

# Questions to the Soil — Guide 2: Boden-Begegnung

*For Adults and Families (Open Community Format)*

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## Guide 2: Boden-Begegnung — Encountering the Soil

### For Adults and Families (Open Community Format)

#### Overview

<b>Title</b>	Boden-Begegnung / Encountering the Soil / Spotkanie z Glebą
<b>Target Group</b>	Adults (open community), families with children, Open Makerspace Day visitors, Repair Café participants, garden enthusiasts
<b>Group Size</b>	6–20
<b>Duration</b>	2.5–3 hours (weekend morning or afternoon format)
<b>Location</b>	Erdpuls campus garden (Zone B) with comparison sites on campus grounds
<b>Season</b>	All seasons; especially suited to early spring (garden-planning relevance) and autumn (harvest/decomposition)
<b>Learning Objectives</b>	By the end of this workshop, participants will: (1) apply the 13 Questions protocol independently to assess soil condition at their assigned patch and articulate at least five findings in their own words; (2) identify at least two specific ways their soil observation could change their home garden or allotment management, written in the Action section of their Soil Explorer Notebook; (3) compare instrument readings with bodily observation at the same location and explain in their own words why both data sources are necessary and non-replaceable; (4) contribute at least one validated measurement entry (temperature, pH, moisture, life count) to the Erdpuls soil observation record

<b>Sustainability Dimensions</b>	<b>Ecological</b> (soil food web; organic matter cycles; biodiversity as soil health indicator; water infiltration and climate resilience); <b>Economic</b> (soil health as economic asset for food growers; composting as circular economy practice; cost-benefit of soil care vs. purchased inputs); <b>Social</b> (community-building through shared practice; intergenerational connection when families participate; Repair Café as civic infrastructure for sustainability); <b>Cultural</b> (Goethean observation as European intellectual tradition; local food culture; repair ethic extended below the surface)
<b>SDG Links</b>	<b>SDG 2</b> (Zero Hunger — home and allotment food growing; soil health as food security foundation in the local region); <b>SDG 15</b> (Life on Land — biodiversity documentation; soil organism awareness; home garden and allotment as habitat corridor); <b>SDG 11</b> (Sustainable Cities and Communities — community soil knowledge network; distributed citizen science across Müllrose and the Oder-Spree region)
<b>4A-Pathway Focus</b>	Full pathway, with emphasis on Attitude ("How do I relate to this ground?") and Action ("What will I do differently in my own garden?")
<b>Practical Connection</b>	Directly applicable to home gardening, allotment management, food growing, composting
<b>Methodological Foundations</b>	Goethean phenomenology (Naydler, 1996): receptive, patient observation as the primary pathway to ecological knowledge. Transformative learning theory (Mezirow, 1991): embodied encounter with the unexpected (e.g., discovering that "dead" soil contains dozens of organisms) triggers perspective transformation. Citizen science methodology (Bonney et al., 2009): distributed adult observation contributing to longitudinal monitoring.

## Preparation and Materials

**Per pair or individual:** - Trowel - Hand lens - Soil Explorer Notebook (see below — a half-A4 folded booklet with the 13 Questions and recording space, more text-based than the children's field sheet) - Pencil - Water bottle (personal) and small cup for infiltration test - Small labeled jar for take-home soil sample

**For the group:** - pH strips, soil thermometer, moisture sensor - Erdpuls sensor dashboard on tablet - Reference card: "Reading Your Soil" (laminated A4 with texture triangle, color guide, and pH interpretation — for use during and after the workshop) - Thermos of tea/coffee and seasonal snack from the garden (if available) for the closing circle - Handwashing station

**Advance Preparation:** - Select 3–4 comparison patches representing different conditions: a well-managed garden bed, a neglected/compacted area, a wild/unmowed area, and a transitional zone (e.g., the edge where garden meets path). These represent common conditions adults encounter in their own spaces. - If families with young children attend, prepare simplified materials (drawing sheets, magnifying glasses) alongside the adult materials.

### The Soil Explorer Notebook

*A four-page folded A4 booklet. More sophisticated than the children's field sheet but still field-practical — writing in soil-stained conditions.*

**Page 1 (Cover):** Boden-Begegnung — Erdpuls Müllrose Date: \_ **Season:** *Weather:* \_\_ Name: \_ **Patch location:** \_\_\_\_

**Page 2 (Observation):** The 13 Questions printed in condensed form, with lined space after each for notes. No boxes to circle — adults write freely.

**Page 3 (Data):** Measurement recording table: temperature, pH, moisture, infiltration time, life count. Plus a space for "Sensor Comparison" — what the Erdpuls dashboard shows for the nearest permanent sensor.

**Page 4 (Reflection and Action):** "What does this soil need?" "How does this compare to the soil in my own garden/allotment/yard?" "One thing I will do differently:" "One question I want to investigate further:"

### Welcome and Framing (15 minutes)

Gather at the garden edge. The framing for adults is different from children — it starts from practical relevance and moves toward the philosophical, rather than the reverse.

"Most of us who garden or grow food have a relationship with soil that is primarily instrumental — we add things to it, we plant things in it, we assess whether it's 'good' or 'bad' for our purposes. Today we're going to slow down and meet the soil on its own terms. Not 'what can this soil do for me?' but 'what is this soil, and what is it already doing?'

The method comes from Goethean science — Johann Wolfgang von Goethe, the poet, was also a serious natural scientist. His approach was simple and radical: observe carefully and completely before you explain. Let the phenomenon show itself. We'll spend the first hour doing nothing but observing, with all our senses. Then we'll bring in the instruments and the data. The tension between what your hands tell you and what the sensor tells you is where the real learning happens."

For **families with children:** "Children are welcome at every stage. They often see and smell things adults have trained themselves to ignore. Let them lead some of the observations."

*Proxemic note for the facilitator:* Adults have the most rigid proxemic boundaries of any target group. The workshop will ask them to kneel on the ground, press soil between their fingers, and bring it to their nose — intimate proxemic behaviors they may not have performed since childhood. The facilitator's key move: model it first, naturally, without commentary. Kneel, handle the soil, smell it, describe what you perceive. Adults follow modeled behavior more readily than verbal instruction when proxemic boundaries are involved. Do not announce "Now we're going to smell the soil!" — simply do it yourself, describe what you notice, and invite them to join.

### The Experience (90 minutes)

Adults work individually or in pairs (families work as a unit). Each selects or is assigned a patch. The facilitator reads the questions aloud, one at a time, with 5–8 minutes between each for observation and recording.

**Questions 1–5 (Sensation):** These proceed as in Appendix A. The key facilitation move for adults is resisting the urge to explain. When an adult says "I think this is clay because it's sticky," the facilitator responds: "That's an interpretation. First, describe the stickiness. What does it feel like? What does it remind you of?" Adults find this discipline more challenging than children do, because they have more habits of premature categorization.

**Question 5 (Smell):** This is often the breakthrough moment for adults. Many have never deliberately smelled soil. The facilitator can share: "The smell of healthy soil — that 'rain on earth' smell — is a chemical called geosmin, produced by beneficial soil bacteria. When you enjoy that smell, you're detecting biological health at a distance."

*Proxemic note:* Question 5 is consistently the proxemic breakthrough of the adult workshop. It requires bringing the soil to within centimeters of the nose — deep intimate distance with a non-human substance. This is the moment where the adult proxemic barrier dissolves. Hall identified the olfactory code as the most intimate proxemic channel: it operates only at close range and triggers the deepest associative responses. Allow extended time for the responses that follow — adults often surprise themselves with memories and associations they did not expect.

**Question 6 (Structure):** For gardening adults, this is where the experience connects to practice. "The aggregate structure you're seeing is built by earthworms, fungi, and roots over years. Every time we till, we break this architecture. Whether that's appropriate depends on context — but now you know what you're breaking."

**Question 7 (Life Count):** Adults are often as astonished as children. Provide the hand lens. Encourage them to take their time. If anyone identifies an organism by name, invite them to share with the group — but emphasize that "small brown beetle" is as valid an observation as "*Carabid ground beetle*."

**Question 8 (Water/Infiltration):** This has immediate practical significance for gardeners. "If water pools on your garden bed for more than 30 seconds, you have a compaction or structure problem. If it disappears in under 5 seconds, you may have drainage that's too fast to retain moisture. Your soil just told you something you can act on."

**Question 8b (Sound — Proxemic Enrichment):** "Lower your ear close to the ground — within a few centimeters of the soil surface. What can you hear? Now stand up slowly. What sounds disappeared? What new sounds appeared?" This exercise completes the full sensory circuit and provides a concrete proxemic experience: the world literally sounds different at different distances. For adults, this is often a moment of genuine surprise — they realize they have never listened to soil. The proxemic contrast (ear-to-ground vs. standing) makes the concept of sensory distance tangible.

**Questions 9–10 (Roots and Layers):** Adults can handle the full complexity. The facilitator can introduce horizon terminology if the group is interested (O-horizon, A-horizon, B-horizon) but should frame this as vocabulary for what participants have already observed, not as prior knowledge they should have had.

**Proxemic bridge — the Repair Café connection:** When introducing the closing reflection, the facilitator can make explicit: "In the Repair Café, you hold a broken toaster in your hands, diagnose its problem with all your senses, and repair it. Today you held soil in your hands, diagnosed its condition with all your senses, and asked what it needs. The proxemic pattern is identical: intimate distance with a material, multi-sensory diagnosis, care. The circular economy ethic operates the same way above and below ground."

**Question 11 (History):** This is where local knowledge enriches the experience. If any participant has lived in the area for decades, ask: "What was on this ground before? What was this part of the campus used for? When did the garden begin?" Oral testimony becomes longitudinal data.

**Question 12 (Relationships):** Encourage participants to physically stand up and look around from their patch. "Your patch doesn't exist alone. It receives water from uphill, shade from that wall, organic matter from that tree. It is a node in a network."

**Question 13 (Care):** For adults, this question has real-world application. "Based on everything you've observed — not what the internet says, not what the garden center recommends — what does this specific soil, in this specific spot, need from you?" Answers should emerge from the evidence gathered, not from general gardening advice.

### **Sensor Dialogue (20 minutes)**

Bring the group together. Display the Erdpuls dashboard.

For adults, the sensor dialogue goes deeper than for children. Key discussion points:

- **Resolution vs. Integration:** "The sensor takes a reading every 5 minutes at a single point. Your hand integrates temperature, texture, moisture, and structure simultaneously across a whole area. The sensor has temporal resolution; your body has spatial and multi-sensory resolution."
- **What the sensor misses:** "No sensor measures soil smell, soil structure, or biodiversity. These are properties only a human observer can assess. Your observations today are not a substitute for sensor data — they are a *complement* that the sensors cannot provide."
- **Trends vs. snapshots:** "Your visit today is a snapshot. The sensor has been running for months. Show me the temperature graph over the past week. How does today's reading relate to the trend? What happened three days ago that changed the moisture level?"

This positions citizen science observation and IoT monitoring as genuinely complementary — not as a "real science vs. amateur" hierarchy.

### Citizen Science Output

Each participant's notebook becomes a data point in the Erdpuls soil observation record. Specifically:

- Life Count data (organism type and count) entered into the seasonal biodiversity log
- Infiltration time and texture assessment compared with previous visitors' observations of the same patches
- Any identifiable species photographed and uploaded to iNaturalist
- New observations that surprise the facilitator flagged for follow-up by the Erdpuls research team

**For home application:** The "Reading Your Soil" laminated reference card goes home with each participant. They are encouraged to repeat the protocol in their own garden and share results at the next Open Makerspace Day or Repair Café. This creates a distributed soil observation network across the Müllrose area — citizen science at its most organic.

### Closing and Reflection (20 minutes)

Gather in a circle, ideally sitting on the ground. Tea or coffee if available. Seasonal snack from the garden (herbs, dried fruit, bread with garden-grown pesto — whatever is available; this grounds the experience in the garden's productivity).

*Proxemic note:* The closing circle is strongly sociopetal — everyone facing inward, at personal distance, with shared food and drink as mediating objects. This arrangement is the proxemic counterpart to the sociofugal dispersal during the observation phase (individuals at separate patches). The transition from dispersed to gathered is itself a pedagogical moment: "We went out alone into the soil. Now we bring what we found back to each other." The warm beverage and food activate olfactory and thermal channels that were focused on soil during the workshop — redirecting them toward human community.

Each participant shares: - One thing the soil showed them that they hadn't expected - One thing they'll do differently at home

The facilitator closes by connecting to the wider pattern-discovery framework: "What you did today is what we call Ring 2 of the pattern-discovery process — encountering the garden and near landscape. Each of your observations is a candidate for a *pattern* — a recurring relationship that makes this place alive. If you return in another season, or if you do this in your own garden, you're extending that pattern language."

## Follow-Up and Continuation

- **Open Makerspace Day:** Bring your home soil sample to compare with the campus soil.
- **Repair Café connection:** "You know how in the Repair Café we ask 'Can this be repaired?' Today you learned to ask the same question about soil. Compacted soil can be repaired. Depleted soil can be repaired. The repair ethic extends below our feet."
- **Sensor-building follow-up (Zone C):** Participants interested in continuous monitoring can attend a sensor-building workshop to construct a soil moisture and temperature sensor for their own garden, connected to the openSenseMap network.
- **Seasonal return:** Explicit invitation to repeat the protocol in a different season. The comparison data is the most valuable citizen science output the program generates.

## Token Economy Integration

Activity	Token Element
Completing the Soil Explorer Notebook	Cooperation
Sharing home garden data at Open Makerspace Day	Reciprocity
Returning for seasonal repeat	Cooperation + Regeneration
Building a home soil sensor (Zone C follow-up)	Reciprocity + Mutualism
Contributing data to the Erdpuls soil record	Mutualism
Implementing a soil-care action at home and reporting results	Regeneration

## Facilitator Notes

**BNE Qualification Requirements (Areas 6.1.1/6.1.2 — minimum: one of the following):** Facilitator should hold either (6.1.1) formal qualifications in environmental education, adult education, horticulture, biology, or a related field, or (6.1.2) demonstrated personal qualification: minimum 3 years facilitating experiential workshops for adult community audiences, plus Erdpuls facilitator induction including personal extended practice of the Goethean soil observation protocol. The facilitator must be



comfortable modeling intimate proxemic behavior with soil in front of adult groups — the key pedagogical move in this guide. Familiarity with allotment and home gardening practices is a practical asset.

**Pre-Workshop Participant Preparation (Area 3.3.1):** Send to registered participants at least 5 days before the workshop: (a) a short welcome note explaining what to wear (comfortable outdoor clothing, closed shoes suitable for garden work, clothes that can get dirty); (b) one question to reflect on beforehand: "If you were to describe the soil in your own garden or nearest green space, what would you say about it?"; (c) for families: a child-friendly activity — "Before you come, dig a small hole in your garden or a local park and write down three things you notice." No specialist knowledge is required or assumed.

**Post-Workshop Follow-Up Resources (Area 3.3.3):** Provide to participants after the workshop: (a) the laminated "Reading Your Soil" reference card (distributed at the closing circle — this is the primary take-home resource); (b) a digital "Home Soil Protocol" — a simplified 6-question version of the 13 Questions for independent use in their own garden, formatted as a printable PDF; (c) the date of the next Open Makerspace Day with invitation to bring a home soil sample for comparison; (d) instructions for contributing home observations to the Erdpuls distributed soil network (simple form or email submission); (e) the Erdpuls soil sensor dashboard URL for participants to track campus soil data over time and compare with their own.

**Key difference from children's guide:** Adults bring prior knowledge — some accurate, some not. The facilitator should welcome knowledge ("Yes, that's a great observation about clay structure") while gently redirecting premature conclusions ("Before we decide why, let's finish describing what we see"). The Goethean discipline of observation-before-interpretation is harder for adults than for children, and more transformative when achieved.

**Families:** When children and adults observe together, the children often notice things adults miss (small creatures, subtle colors, unusual smells). Framing the child as a co-scientist, not a tag-along, enriches the experience for both.

**Gardening experts in the group:** These participants may already know a great deal about soil. The facilitator should honor their expertise while noting: "Your knowledge is about soil *management*. Today we're practicing soil *encounter* — letting the soil speak before we act. Even experts can be surprised."

## Seasonal Variations

As in Guide 1, with the following adult-specific additions:

Season	Adult-Specific Focus
Spring	Garden planning: "What is your soil telling you about what to plant where?" Directly applicable timing.

Season	Adult-Specific Focus
Summer	Drought and heat stress: "How is your soil coping? Where is moisture held and where is it lost?" Water management relevance.
Autumn	Composting and mulching: "The decomposition you see here is the same process your compost pile uses. What conditions support it?"
Winter	Soil rest: "The soil is not dead — it's dormant. What's happening below the surface that you can't see?" Connects to patience and seasonal rhythm.

## Risk and Safety

As in Guide 1. Additional for adults: some participants may have mobility limitations or chronic pain that makes kneeling difficult. Provide a folding stool or offer a standing observation at a raised garden bed as an alternative. The protocol works at any height — the Questions can be addressed to soil in a container if necessary.

## Proxemic Design Notes

**The adult proxemic barrier and its dissolution:** This guide's most important proxemic challenge is the initial resistance of adult participants to intimate-distance engagement with soil. Adults have spent decades calibrating their proxemic boundaries for human-to-human interaction; this workshop asks them to apply intimate-distance behavior to a non-human substance. The facilitator's modeled behavior is the primary tool for overcoming this barrier (see proxemic note in Welcome and Framing above). The smell question (Question 5) is consistently the moment where the barrier dissolves — once an adult has brought soil to their nose, the remaining intimate-distance activities proceed naturally.

**Families as proxemic units:** When families participate together, the parent-child proxemic relationship transforms the dynamic. Children who might be shy alone are emboldened by a parent's presence. Parents who might resist kneeling in the dirt do it because their child is doing it. The family operates as a proxemic unit with its own internal comfort zone — and that zone is more flexible than either individual's. Frame accordingly: "Work together. Let your child's hands guide yours."

**The sensor dialogue as proxemic shift:** The transition from field observation (intimate/personal distance, all channels active) to sensor comparison (social distance, vision-only) risks an engagement drop. Scaffold by passing soil samples during the discussion and keeping the tablet/display low enough that participants can lean in together (personal rather than public distance).

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