Earth Detectives: First Encounters with Living Ground

Learning Guide 01 — Grades 1-4

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Erdpuls Learning Guide 01 — Grades 1–4

Earth Detectives: First Encounters with Living Ground

For Children Ages 6–10 — Lower Primary School

Institution: Erdpuls Müllrose - Center for Sustainability Literacy, Citizen Science and Reciprocal Economics

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Changelog

Version	Date	Changes
1.1	February 2026	Initial generation for OER publication; institution name and license applied
1.0	—	Not released

Overview Table

Element	Detail
Target Group	School classes, Grades 1–4, ages 6–10
Session Length	90–120 minutes (half-day preferred)
Group Size	10–28 children; minimum 1 adult per 10 children
Setting	Erdpuls campus garden (outdoor Rings 0–2); adaptable to any school garden or park

Element	Detail
Season	Spring and autumn optimal; all seasons viable with adaptations
Core Method	Sensation before interpretation — the body as the primary instrument
Toolkit Links	Appendix A (Questions to the Soil, Questions 1–8 selected); Appendix B (Token Economy, introductory)
Developmental Stage	Will-forces period (anthroposophical first seven-year period of school life): embodied knowing, imagination, rhythmic learning, direct sensory trust
Citizen Science Output	Illustrated field cards; class soil portrait; first iNaturalist observation record
Token Economy Level	Introductory — Token Seeds (discovery and sharing recognition)
Languages Available	EN ([emoji]) DE pending PL pending

Five Competency Clusters at This Level

Competency Cluster	Expression for Ages 6–10
Environmental Literacy	Direct sensory encounter with soil, insects, roots, and water; naming living things by observation, not by label; seasonal awareness as felt rhythm
Scientific Inquiry	"What do you notice?" as the first scientific question; drawing as data recording; comparison between patches as the first experimental question
Technology Competence	The senseBox MCU introduced as a "conversation partner": *it* notices temperature and moisture; *we* notice texture and smell. Side-by-side comparison, not replacement.
Economic Understanding	Token Seeds introduce the idea that sharing a discovery creates value for the whole group. Each observation is a gift to the community.
Social-Emotional Learning	Circle observation; naming what surprised you; recognizing that careful attention is itself a form of care

Pedagogical Rationale

The Developmental Stage

Children in Grades 1–4 live primarily in the **will-forces** — the deep human impulse to *act*, *move*, *make*, and *do*. Abstract environmental concepts such as carbon cycles or ecosystem services are developmentally premature. What these children possess is something more fundamental: **perceptual openness**. They have not yet learned to overlook the small, the slow, or the non-human. A centipede crossing a soil clump commands the same attention as anything else in the visual field. An unexpected smell produces genuine astonishment.

The Erdpuls phenomenological method — sense first, interpret later — meets children at precisely this developmental moment. The discipline of "looking before naming" is not a concession to young learners; it is the recognition that first-grade perceptual trust *is* rigorous science. The Goethean instruction to achieve "sensation before interpretation" describes what six-year-olds do naturally. Erdpuls learning at this level is about extending and honoring that capacity, not yet conceptualizing it.

Anthroposophical Framework in Practice

Rudolf Steiner described this period as one in which *"the world is good"* — children move toward the world in trust and learn primarily through imitation and rhythm. Practical implications:

- **Rhythm over instruction:** Activities repeat in cycles (touch → smell → draw → touch again) rather than following a linear information sequence
- **Image over concept:** A worm is met as *herself* — a living, tunneling, composting being — not as a specimen of phylum Annelida
- **Movement over sitting:** Observation at Ring 0 means kneeling, lying, reaching — not sitting at tables
- **Story as pedagogical frame:** Every observation phase is introduced by a narrative invitation, not a learning objective
- **Will before thinking:** Children *do* the science before they name it; action precedes reflection

Why the Token Economy Starts Here

The Token Seed system at this level is deliberately pre-economic. Children do not yet think about exchange ratios or community thresholds. What they understand is: *"I found something amazing, I told everyone, and they were happy I did."* The Token Seed ceremony makes this visible and ritualized. It is the first experience of contributing to a commons — the ground from which all later economic understanding grows.

Preparation and Materials

Facilitator Preparation (48 Hours Before)

- Read Appendix A (Questions to the Soil, Questions 1–8 minimum) in the Pattern Discovery Toolkit Appendices
- Read the proxemic design notes for Guide 1 in the Proxemic Integration document (Ring 0–2 at intimate distance)
- Mark three 30×30 cm observation frames on the soil using bamboo stakes and twine; place frames in contrasting locations (shade vs. sun, near tree vs. open bed) at least 24 hours before, so the ground settles
- Prepare three **Smell Jars**: small lidded glass jars containing (1) fresh damp soil from the site, (2) dry leaf compost, (3) dry sand. Label each with a number only, not a name — children should discover by smell, not by reading.
- Charge the senseBox MCU if available; test HDC1080 temperature/humidity sensor and soil moisture probe
- Print or handwrite **Earth Detective Cards** (one per child — A5 card with space for four drawings and a name field)
- Prepare Token Seeds: 40–60 cardboard circles (5 cm diameter), each stamped or drawn with a leaf icon. Store in a fabric pouch.
- Prepare the **Community Observation Board**: a large sheet of paper (A1 or larger) pinned to a board or tied to a tree. Write the date and location at the top. Leave the rest blank.

Materials List

For sensory observation (per group of 4–5 children): - 1 magnifying glass (hand lens, 5× or 10×) - 1 observation frame (30×30 cm, pre-placed) - Earth Detective Cards (one per child) - Wax crayons — not felt-tips (work in cold and wet conditions) - 1 soil collection jar (small, with lid) - 1 water dropper bottle (50 ml, filled) - 1 white plastic tray (for the Life Count) - 1 timer or phone timer for the facilitator

For the Smell Jar station (shared): - 3 Smell Jars (prepared as above) - 1 cloth or tray to display them

For the senseBox station (optional but recommended): - 1 senseBox MCU - HDC1080 temperature/humidity sensor - Soil moisture probe - Charged battery pack

For the Token Seed ceremony: - Token Seeds (40–60 minimum) - Community Observation Board - 1 marker for the facilitator to write shared observations

For opening ritual: - 1 smooth stone per child, collected from the site in advance and placed in a basket

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Session Structure

Phase 0 — Arrival: The Stone Circle (10 minutes)

Children sit in a circle outdoors. Each child takes one stone from the basket. The facilitator speaks quietly and slowly:

"This stone has been sitting on this earth longer than any of us have been alive. Before we ask questions, let's do what all good detectives do first: slow down."

Body Calibration Sequence (Ring 0 of the phenomenological method):

1. *Close your eyes. Feel the stone. Is it warm or cool in your palm?*
2. *Now feel your own foot, pressing down through your shoe. What does the ground feel like under you?*
3. *Open eyes. What is the first color you see?*
4. *What is the loudest sound right now? What is the quietest?*
5. *Take one slow breath through your nose. What do you smell?*

The facilitator writes responses on the Community Observation Board as children share them — no correction, only reception. This is the first data entered on the board.

Proxemic note: The circle is sociopetal — all children face inward and each other. This spatial arrangement activates social connection before any content is introduced. Every voice is equidistant from the center. The stone is the sensory anchor for the opening personal-distance engagement.

Phase 1 — The Questions (40 minutes)

Children move in groups of 4–5 to their observation frames. Each group has Earth Detective Cards, a magnifying glass, and crayons.

The facilitator reads each question aloud for the whole group, then allows 4–6 minutes of independent observation. **Drawing is the primary data format at this age.** Children who want to write words may; children who prefer to draw only should be encouraged to do so freely.

Q1 — What does the soil look like?

"Draw the colors you see in your frame. Are there different colors in different places? Is anything shiny? Is anything dull?"

Note for facilitator: Do not say "dark brown" or name the color for them. Wait for children to find their own words or color equivalents in their crayons.

Q2 — What does the soil smell like?

Bring out the Smell Jars. Pass them around the group.

"Sniff Jar 1. Sniff Jar 2. Sniff Jar 3. Now smell the soil in your frame. Does it smell most like Jar 1, Jar 2, or Jar 3? Draw a nose with wavy lines to show how strong the smell is — big waves = strong smell, tiny waves = faint smell."

Q3 — How does the soil feel?

"Touch it with one finger. Now with your whole palm. Is it: warm or cool? Soft or hard? Wet or dry? Smooth or rough? Draw your hand and write (or draw) the feeling words around it."

Facilitator note on reluctance: Some children will not want to touch soil. Never require it. Offer the magnifying glass instead ("You can look very closely without touching"). Observe without comment. In most groups, within five minutes of watching peers' discovery-faces, reluctant children begin touching spontaneously.

Q4 — What is living here?

"Find three living things in your frame and draw them. A worm, a beetle, a root, a moss patch — all count. Use your magnifying glass. Don't disturb them — we are visiting their home."

Pass around the white tray. Show children how to gently place a small amount of soil on the tray to see small creatures against the white background.

This is typically the most engaged phase for ages 6–10. Do not rush it. A child who spends the full time on a single worm drawing is doing excellent science.

Q5 — What has been here before?

"Can you find something that used to be alive, but isn't moving now? A dry leaf, an empty seed case, a bit of old root? Draw it. This is the soil's memory."

Q6 — What happens when you add water?

"Use your dropper. Add five drops to the soil. Watch carefully. Does the water disappear fast or slow? Does the color change? Does a smell appear? Draw what happens in three pictures: before, during, after."

Q8b — What can you hear? (Auditory enrichment — proxemic extension)

"Put your ear close to the ground — not touching it, but as close as you can. Be completely quiet for thirty seconds. Draw the sounds as shapes and lines."

Then stand up: *"What sounds do you hear now? What disappeared when you stood up?"*

This completes the full sensory circuit: touch (Q3), smell (Q2), sight (Q1, Q4, Q5), water observation (Q6), and sound (Q8b).

Phase 2 — The senseBox Conversation (15 minutes)

The facilitator brings the senseBox to the group.

"Now we have a helper. This little box can feel some things — but not the same things as us. Let's have a conversation."

Children sense (by body)	senseBox senses
"Is the air warm or cool?" — palm held up	Temperature in °C
"Is the soil wet or dry?" — finger 2 cm into soil	Soil moisture %
"Does the air feel heavy?" — breathe slowly	Humidity %

Children enter their body readings on the Observation Board as simple symbols (a sun for warm, a raindrop for wet, a cloud for heavy air). The facilitator writes the senseBox numbers below each symbol.

Discussion: *"Where do our feelings and the box's numbers agree? Where do they disagree? Which one tells us more about what it's like to be here?"*

Citizen Science Output: The senseBox data is uploaded to openSenseMap by the facilitator. Children receive a small printout of their data point at the end of the session — their first contribution to a global environmental monitoring network. The facilitator reads aloud: *"Right now, someone in Japan or Brazil could look at this number and know what the air is like in Müllrose today. You sent a message to the whole world."*

Phase 3 — The Token Seed Ceremony (15 minutes)

The group gathers around the Community Observation Board. Each group shares their most surprising discovery. After each sharing, the facilitator asks:

"Who learned something new just now?" (Hands raised.) *"This discovery was a gift to all of us."*

The child who made the discovery receives a Token Seed. So does every child who raised their hand — because receiving a discovery and letting it matter is also a community contribution.

The Class Token Jar: All seeds go into a shared jar. Count them aloud together. If the class reaches 20 seeds, they earn the right to choose one item from the Erdpuls seed library to take back to their school — a packet of native wildflowers, a native grass seed mix, or a small soil sample kit.

Facilitator note: The token system must not become competitive. If two children observe the same thing independently, both observations are real, both are contributions, both receive recognition. The question is always *"What did you notice?"* not *"Who noticed first?"*

Phase 4 — The Class Soil Portrait (20 minutes)

Each group selects their best drawing and contributes it to a large collaborative **Class Soil Portrait** — a drawing that shows the soil patch from above (bird's eye view) and from the side (imaginary cross-section showing what lives above, at surface, and below).

Children work together to: - Place their individual drawings in the correct layer (above ground, at surface, underground) - Add the senseBox readings as number labels - Add the smell descriptions from the Smell Jar comparison

The facilitator writes the title at the top: *"Soil at Erdpuls Müllrose, [date], observed by [Class Name]."*

The portrait is photographed and archived. A printed copy returns to the classroom. Any identified species are uploaded to iNaturalist by the facilitator, and children receive their observation IDs.

Closing Circle (5 minutes)

Children return to the stone circle. Each child places their stone back where it was found.

"We borrowed these stones to help us slow down and notice. Now we give them back. What are you taking home with you today — not in your pocket, but in your memory?"

One word per child. No response is wrong. No response is repeated — each one is unique and stays on the board.

Seasonal Variations

Season	Key Adaptation
Spring	Q4 (living things) richest — new insects, first roots emerging. Emphasis on emergence: "What is waking up?"
Summer	Q6 (water test) most dramatic — dry soil shows absorption clearly. Add shadow mapping: "Where does the soil stay coolest?"
Autumn	Q5 (soil memory) richest — decomposing leaves, seed cases, dying roots. Smell Jars most vivid.
Winter	Reduce outdoor phases to 20 minutes. Frost crust observation. "What is sleeping under here?" as narrative frame. Warm indoor reflection extended to 30 minutes with hot cocoa if possible.

Facilitator Notes

If children rush through drawings: Slow down by asking questions rather than giving more time. *"Can you add one more detail? What color is the edge of the leaf?"* Attention is extended by interest, not by instruction.

If the senseBox is unavailable: The session works fully without it. Skip Phase 2 and add 15 minutes to the Soil Portrait phase. When senseBox is not available, the body-sensing comparison happens verbally: *"If you were a little machine that measured temperature — what number would you give this air?"*

If outdoor conditions are difficult: The full protocol works indoors using soil samples brought in containers. Place three containers at different stations. The sensory encounter is less spatially rich but remains valid. Smell Jars become even more important as substitutes for ground-level encounter.

On the word "soil" vs. "dirt": At this age, either is fine — do not correct the word. The goal is relationship with the substance, not correct terminology. Terminology can follow once the relationship is established.

Pre-Visit Classroom Activity (1 lesson, teacher-led)

"What do you already know about soil?"
Children draw their mental model of "what's under the grass." No right answers. These drawings are brought to Erdpuls and compared against what children actually observe. The comparison between prediction and observation is a first experience of the scientific cycle.

Post-Visit Classroom Activity (1–2 lessons, teacher-led)

The Soil Story:
Children write or dictate a short story from the perspective of one organism they observed: a worm, a beetle, a root. *"I am a worm, and this is what I saw today when the humans came..."*

The Comparison:
Bring a small jar of school garden soil. Compare it to the Erdpuls soil portrait. What is the same? What is different? Why might it be different?

Risk and Safety

- Wash hands after soil contact — make this a ritual, not a warning
- Brief adults: some children with sensory sensitivities may not touch soil; this is respected completely

- Check observation frames in advance for hazards (broken glass, sharp metal)
- In summer: sun protection and water; in winter: appropriate clothing briefed to school in advance
- No eating during the soil phases; the closing circle (after handwashing) is the appropriate moment for a snack

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