute **The Big Change — Page 2**. Three steps: (1) observe the fresh apple, (2) draw what you see in the large box, (3) circle the picture-label that matches: fresh or old (teacher reads both options aloud).

CIRCULATE Scribe children's verbal descriptions beside their drawings. "This is the 'before' picture. Next time, we will look at what happened AFTER."

CLOSE Soil wondering song. Preview: "Next time, we will look at the same apple AFTER something has happened to it. What do you think will change?"

Session 15 Workbook Activity — Before and After: The Apple

20–25 min · Before/after apple display + tables

SLIDES Slide 23 as extension provocation; Slide 14 as reference

WORKBOOK The Big Change — Page 3: Before and After: The Apple

PROVOCATION Display both apple slices side by side. Display **Slide 23 — What Happens When It Rains?** briefly (2 min).

> *"Look at the two apples. One is fresh. One has changed. What is DIFFERENT? Where did those changes come from? When it rains, where does the water go in the soil? Do you think water helps things decompose?"*

WORKBOOK Distribute **The Big Change — Page 3**. Three steps: (1) look at both apple pictures, (2) circle what is different, (3) colour the 'after' apple picture to show the change.

KEY QUESTION "What changed? What do you think MADE it change?" Listen for connections to decompose vocabulary or creature knowledge — these are the most significant learning indicators in this session.

CLOSE Look-closely gesture + soil wondering song. Add any new questions to wondering wall.

Session 16 Workbook Activity — The Leaf's Big Journey: Put It in Order

20–25 min · Sequencing cards + tables

SLIDES	Slide 14 displayed throughout as vocabulary reference
WORKBOOK	The Big Change — Page 4: The Leaf's Big Journey: Put It in Order
EXPLORE FIRST	Lay sequencing picture cards (fresh leaf → yellowing → crumbling → soil) in random order on each table. "Can you put these pictures in order? What happened first? What happened last?"
PHYSICAL SEQUENCE	Allow children to physically arrange the cards in order before cutting and pasting. This physical manipulation is itself the reasoning activity — do not rush to the workbook.
WORKBOOK	Distribute The Big Change — Page 4. Two steps: (1) cut out the pictures (or use pre-cut versions for children with developing scissor control), (2) paste them into the correct order in the workbook.
EXTENSION	Upper-range: teacher scribes a full sentence dictated by the child explaining the journey. "Tell me what happens to the leaf — I'll write your words." Add this as an annotation to the workbook page.
CLOSE	Soil wondering song. "The leaf goes back into the soil. That is nature's way of recycling — DECOMPOSE. Can everyone say decompose?"

Session 17 Outdoor / Real-World — Finding Decomposing Matter

25–30 min · Garden + post-exploration workbook

SLIDES	Slide 17 on tablet at wonder station
WORKBOOK	Post-exploration: The Big Change — Page 5: Who Helps? Meet the Helpers
EXPLORATION FOCUS	Children specifically look for decomposing matter — fallen leaves, rotting wood, damp compost, any signs of things breaking down. Teacher narrates: "Look at this leaf — can you see how it is starting to crumble? What do you think is helping it break down?"
POST-EXPLORATION	Return to tables. Lay helpers display cards (worm, snail, beetle, fungus) in the centre. Distribute The Big Change — Page 5. Children match each helper creature to the thing it helps with. Two steps: find the match, draw a line.
CLOSE	Look-closely gesture + soil wondering song. Ask: "Did you find something today that was decomposing? What did it look like? Smell like?"

Session 18 Semester Celebration — What Do We Know Now?

30–35 min · Whole class mat + celebration

SLIDES	Slide 1, Slide 25, Slide 24
OPENING	Display Slide 1. Soil wondering song — loudly and joyfully. "This was our question ALL semester long. And now we KNOW so much!"
SLIDE 25	Display Slide 25 — What Do We Know Now?

> *"Remember when we first asked this question? What did you think was in the soil back then? What do you know NOW that you didn't know before? What is the most amazing thing you discovered this whole semester?"*

WONDERING WALL	Read the entire semester's wondering wall aloud. Celebrate every answered question with a star. Honour unanswered questions: "These ones are still mysteries — they are questions for NEXT time. Good scientists always have more questions than answers."
SHARE	Each child chooses their favourite page from any of their three workbooks and holds it up to share. One child at a time — "Tell us one thing about your page." Teacher photographs each child holding their books.
SLIDE 24	Display Slide 24 — How Can WE Help the Soil?

> *"Now that we are soil scientists, we have a responsibility. We can plant seeds. We can make compost. We can be gentle with the ground. How will YOU help the soil?"*

CLOSE	Photograph all three workbook covers together with each child. Lead a final, triumphant look-closely gesture sequence. Sing the soil wondering song one last time. "We are soil scientists — and the inquiry never really ends."

TEACHER TIP — SLIDES 15, 16, AND 20 AS OPTIONAL EXTENSIONS

Slide 15 (Roots!), Slide 16 (Our Word: ROOTS), and Slide 20 (What Would Happen If There Was No Soil?) are intentionally available in the deck as extension material. Include them if time permits, if children's curiosity specifically demands them, or as entry points into extension workbooks you design yourself (see Section 8: Follow-Up). They are not assigned to any core session precisely because the inquiry should be led by children's questions.

DIFFERENTIATION

05 Meeting Every Child: Differentiation Across the Semester

Differentiation at nursery level works through three levers applied simultaneously across the whole classroom — not by singling out individual children. When you deploy all three levers at once, every child has a way in, a way through, and a way further.

Lever 1: Physical Scaffold

- Larger colouring and sorting areas
- Pre-cut pieces for motor-developing children
- 4mm+ dotted tracing lines throughout
- Thick borders drawn by teacher to orient glue placement
- Sealed zip-bag soil for touch-avoidant children
- Tweezers and brushes as 'scientist tools' for all

Lever 2: Language Scaffold

- Bilingual vocabulary cards for all 9 key terms
- Gesture + image rather than word-only instructions
- Teacher scribes all verbal observations
- EAL children paired with verbally confident English speakers
- Vocabulary wall always visible from tables
- Look-closely gesture as non-verbal entry point

Lever 3: Cognitive Extension

- Second classification rule after first sort is complete
- Pattern creation after completing workbook prompt
- Dictated observation sentence — teacher scribes
- Card sequencing from fewest to most
- New question generation for the wondering wall
- Peer-expert moments ("Show your friend how")

Tiered Activity Matrix — Quick Reference

Laminate this table and keep it on your clipboard during sessions for fast decision-making.

WORKBOOK / PAGE	SUPPORT SCAFFOLD	CORE ACTIVITY	CHALLENGE EXTENSION
Digging In Page 3: Two Kinds of Soil	Sealed zip bag; brush/tweezers; teacher names textures aloud as child explores	Touch both soils → circle the rough one	"Tell me one MORE thing that is different" — teacher scribes answer as workbook annotation
Digging In Page 5: Big, Medium, Small	Physical pebbles to arrange before drawing; teacher places pebbles in a row for child to trace	Arrange pebbles in size order → draw them in order	Create a new AB pattern by drawing or stamping after completing the size order
Who's Down There? Page 3: Legs or No Legs?	Physical creature cards to handle and feel; teacher reads "legs" and "no legs" column labels aloud	Look at creatures → sort into legs/no-legs → draw one more in each column	Apply a second rule: "Now sort them a DIFFERENT way — big and small? Underground and above?"
Who's Down There? Page 4: How Many Legs?	Physical reference cards; child points to each leg and counts aloud with teacher; use 1-to-1 counting support card	Count legs on each creature → circle the one with most legs	Arrange reference cards in order from fewest to most legs on the table
The Big Change Page 4: Leaf's Big Journey	Pre-cut picture cards available; colour-coded arrow strip shows left-to-right sequencing direction	Physical arrangement of cards → cut and paste in correct order	Teacher scribes a complete sentence dictated by child explaining what happens to the leaf
The Big Change Page 5: Who Helps?	Helpers display cards laid beside the workbook as physical reference; teacher reads each helper's name aloud	Match each helper creature to what it helps with → draw a line	Teacher scribes a dictated sentence: "The [creature] helps the soil by..." — child completes it

EAL (English as an Additional Language) Children

- Prepare bilingual vocabulary cards for all 9 key terms before Session 1 — home language label beneath the English label, with a clear photograph icon
- The bilingual vocabulary wall is the EAL child's primary reference tool throughout all 18 sessions — ensure it is at child eye level and positioned for easy table-to-wall sightline
- Use **gesture + image** consistently when giving activity instructions — demonstrate the action physically before reading the written instruction
- The look-closely gesture sequence is particularly valuable — it is a complete non-verbal participation pathway that does not require English comprehension
- Pair EAL children with verbally confident English speakers during all pair-sharing moments
- For children with very limited English: the vocabulary tracking grid (see Section 6) applies — note the first time they use a key term in any language, as the concept transfer across languages is itself a significant learning event

Sensory-Avoidant Children

Never present the sealed-bag option as a lesser alternative. Frame all tool use as scientifically valid:

> *"Some scientists use their hands directly. Some scientists use tools — tweezers, brushes, bags — to keep their specimens safe and clean. Both ways are real science. You choose which scientist you are today."*

- Sealed zip-bag soil sample at every session from Session 2 onward — always available, never required
- Tweezers, small brush, and a wooden stick available as 'scientist tools' in the centre of every table
- Visual-only observation is fully sufficient for completing all workbook activities — the drawing and sorting activities do not require physical soil contact
- All three workbooks are fully completable without any direct soil contact

The Wonder Drawer — Early Finisher Extension

Keep a 'wonder drawer' at each table throughout the semester. This is not an add-on task but a continuation of the inquiry:

- Creature reference cards (laminated)
- Magnifying glasses
- Blank 'scientist notebooks' — folded A4 paper, stapled, labelled with child's name
- Earth-tone crayons

Children who finish workbook activities early draw freely in their scientist notebook — observational drawing of what they see in the tray, or from memory. Treat these drawings as scientific records and collect them at the end of the semester.

> **TEACHER TIP — MIXED-ABILITY PAIRING**
>
> The most efficient whole-group differentiation strategy is deliberate mixed-ability pairing during pair-sharing moments. Pair a verbally confident child with a quieter or EAL child — and pair a motor-confident child with a child who has developing fine motor control. Scaffold is distributed across the peer group, and both children benefit: the confident child consolidates through explanation; the developing child gains a peer model.

ASSESSMENT

06 Watching and Wondering: Assessment Through Observation

CORE ASSESSMENT PRINCIPLE

Workbooks are scientific records, not marked work. Never correct a workbook with red marks or cross anything out. If a child's sort appears 'incorrect' by adult standards, ask: "Tell me about this one." Surface the child's logic before making any adjustment — their reasoning is the data, not the correctness of the placement.

Four Assessment Methods

METHOD 1 — TEACHER SCRIBE ANNOTATIONS

During every workbook session, write in pencil beside the child's drawing the exact words the child used to describe what they were doing. Use quotation marks. Date the annotation. This transforms every workbook into a linguistic record that is far more informative than the drawing alone.

Examples of scribe annotations:

- *"I found a dark bit and a light bit and they felt different"* — beside Page 3, Workbook 1
- *"The worm goes here because it has no legs — it wiggles"* — beside Page 3, Workbook 2
- *"The leaf got all crumbly and went into the dirt"* — beside Page 4, Workbook 3

METHOD 2 — VOCABULARY EMERGENCE TRACKING GRID

Keep a simple class grid: child names down the left, the nine key terms across the top. Update it with a dry-erase marker in real time during sessions. Takes 2 minutes per session to update.

Symbol	Meaning	When to Mark
.	**First use with teacher prompt**	Child uses the word after teacher has just used it in a question or instruction
●	**Spontaneous correct use**	Child uses the word correctly in context WITHOUT a teacher prompt — most significant data point
○	**Used to explain to another child**	Child uses the word to teach or explain something to a peer — highest level of consolidation

METHOD 3 — CLASSIFICATION CHOICE ANALYSIS

When a child sorts creatures on **Who's Down There? — Page 3** (Legs or No Legs?), note not just the sort result but the justification type. Each type reveals a different level of scientific thinking:

Justification Type	Example	What It Shows
Attribute identification	"It has no legs"	Can identify and name a specific observable attribute — foundational classification skill
Analogical reasoning	"It's like a snake"	Connects new information to prior knowledge — more advanced scientific thinking
Functional reasoning	"It wiggles so it doesn't need legs"	Connects form to function — emerging interdependence understanding
Sensory intuition	"It feels different" / "I don't know"	Sensory-led decision making — valid starting point, not yet attribute-based classification

METHOD 4 — WORKBOOK DRAWING ANALYSIS (3-LEVEL RUBRIC)

Use this rubric to track drawing progression across the three workbooks. Do not push children toward Level 3 — simply document which level they are working at and whether it progresses.

IMPORTANT — ALWAYS ASSESS DRAWING WITH THE VERBAL ANNOTATION

A Level 1 scribble accompanied by a rich verbal description is more scientifically advanced than a neat Level 3 drawing completed in silence. The drawing rubric is always paired with what the child said while drawing.

Level	Drawing Characteristics	What It Indicates
Level 1 Mark-making	Scribble or undifferentiated marks — child is representing something but form is not yet differentiated	Child is engaging with the task and forming internal representations — verbal annotation essential
Level 2 Recognisable form	Roughly circular worm, irregular soil patch, creature outline — form is recognisable but details limited	Child is drawing from visual memory or observation; form is beginning to differentiate

One-Page Documentation Template

Complete one per child per workbook cycle — designed to take 5 minutes at the end of each cycle (not in real time during sessions).

Cycle Documentation — What Lives in the Soil?

CHILD NAME

WORKBOOK CYCLE

VOCABULARY LEVEL REACHED (•/○ ON GRID)

DRAWING LEVEL (1 / 2 / 3)

CLASSIFICATION REASONING TYPE OBSERVED

STANDOUT MOMENT — EXACT WORDS USED (QUOTATION)

IB PYP LEARNER PROFILE ATTRIBUTES OBSERVED THIS CYCLE

NEXT STEPS / QUESTIONS TO PURSUE

Key Assessment Moments Across the Semester

Session	Assessment Moment	What to Note
Session 1	**Slide 5** — hypothesis generation	Scribe all hypotheses; photograph the wondering wall — this is your baseline
Session 2	**Digging In — Page 2** drawing	First drawing level assessment — establishes baseline for three-workbook progression
Session 3	**Digging In — Page 3** texture sort	First classification — note attribute used (texture, colour, or wetness)
Session 9	**Who's Down There? — Page 3** sort	Classification reasoning type — record verbatim justification
Session 10	**Who's Down There? — Page 4** counting	Counting strategy observed: pointing, grouping, or subitising
Session 14	**The Big Change — Page 2** drawing	Second drawing level — compare to Workbook 1 Page 2 for progression evidence
Session 16	**The Big Change — Page 4** sequencing	Sequence reasoning: visual change, size, or narrative logic
Session 18	**Slide 25** — "What do we know now?"	Summative vocabulary grid + drawing level rubric; semester portfolio complete

> **TEACHER TIP — PHOTOGRAPH THE WONDERING WALL**
>
> Photograph the wondering wall at the end of each workbook cycle. This is a class-level assessment artefact that shows the collective growth of the inquiry across the semester. The visual difference between the Session 1 wondering wall and the Session 18 wondering wall is one of the most powerful pieces of learning documentation you can share with families and administrators.

LOOK-FORS

07 What to Watch For: 10 Observable Learning Indicators

These look-fors are concrete, seeable actions — not internal states. You can identify them in real time without stopping to interpret. They are not a checklist to complete: seeing even one in a session is a significant learning event worth documenting.

Keep a laminated A5 tally card with child names and look-for codes (L1–L10). Update with a dry-erase marker in real time. Transfer to the documentation template at end of day.

CATEGORY A — VOCABULARY EMERGENCE

L1

VOCABULARY EMERGENCE · TEXTURE · SLIDE 21 · DIGGING IN PAGE 3

Child uses the word "texture" spontaneously when touching soil — without a teacher prompt.

Indicates internalisation beyond recall. Note the exact sentence used. This is a ● on the vocabulary tracking grid. Example: *"This one has a different texture — it's rougher."*

L2

VOCABULARY EMERGENCE · HABITAT · SLIDE 8 · WHO'S DOWN THERE? PAGE 2

Child uses the word "habitat" or "home" to describe where a creature lives — in a new context, not in direct response to a teacher question.

Indicates conceptual transfer from vocabulary introduction to applied usage. Example: *"The worm's habitat is underground."* or *"This is the ant's home — the soil."*

L3

VOCABULARY EMERGENCE · DECOMPOSE · SLIDE 14 · THE BIG CHANGE PAGES 3–4

Child uses the word "decompose" OR connects "change" and "soil" in the same sentence without prompting.

The most cognitively complex vocabulary indicator in the kit. Example: *"The leaf decomposed and went back into the soil."* or *"It changed because of the worms."*

L4

VOCABULARY EMERGENCE · COMPARATIVE LANGUAGE · ALL CYCLES

Child uses comparative language spontaneously during observation: "this one is rougher," "the worm is longer," "that one has MORE legs."

Indicates scientific descriptive language developing beyond simple labelling. Comparative language is the foundation of classification thinking at this age.

CATEGORY B — SCIENTIFIC THINKING BEHAVIOURS

L5

SCIENTIFIC THINKING · TOOL USE · SESSIONS 2, 8, 10, 11

Child holds magnifying glass close to a specimen and adjusts distance to focus — using it as a genuine observation tool rather than waving it around.

A motor + cognitive integration indicator. Shows the child has internalised the observation tool as a scientific extension of their own vision. Note which session this purposeful use first appears in for each child.

L6

SCIENTIFIC THINKING · HYPOTHESIS FORMATION · WHO'S DOWN THERE? PAGE 3

Child makes a prediction BEFORE completing a workbook activity. Example: "I think the worm will go in the no-legs box" — said before beginning the sort.

Hypothesis formation is the highest-order scientific thinking behaviour at the nursery level. When it appears, invite the child to share their prediction with the class before the activity begins. May only appear in a small number of children across the semester — treat it as a significant event.

L7

SCIENTIFIC THINKING · CREATURE-TO-FUNCTION CONNECTION · SLIDE 17 · THE BIG CHANGE PAGE 5

Child connects a creature to a function — "the worm makes the soil good," "the bug eats the leaf," "the beetle helps things decompose."

This is the key indicator of conceptual progress in the Workbook 3 cycle. It signals the child has moved from identification (naming) to understanding (explaining). This is the deepest learning goal of the kit. Note the exact words used.

L8

SCIENTIFIC THINKING · TEMPORAL AWARENESS · THE BIG CHANGE PAGE 3

Child notices and names change across time — compares the fresh apple and the browned apple and says "it was different before" or "it changed while we waited."

Indicates temporal scientific thinking — understanding of the key concept of Change. Connects to the before/after structure of **The Big Change — Page 3**. Often accompanied by the first spontaneous use of L3 (decompose vocabulary).

CATEGORY C — SOCIAL INQUIRY BEHAVIOURS

L9

SOCIAL INQUIRY · CHILD-GENERATED QUESTIONS · ALL SESSIONS · SLIDE 23

Child asks a new question not prompted by the teacher or the slides, and directs it to the wondering wall or to the teacher. Example: "But what happens to the worm when it rains?"

Indicates ownership of the inquiry and emergent meta-cognition. Honour immediately: scribe the question on the wondering wall WITH the child's name beside it. This public recognition is a powerful motivator for other children to begin generating their own questions. The example question above is specifically prompted by **Slide 23**.

L10

SOCIAL INQUIRY · PEER TEACHING · ALL SESSIONS · THE BIG CHANGE PAGE 5

Child teaches another child — explains a sort, shares a creature name, demonstrates the look-closely gesture to a peer, or says "no, it goes HERE because..."

Both an assessment indicator AND a pedagogical resource. Consolidation through social transmission is one of the most reliable signs of deep learning. Position children who demonstrate L10 as peer experts: "Can you show your friend how you sorted yours?" This distributes the scaffolding without requiring teacher presence at every table.

> **LOOK-FORS ARE CUMULATIVE ACROSS THE SEMESTER**
>
> A child who shows L3 (decompose vocabulary) in Session 14 but not earlier is showing exactly the learning progression this kit is designed to produce. Do not expect all look-fors to appear in every workbook cycle. The arc of growth is the data — not any single session snapshot.

FOLLOW-UP

08 Where Next? Extending the Inquiry Beyond Three Workbooks

The three included workbooks cover the first three loops of the spiral — sensory observation, creature classification, and decomposition understanding. But the central question *"What lives in the soil?"* has many more dimensions that children's curiosity will naturally reach for. This section equips you to extend the inquiry for as long as the semester allows.

How to Choose Your Next Inquiry Facet

Answer these three questions at the end of each workbook cycle. Your answers point directly to the next direction:

GUIDING QUESTIONS — CHOOSING THE NEXT FACET

1. **What question appeared most frequently on the wondering wall during the last cycle?** The unanswered questions your children generated are the most authentic and motivating entry points.
2. **Which look-for appeared most strongly?** Vocabulary emergence (L1–L4) → choose a vocabulary-rich facet like Roots or the Soil Food Web. Scientific thinking (L5–L8) → choose a process facet like Water in Soil or Underground in Winter. Social inquiry (L9–L10) → choose a collaborative investigation like Comparing Soils.
3. **Are children asking about a specific creature, a specific process, or a specific environment?** Creature questions → Facets 4, 9, 11. Process questions → Facets 1, 5, 6. Environment questions → Facets 3, 8, 10.

> TEACHER TIP — LET CHILDREN VOTE
>
> Where possible, answer the guiding questions collaboratively with the children. A 5-minute class vote between two or three next-facet options ("Which do you want to find out about next — roots or what happens when it rains?") builds ownership and models democratic inquiry. The act of choosing is itself a scientific thinking skill.

12 Suggested Next Inquiry Facets

FACET 1

Water in Soil

What happens when we add water? Sparked by **Slide 23**. Children's first encounter with soil moisture in **Digging In — Page 3** often generates questions about wet vs. dry soil. Minimal additional materials needed — anchor slides already in the deck.

FACET 2

Roots as Food Finders

What are roots doing underground? Sparked by **Slide 15** and **Slide 16**, both already in the deck and ready to use. Connects to the living/habitat concepts from Workbook 2. Root specimens available from potted plants.

FACET 3

Comparing Soils from Different Places

Is all soil the same? Extension of **Digging In — Page 3**. Requires soil samples from 3–4 different locations — schoolyard, park, potted plant, sand pit. A rich classification and texture vocabulary extension.

FACET 4

What Do Worms Need?

A worm habitat inquiry. Sparked by look-for L7 and children asking "where does the worm sleep?" Leads into a simple wormery setup if school resources allow. Builds directly on creature knowledge from Workbook 2.

FACET 5

Underground in Winter

Does anything change? Seasonal extension connecting the change concept from Workbook 3 to environmental science. Uses the same before/after page structure as **The Big Change — Page 3** — familiar format, new content.

FACET 6

The Soil Food Web

Who eats who? Sparked by **Slide 20**. Advanced extension for classes where look-for L7 (creature-to-function connection) is appearing frequently. Simplified food chain structure appropriate for nursery level.

FACET 7

Seeds in Soil

How does a seed know what to do? Bridges soil inquiry to plant science. Requires a seed-planting activity preceding the workbook. Uses the same sequencing structure as **The Big Change — Page 4** — applied to a seed germination journey.

FACET 8

Soil vs Sand vs Mud

Can you tell them apart? Sensory science extension deepening texture and classification work from Workbook 1. Three materials for direct comparison. Very accessible starting point — high sensory engagement, familiar activity structure.

FACET 9

Night Creatures in the Soil

Who comes out in the dark? Extends creature inquiry from Workbook 2 into temporal habitat understanding. Uses nocturnal creature reference cards. Extends the size-comparison activity from **Who's Down There? — Page 5** to nocturnal creatures.

FACET 10

How Big Is Underground?

Making a soil layer model. Hands-on art-science integration — children create a layered soil model in a clear cup, connecting directly to **Slide 18 — Soil Has LAYERS!** Requires clear plastic cups, different soil/sand/gravel layers, and spoons.

FACET 11

Blank Workbook Planning Template

Use this structure to design any of the 12 extension facets — or your own. It follows the same five-page format as the three included workbooks, so you are not designing from scratch but filling a familiar container with new content.

Page	Type	Structure	Key Field to Fill
Cover	Title page	Workbook title + central sub-question for this cycle	*What is the one question this workbook explores?*
Page 2	Observational drawing	Observe the specimen → draw what you see → label one thing (teacher scribes label)	*What is the sensory anchor that precedes this page?*
Page 3	Sorting or matching	Two-step: sort or match → draw one more item in each group	*What is the sorting rule? What are the two categories?*
Page 4	Sequencing or counting	Two-step with extension: physical card arrangement → cut/paste in order OR count → circle the most/least	*What is the upper-range extension for this page?*
Page 5	Creation or reflection	Child-generated response: "Draw your own [creature/layer/helper]" OR "Draw what would happen if..."	*What open-ended prompt invites the child's own thinking?*

FOR EACH PAGE, ALSO SPECIFY:

- **Sensory Anchor:** What real-world experience precedes this page? (If you cannot answer this, reconsider the page — without a sensory anchor, the activity will not function within the inquiry model.)
- **Teacher Talk Move:** What is the key open question you will ask during this activity?
- **Differentiation Note:** What is the support scaffold? What is the challenge extension?

Condensed Three-Session Micro-Cycle

If time is limited, extension workbooks do not require the full six-session cycle. A condensed three-session micro-cycle is sufficient for a focused facet inquiry:

Micro-Cycle Session	Type	Focus	Duration
Session A	Provocation	Open with the sub-question; show 1–2 relevant slides; generate wondering wall questions; introduce vocabulary	20 min
Session B	Workbook + Hands-On	Sensory exploration (5–7 min) → workbook pages 2–4 across one extended session (move between pages as children are ready)	30 min
Session C	Share + Reflect	Children share one discovery; revisit wondering wall questions; celebrate; preview the next facet or close the semester	15 min

Home-School Connections

At the close of each workbook cycle, send a brief communication home with three things:

- **One thing your child discovered** — use a direct quotation from your scribe annotations
- **One question your child is wondering** — copied from the wondering wall
- **One thing to try at home** — for example: "Go outside and look at the soil in your garden. What colour is it? What can you find in it? Bring a wondering to school!"

Suggested Read-Alouds to Extend the Inquiry

- *Diary of a Worm* by Doreen Cronin — Workbook 2 cycle, creature perspective narrative
- *Jump Into Science: Dirt* by Steve Tomecek — Workbook 1 cycle, accessible soil science for young children
- *In the Garden with Dr. Carver* by Susan Grigsby — Workbook 3 cycle, soil care and growing connections
- *The Tiny Seed* by Eric Carle — Extension Facet 7 (Seeds in Soil) provocation text
- *Compost Stew* by Mary McKenna Siddals — Extension Facet 1 (Water in Soil) and general decomposition cycle connection