Pattern Discovery Toolkit — Appendices A-D

Questions to the Soil, Token Economy, Bioregion Mapping, BNE Quality Framework

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Discovering a Pattern Language of Place — Appendices

Standalone Appendices to the Transferable Toolkit

Developed at Erdpuls Müllrose — Living Laboratory & Makerspace Garden

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Changelog

Version	Date	Changes
1.1	February 2026	Institution name updated; license footer added; version updated for OER publication
1.0	October 2025	Initial release

Appendix A: Questions to the Soil — A Phenomenological Protocol

A.1 Purpose and Lineage

This protocol is a structured sequence of encounters between a human observer and a specific patch of soil. It is not a soil test (though it may lead to one). It is a phenomenological practice: a way of coming to know a place by attending carefully to the most fundamental substance of that place — the ground itself.

The protocol draws on three traditions. From Goethean science, it takes the discipline of sequential observation — moving from sensory impression to relational awareness to temporal imagination without rushing to analytical conclusions. From indigenous soil knowledge traditions (particularly the practice found across many agricultural cultures of reading soil by hand, smell, and taste), it takes the principle that the human body is a legitimate instrument of soil assessment. From modern pedology and citizen science, it takes the recognition that subjective observation and instrumental measurement are not opponents but partners.

The protocol is designed to be used at Ring 2 of the main toolkit (The Garden and Near Landscape), but it can be used independently at any site where participants can safely handle soil. It works with any soil type, in any climate, in any season. Indeed, repeating the protocol in different seasons at the same location is one of the most revealing exercises in the entire toolkit.

A.2 Preparation

Site Selection: Choose a specific patch of ground — no larger than 1 m² — that is representative of or interesting within the local landscape. It might be a garden bed, an unmowed field edge, a forest floor, a riverbank, or even the compacted earth at the base of a building. The protocol works best when each small group (2–4 participants) has its own patch, allowing comparison afterward.

Materials: - Clean hands (remove gloves — this exercise requires direct contact) - A small trowel or strong stick for digging - A notebook and pencil - A water bottle (for the moisture test at Question 8) - Optionally: a hand lens or magnifying glass, pH strips, a soil thermometer, a smartphone for photography

Timing: Allow 45–60 minutes for the full protocol. Do not rush. The questions are sequenced intentionally, and their power lies in the cumulative slowing of attention.

Facilitator Guidance: Read the questions aloud to the group, one at a time, with generous pauses between them. The facilitator should resist the temptation to explain or interpret. The questions are designed to guide perception, not to teach content. If a participant asks "what's the right answer?", the response is always: "What do you observe?"

Proxemic Note — The Intimate Zone of Place-Relationship:

This protocol is the most proxemically intense activity in the entire toolkit. It systematically moves participants into *intimate proxemic distance* (0–45 cm, in Edward T. Hall's terminology) with a non-human entity — the soil. In daily life, intimate distance is reserved for lovers, children, and close family. The soil protocol asks participants to kneel, handle, smell, press, warm, and listen to earth — sensory engagement that activates every one of Hall's proxemic codes: haptic (touch and texture), thermal (soil temperature in the hand), olfactory (geosmin, decay, moisture), visual (color, structure, life), and auditory (insects, water, root systems at close range).

The questions are sequenced to follow a proxemic logic: they begin with the channels that operate only at intimate distance (touch, thermal, smell) and move toward the channels that extend to personal and social distance (sight, relational context). This sequence progressively *expands* the proxemic field from the body outward, mirroring the ring structure of the main toolkit.

Facilitators should be aware that the proxemic intensity of this protocol is precisely why it produces such powerful responses — and why some participants initially resist. Adults have the most rigid proxemic boundaries; asking a 45-year-old to kneel and press their face toward soil requires crossing a threshold

they may not have crossed since childhood. The facilitator's key move: model the behavior first, naturally, without commentary. Kneel, handle the soil, smell it. Participants follow modeled behavior more readily than verbal instruction when proxemic boundaries are involved.

For target-group-specific proxemic guidance (children, adults, elders, artists/researchers, cross-border groups), see the corresponding Living Experience Guides and the Proxemic Integration supplement.

A.3 The Thirteen Questions

Question 1: First Impression

Before you touch anything — what does this patch of ground say to you at first glance? What is your immediate, unreflected impression? Write a single sentence or draw a quick sketch.

This question captures the pre-analytical response. It is often the most honest and sometimes the most revealing. Participants frequently want to skip it or dismiss it as "subjective." That is exactly the habit this protocol is training them to unlearn.

Question 2: The Surface

Look closely at the surface. What covers it? Living plants, dead leaves, bare earth, moss, stones, crust, mulch, water? How much of the surface is covered, and how much is exposed? What pattern does the coverage make?

Surface coverage is the soil's first line of communication. A fully covered surface tells a different story than a bare one. The pattern of coverage — patchy, uniform, concentrated at edges — reveals wind, water, light, and use patterns.

Question 3: Color

What color is the soil surface? Now dig a shallow hole (10–15 cm). What color is the soil below the surface? Is it the same or different? If different, where does the change happen — gradually or abruptly?

Color is one of the most information-dense properties of soil. Dark soils are typically rich in organic matter. Red and orange soils contain oxidized iron (well-drained). Grey and blue-grey soils indicate waterlogging and reduced iron. White deposits may be calcium carbonate, salt, or fungal mycelium. Participants do not need to know these explanations during the protocol — the point is to *see* the color precisely, not to diagnose it.

Question 4: Touch and Texture

Take a small amount of soil from 10 cm depth. Roll it between your fingers. Is it gritty (sand), silky (silt), or sticky (clay)? Can you roll it into a ribbon? How long before it breaks? Is it cool or warm? Damp or dry? Does it stain your hands?

The ribbon test is one of the oldest soil assessment techniques — used across cultures for millennia. It teaches participants that their fingers are a precision instrument for particle size analysis. The temperature and moisture of soil are experienced differently through touch than through a thermometer or moisture sensor — both experiences matter.

Question 5: Smell

Bring the soil close to your nose. What does it smell like? Can you distinguish different smells? Does the surface soil smell different from the soil at depth? Describe the smell as precisely as you can — not "earthy" (too vague) but something more specific.

Healthy soil has a distinctive smell produced by geosmin, a compound released by soil actinobacteria. Waterlogged soil smells sulfurous. Dry mineral soil smells like dust. Highly organic soil smells sweet or mushroom-like. Most people have never been asked to *attend* to soil smell, and the exercise produces a surprising depth of discrimination.

Proxemic note: This question is consistently the proxemic breakthrough of the protocol. It requires participants to bring the soil to within centimeters of their nose — deep intimate distance with a non-human substance. Hall identified the olfactory code as the most intimate proxemic channel: it operates only at close range and triggers the deepest associative responses. When elders smell soil, the olfactory-mnemonic link often produces extraordinary responses ("My grandmother's potato field smelled exactly like this"). Allow extended time for these responses. They are not digressions — they are the protocol's deepest data.

Question 6: Structure

Pick up a clump of soil from your hole. Look at it closely. Does it break into natural aggregates (crumbs, blocks, plates, columns)? Or does it fall apart as loose grains? Or does it hold together as a dense, featureless mass? How do the aggregates hold together — with visible roots, fungal threads, or something else?

Soil structure is the architecture of the underground. Good aggregate structure means air and water can move through the soil; earthworms, roots, and fungi have created habitable space. Compacted, structure-less soil indicates disturbance, heavy traffic, or loss of biological activity. This is where participants begin to understand soil as a *built environment* — constructed not by humans but by organisms over decades.

Question 7: Life

Look at the soil surface and into your hole. What is alive? Insects, worms, larvae, spiders, mites, springtails, fungi (threads or fruiting bodies), roots? What is moving? Count what you can see in one minute of close observation. If you see very little, what might that tell you?

The biodiversity visible to the naked eye in a handful of healthy soil is astonishing when people actually look. Participants are often shocked — either by abundance ("I had no idea so many creatures lived here") or by absence ("there's nothing alive in this soil at all"). Both responses are powerful entry points for sustainability literacy.

Question 8: Water

Pour a small amount of water (about 100 ml) onto the surface near your hole. Watch carefully. Does it soak in immediately? Pool on the surface? Run off to one side? How long until it disappears? Now look at the sides of your hole — can you see channels, pores, or cracks where water would move?

Infiltration is one of the most important functional properties of soil, and one of the easiest to observe. Participants directly witness the difference between soil that accepts water (healthy structure, organic matter, biological activity) and soil that rejects it (compaction, crust, hydrophobic surface). This connects immediately to flood risk, erosion, drought resilience, and groundwater recharge — sustainability themes made tangible.

Question 8b: Sound *(Proxemic Enrichment)*

Lower your ear close to the ground — within a few centimeters of the soil surface. What can you hear? Insects moving? Water trickling below? Roots creaking? Wind in nearby vegetation? Now stand up. What changed? What sounds can you hear at standing height that you couldn't hear with your ear to the ground — and what sounds did you lose?

Hall's proxemics identifies voice/sound as one of the sensory codes that changes with distance. The soil has its own acoustic profile, audible only at intimate distance. This question completes the proxemic sensory circuit: touch (Question 4), smell (Question 5), thermal (implicit in 4 and 8), visual (Questions 2, 3, 6, 7), and now auditory. The contrast between ground-level and standing-height sound is itself a proxemic lesson: the world sounds different at different distances because different acoustic channels are active.

Question 9: Roots

Look at the roots visible in the walls of your hole and at the surface. How deep do they go? Are they thick or fine? Do they go straight down or spread sideways? Do they follow cracks and channels, or do they push through the bulk soil? Is there a depth where roots stop — and what happens at that boundary?

Roots are the negotiation between plant and soil made visible. Where roots are shallow, something is preventing deeper exploration — compaction, waterlogging, toxic conditions, rock. Where roots follow cracks, the soil structure is doing the work of creating access. The root-stop boundary often marks a significant soil horizon change.

Question 10: Layers

Look at the wall of your hole. Can you see distinct layers (horizons)? Where does one layer end and another begin? Are the transitions sharp or gradual? Do the layers differ in color, texture, root density, moisture, or compactness?

This is the most geological of the questions. It asks participants to read a vertical history: the top layer is the most recent, shaped by current vegetation and management; deeper layers record older conditions. In many landscapes, the stratigraphy reveals glacial deposits, buried soils, fill material, or the legacy of past land uses.

Question 11: History

Based on everything you have observed so far — what has happened to this soil? Has it been plowed, compacted, built on, flooded, planted, neglected, enriched, impoverished? What clues tell you about its past? How long ago might those events have occurred?

This is the first interpretive question — deliberately placed late in the sequence, after extensive observation. Participants are now asked to construct a narrative from their evidence. There is no single right answer, but the discipline of basing the narrative on observed evidence (not assumption) is the core scientific practice.

Question 12: Relationships

How does this patch of soil relate to what surrounds it? What is uphill and downhill? What is upwind? What plants grow on this soil versus the soil five meters away? Is this soil in sun or shade — and how does that change through the day and through the year? What human activity affects it?

This question re-embeds the patch in its context. Soil does not exist in isolation — it receives water, nutrients, seeds, pollutants, and compaction from its surroundings. This is where the single patch connects to the larger pattern language: the soil is a node in a network.

Question 13: Care

If you were responsible for this soil — for its health, its life, its capacity to support plants and animals and water and people — what would you do? What would you stop doing? What would you leave alone?

The final question moves from observation to ethical response. It is the bridge between knowing a place and caring for it — the Attitude and Action stages of the 4A-Pathway. Participants often find that the twelve preceding questions have changed their answer to this one: having closely observed the soil, their prescriptions become more specific, more humble, and more attentive to what the soil itself is already doing.

A.4 After the Questions

Group Synthesis: Each small group shares their observations and compares notes. The differences between patches are as instructive as the observations within each patch. If groups worked on different parts of the same site, the comparison often reveals microclimatic and management gradients that no one had noticed before.

Sensor Cross-Reference: If soil sensors (temperature, moisture, pH probes) are available, take readings at the same patches and compare instrumental data with phenomenological observations. Where do they align? Where do they diverge? What does the divergence teach?

Pattern Extraction: Review the observations for recurring relationships — these are candidate patterns for the pattern language. For example: "Wherever the old wall casts afternoon shade, the soil is darker, cooler, and more biologically active" — this is a pattern linking architecture (Ring 1) to soil ecology (Ring 2).

Season-Marking: Record the date, time, weather conditions, and recent rainfall. If the protocol will be repeated in another season, these records allow longitudinal comparison — one of the most powerful learning experiences the toolkit offers.

Proxemic Reflection: Before closing, ask participants to notice their relationship with the soil now compared to the beginning of the session: "An hour ago, this was 'the ground' — background, unnoticed, at public proxemic distance. Now you have held it in your hands, smelled it, watched its creatures, poured water into it, listened to it, and imagined its future. It has moved from 'the ground' to '*this*

ground.' That shift — from generic space to particular place, from public distance to intimate relationship — is what this entire toolkit is designed to produce. The soil protocol does it in one hour. The full ring sequence does it across a landscape."

A.5 Adapting the Protocol for Other Media

The "Questions to the Soil" is a model protocol for one specific medium. Initiatives working primarily with other media should develop equivalent protocols:

- **Questions to the Water** — for coastal, riparian, or lake-based sites
- **Questions to the Stone** — for geological or mountain landscapes
- **Questions to the Wall** — for urban or heritage-building contexts
- **Questions to the Tree** — for forest-based sites
- **Questions to the Air** — for sites where atmospheric conditions (pollution, wind, fog) are dominant

The structure remains the same: begin with sensation, move to relationship, end with care. The specific questions change to match the medium.

A.6 The Proxemic Architecture of the Protocol

The Thirteen Questions (now Fourteen, with the auditory enrichment at 8b) follow a proxemic arc that mirrors and concentrates the ring structure of the main toolkit:

Question	Proxemic Zone	Primary Sensory Channels	Proxemic Movement
1 (First Impression)	Personal → Intimate	Visual (whole-field)	Approaching the ground
2 (Surface)	Intimate	Visual (close detail)	Eyes close to surface
3 (Color)	Intimate	Visual + Haptic (digging)	Hands in the ground
4 (Touch/ Texture)	Intimate	Haptic + Thermal	Soil in the hands
5 (Smell)	Intimate (deepest)	Olfactory	Soil near the face — proxemic peak
6 (Structure)	Intimate	Haptic + Visual	Breaking and examining aggregates
7 (Life)	Intimate	Visual (fine detail) + Haptic	Face close to ground, counting

Question	Proxemic Zone	Primary Sensory Channels	Proxemic Movement
8 (Water)	Personal	Visual + Temporal (watching)	Pouring and observing from slightly above
8b (Sound)	Intimate → Personal	Auditory	Ear to ground, then standing — proxemic contrast
9 (Roots)	Intimate	Visual + Haptic	Reading the hole's walls
10 (Layers)	Personal	Visual (geological)	Stepping back to see the profile
11 (History)	Social (conceptual)	Interpretive	Moving from observation to narrative
12 (Relationships)	Social → Public	Visual + Spatial awareness	Re-embedding the patch in its landscape
13 (Care)	Personal (ethical)	Integrative	Returning from observation to relationship

The arc moves: approach → intimate immersion → gradual widening → re-embedding in context → ethical response. This mirrors the ring sequence (Ring 0 → Ring 4 → reflection) but compressed into a single hour at a single patch of ground. The protocol is, in effect, a *proxemic microcosm of the entire toolkit* — which is why participants who complete it are prepared for the wider ring explorations that follow.

For equivalent protocols in other media (Questions to the Water, Questions to the Stone, etc.), the proxemic arc should be preserved: begin at intimate distance with the medium, activate all sensory channels, then gradually widen to relational and ethical context.

Appendix B: Integrating a Reciprocal Token Economy

B.1 Why This Appendix Exists

The main toolkit is designed to work without any economic or blockchain infrastructure — the minimum requirements are a place, a facilitator, participants, and notebooks. However, the question of how pattern-discovery work is *valued*, sustained, and incentivized is not trivial. If the patterns a

community discovers remain in a binder on a shelf, the process has failed. If participants contribute their time, knowledge, and data but receive no recognition or return, the process is extractive — the very opposite of what it intends.

This appendix describes how a reciprocal token economy — specifically one modeled on the four-element system developed at Erdpuls Müllrose — can be integrated into the pattern-discovery process. It is written as a general framework, not as a technical manual for a specific blockchain platform. Initiatives may implement the principles using the Stellar blockchain (as Erdpuls does), other distributed ledger systems, local paper currencies, time-banking systems, or even simple tracking spreadsheets. The economic principles matter more than the technology.

This appendix is optional. Not every initiative will want or need a token economy. But for those working to embed pattern discovery in a longer-term community practice — beyond a one-time workshop — the question of economic reciprocity will eventually arise.

B.2 The Problem the Token Economy Addresses

Citizen science and community-based observation have a persistent structural problem: they extract value from participants (time, attention, local knowledge, data) and transfer it to institutions (universities, platforms, government agencies) without reciprocal return. Participants may gain learning and satisfaction, but the economic and epistemic value of their contributions flows upward.

A pattern-discovery process is particularly vulnerable to this dynamic, because the patterns a community discovers are genuinely valuable — they constitute place-based knowledge that can inform planning, education, conservation, and cultural development. If this knowledge is simply published as OER and used by others without any return to its creators, the process replicates the colonial knowledge-extraction model it claims to oppose.

The token economy does not solve this problem completely, but it makes the flows of value visible and creates structural mechanisms for reciprocity.

B.3 The Four Elements as Economic Principles

The Erdpuls four-element token economy is not a cryptocurrency in the speculative sense. It is a system of value-tokens that map to four ecological and ethical principles. Each element recognizes a different kind of contribution:

Cooperation (Kooperation): Recognized when participants work together — co-facilitating a workshop, jointly naming patterns, sharing tools, organizing a walking excursion. The unit of recognition is collaborative action, not individual achievement. In the pattern-discovery process, cooperation tokens might be generated when a group completes a ring observation together, or when two groups synthesize their findings.

Reciprocity (Reziprozität): Recognized when value flows in two directions — when a participant both contributes and receives. An elder sharing local knowledge about how the river used to flow *and* learning to read a soil sensor dashboard is performing a reciprocal exchange. Reciprocity tokens make visible the exchanges that conventional economies render invisible: the farmer who teaches the schoolchild about hedgerow management, the teenager who teaches the farmer to use iNaturalist.

Mutualism (Mutualismus): Recognized when the benefit of an action extends beyond the participants to the wider community or ecosystem. Contributing pattern cards to the open commons, uploading citizen science data to a shared platform, translating a pattern name into another language for a neighboring community — these are mutualist acts. They benefit others who were not present and may never know the contributor's name.

Regeneration: Recognized when an action demonstrably improves ecological or social conditions — not merely documents them. Planting a hedgerow along a pattern-discovered wind corridor, restoring a soil patch identified as degraded through the Questions to the Soil protocol, organizing an intergenerational knowledge-transfer event based on elder testimony from Ring 3. Regeneration is the token element that closes the loop between observation and action.

The Proxemic Dimension of Reciprocal Economics:

Edward T. Hall's proxemics reveals something about the token economy that the economic language alone does not: *reciprocal exchange is a personal-distance activity, while transactional exchange is a public-distance activity.*

When a neighbor watches your cat, when a friend shares garden surplus, when an elder teaches a young person to identify mushrooms — these reciprocal exchanges happen at personal or intimate proxemic distance. Face to face, hand to hand, often in a kitchen or a garden. All sensory channels are active: you see the person, hear their voice, smell the food they prepared, feel the tool they hand you.

Market transactions, by contrast, operate at social or public distance — or increasingly at no physical distance at all (online, automated). The sensory channels close: you may never see, smell, hear, or touch what you are exchanging. The loss is not merely sentimental — it represents a loss of *information*. Reciprocal exchanges at personal distance carry information about quality, need, skill, relationship, and context that market transactions at public distance cannot.

The token economy's four elements — Cooperation, Reciprocity, Mutualism, Regeneration — all require proxemic proximity to assess. You cannot evaluate whether an exchange was truly reciprocal without being close enough to observe what flowed in both directions. You cannot verify regeneration without intimate sensory contact with the site. The tokens are, in this sense, *proxemic certificates* — evidence that someone was close enough to the activity to know what it meant.

This has implications for workshop design: the token card station should be placed at the activity itself (in the Repair Café, at the garden, at the soil station) — not at an administrative desk removed from the action. Filling in a token card *at the moment of exchange* maintains the proxemic connection between the activity and its recognition. Filling it in later, at a desk, introduces the same public-distance abstraction that the token economy is designed to resist.

B.4 Token-Generating Activities in the Pattern-Discovery Process

The following table maps pattern-discovery activities to token elements. It is illustrative, not exhaustive — each initiative should define its own mappings based on its values and context.

Activity	Ring	Token Element	Rationale
Completing the Ring 0 body-calibration exercise	0	Cooperation	Collective practice requires mutual presence and vulnerability
Recording a pattern card (first observation)	1–4	Mutualism	The card enters the commons and benefits future users
Providing elder testimony about settlement history	3	Reciprocity	Knowledge exchange between generations
Cross-referencing sensor data with phenomenological observation	1–2	Cooperation	Integrating two knowledge modes requires collaboration
Translating a pattern name into another language	Any	Mutualism	Extends the pattern's accessibility across language communities
Uploading citizen science data to an open platform	2–4	Mutualism	Data enters the global commons
Identifying a degraded site and proposing a restoration pattern	2–4	Regeneration	Observation leads to restorative action
Facilitating a ring observation for a new group	Any	Reciprocity	The facilitator both teaches and learns through the process
Repeating the Questions to the Soil in a new season	2	Cooperation + Regeneration	Longitudinal commitment to place

Activity	Ring	Token Element	Rationale
Participating in the collective bioregion boundary-drawing	4	Cooperation	Collective synthesis requires democratic deliberation
Contributing a confirmed pattern (multiple observations)	Any	Mutualism + Regeneration	Validated knowledge strengthens the commons

B.5 The Collective Threshold Model for Workshop Access

One specific application of the token economy to the pattern-discovery process deserves separate attention: the Collective Threshold Model for workshop participation.

Traditional workshop pricing creates a binary: you can pay the fee or you cannot. This excludes people who may have the deepest knowledge of place (long-term residents, elders, young people, economically marginalized community members) while admitting those with financial resources but less connection to the locality.

The Collective Threshold Model works differently. A workshop has a total cost (facilitator time, materials, venue). This cost is published transparently. Participants choose one of four pathways to meet it:

Full Rate: Monetary payment covering the participant's share of the total cost. Straightforward, no stigma.

Supported Rate: A reduced monetary payment, with the difference subsidized from the common fund (built up through Full Rate surpluses and token exchanges). Participants self-select this option; no means-testing, no justification required.

Skills Exchange: The participant contributes a defined skill or service in lieu of monetary payment — leading a walking tour of the settlement for Ring 3, providing historical photographs, cooking a meal for the group, translating materials.

Token Pathway: Participants who have accumulated tokens through prior contributions (sensor maintenance, data entry, community outreach, previous workshop facilitation) can use them to cover participation costs.

The result is that workshops become accessible to exactly the people whose participation is most valuable: those who know the place. The economic mechanism reflects the ethical principle: those who contribute knowledge and care to the commons deserve access to the commons.

Proxemic note: The four pathways correspond to different proxemic relationships with the Erdpuls community. The Full Rate participant may be encountering the campus for the first time — at social or public proxemic distance. The Token Pathway participant, by contrast, has accumulated tokens through sustained proxemic engagement with the campus: maintaining sensors (intimate distance with

technology), caring for the garden (intimate distance with the soil), facilitating workshops (personal distance with participants). The token pathway participant's access is earned through *proximity* in the deepest sense — repeated, multi-sensory, embodied engagement with the place and its community. The Collective Threshold Model is, in proxemic terms, a system that rewards closeness with access.

B.6 Implementation Spectrum

Not every initiative needs a blockchain. The four-element principles can be implemented across a wide spectrum of technical sophistication:

Analog (Paper-Based): Printed token cards in four colors, tracked in a ledger book. Works well for small communities with high trust. Low overhead, zero technology requirements. Limitation: difficult to scale or share across sites.

Spreadsheet-Based: A shared spreadsheet (Google Sheets, LibreOffice Calc) tracking contributions by participant, activity, and element. Moderate overhead, accessible technology. Allows basic reporting and transparency. Limitation: requires a trusted administrator; not tamper-proof.

Time-Banking Platform: Existing time-banking software (e.g., hOurworld, TimeOverflow) adapted to include the four element categories. Moderate overhead, established software. Connects to existing alternative-economy networks. Limitation: most platforms only track time, not the qualitative differences between cooperation, reciprocity, mutualism, and regeneration.

Blockchain-Based (Stellar or equivalent): Full token economy on a distributed ledger. Tamper-proof, transparent, scalable, interoperable between sites. The Erdpuls implementation uses the Stellar network, which is energy-efficient and designed for asset issuance. Requires initial technical setup but minimal ongoing administration. Enables cross-site token recognition — a pattern discovered in Müllrose can be valued in a partner site's economy. Limitation: technical barrier to entry; requires participants to hold a wallet (though this can be abstracted through custodial accounts).

The choice of implementation should match the initiative's capacity and ambition. The principles are the same at every level.

B.7 What the Token Economy Does Not Replace

A reciprocal token economy is a mechanism for making value flows visible and enabling participation. It is not a salary, a grant, or a substitute for structural funding. Facilitators, researchers, and staff need real income. Infrastructure costs real money. The token economy operates *alongside* conventional funding, not instead of it.

The token economy also does not replace intrinsic motivation. Many participants will engage in pattern discovery because it is inherently fascinating, socially rewarding, and personally meaningful. The tokens should *recognize* this motivation, not attempt to *create* it through incentive design. If participants only discover patterns when tokens are offered, the process has gone wrong.

Appendix C: Structured Bioregion Mapping Protocol — GIS and Analog

C.1 Purpose

Ring 4 of the main toolkit — the Sub-Bioregion — asks participants to collectively discover and define the ecological, hydrological, geological, and cultural unit within which their site exists. This appendix provides a structured mapping protocol that supports that discovery process, working in two parallel tracks: a GIS-based digital workflow and a paper-based analog workflow. The two tracks are designed to run simultaneously and to inform each other. Neither is superior; each reveals what the other misses.

C.2 Before You Map: The Walking Transects

Mapping should not begin at a computer or a table. It should begin on foot. Before any cartographic work, participants should walk at least two transects outward from the site center, in directions chosen to cross what they suspect are bioregional boundaries or transitions. Each transect should be 3–10 km in length (half day walking) and documented with notes, photographs, and (if available) portable sensor readings at regular intervals.

The purpose of the transects is to develop an embodied sense of where "here" ends and "somewhere else" begins. This felt boundary is the starting hypothesis that the mapping protocol will test, refine, and enrich.

The Proxemic Challenge of Bioregional Scale:

Bioregion mapping presents the toolkit's greatest proxemic challenge. The soil protocol operates at intimate distance (0–45 cm) — all sensory channels active, maximum embodied engagement. The bioregion, by contrast, exists at public proxemic distance (3.7 m+, often kilometers) — it can be seen from a hilltop but not touched, smelled, or heard as a whole. Only vision reaches across a landscape. The walking transect is the proxemic solution: it carries the body *through* the territory at intimate/personal distance, creating a chain of sensory encounters that accumulate into a felt sense of the whole.

The transect documentation should include a proxemic enrichment — the **Sensory Closure Record**. At each observation stop, participants record not only landscape features but which sensory channels are still active:

Distance from center	Observation	Touch (specific to this place)?	Smell?	Sound?	Thermal?	Visual?
0 km	Campus departure	☑ soil, brick, tools	☑ garden, compost	☑ workshop sounds, birds	☑ warm wall	☑ buildings, garden
1 km						
3 km						
5 km						

As participants move outward, a pattern emerges: close to the campus, all five boxes are checked. As they travel, boxes go unchecked — distinctive smell fades, specific touch surfaces disappear, characteristic sounds become generic. The distance at which the last non-visual channel closes is a *proxemically defined boundary* — and it often corresponds to a genuine bioregional transition. "The point where you can no longer smell, hear, or touch anything unique to this place — where only your eyes connect you to it — might be where 'here' ends and 'somewhere else' begins."

Transect Documentation Format:

Distance from center	Observation	Landscape character	Notable transitions	Coordinates (GPS)
0 km	Departure from campus	Built / garden environment	—	[lat, lon]
0.5 km				
1.0 km				
...				

Participants should note every moment where they sense a transition: a change in soil, vegetation, sound, land use, building style, language, or "feeling." These subjective transition-points become data for the mapping exercise.

C.3 The Analog Track: Paper-Based Collaborative Mapping

Materials Required: - Large-format base maps (minimum A1 / 60×84 cm), at least two copies: - Topographic map at 1:25,000 or 1:50,000 scale - Satellite imagery / orthophoto at comparable scale - Historical maps if available (pre-war, post-war, current — three-epoch comparison is ideal) - Transparent acetate overlays or tracing paper - Colored markers (at least 6 colors, agreed meaning for each) - Adhesive dots or pins for marking locations - String or yarn for drawing proposed boundaries - The pattern cards generated in Rings 1–3

Color Key (suggested, adaptable): - Blue: Water features (streams, lakes, wetlands, springs, drainage divides) - Green: Vegetation boundaries and types - Brown: Soil / geological transitions - Red: Settlement and land-use boundaries - Yellow: Cultural features (churches, markets, memorial sites, gathering places, heritage routes) - Purple: Participants' felt transition-points from the walking transects

Process:

Step 1 — Orientation (30 min): Spread the base maps on a large table or floor. Orient the group. Locate the site center. Locate the walking transect routes. Allow participants to simply look at the map and identify what they recognize and what surprises them. This is a Ring-0-like exercise applied to cartography: first impressions before analysis.

Step 2 — Water Layer (45 min): Using blue markers on a transparent overlay, trace all water features visible on the map: streams, rivers, lakes, ponds, canals, drainage ditches, wetlands. Then trace the watershed boundary — the ridgeline or elevated terrain that divides water flowing toward the site from water flowing away. This is often the most powerful single layer, because the watershed boundary frequently corresponds to felt bioregional boundaries even though participants may never have thought of it in those terms. Note: participants may need facilitator guidance on how to read a watershed from topographic contour lines.

Step 3 — Geology and Soil (30 min): Using brown markers, note any geological transitions identified during the transects (soil color changes, landform shifts, transitions from flat to hilly, sand to clay). If a simplified geological map or soil map is available, overlay its major boundaries. In glacial landscapes (like Brandenburg), the moraine ridges, outwash plains, and glacial valleys are often the primary landform divisions.

Step 4 — Vegetation and Land Use (45 min): Using green and red markers, draw the major vegetation and land-use zones visible on the satellite imagery: forest blocks, agricultural fields, meadows, heathland, settlement areas, industrial zones. Note the *edges* — where does forest meet field? Where does village meet agricultural land? Edge zones are often the most ecologically and socially active.

Step 5 — Cultural Layer (45 min): Using yellow markers, locate cultural features: churches and other landmarks, market towns, traditional gathering sites, festival locations, schools, cemeteries, heritage routes, and any places identified by elders during Ring 3 as culturally significant. Locate administrative boundaries (district, state, national) and note where they align with or cut across the emerging bioregional picture.

Step 6 — Transect Overlay (30 min): Using purple markers, plot the transition-points recorded during the walking transects. Do they cluster along any of the boundary lines already drawn? Do they reveal boundaries that the maps did not show?

Step 7 — Boundary Deliberation (60–90 min): The culminating exercise. Using string or yarn, participants collectively propose a boundary for the sub-bioregion by laying it on the map. The boundary should be debated: Does it follow the watershed, the soil type, the vegetation, the cultural catchment, or some combination? Where do different criteria give different answers? Where is the boundary sharp and where is it a gradient? There is no requirement for consensus — divergent proposals can be recorded and discussed.

Proxemic note: The deliberation should be arranged sociopetally — all participants standing around the map table, able to reach the yarn and the markers. This is personal-to-social proxemic distance, with the map as the mediating object. If participants are seated in rows facing a projected map (sociofugal, public distance), the deliberation will become a lecture. The physical act of leaning over the table, reaching across it, moving the yarn — these are haptic proxemic engagements with the territory-as-representation. The map should be large enough and low enough that everyone can touch it.

Additionally, the Sensory Closure Record data from the transect walks (if collected) can be overlaid on the map: "At 3 km west, you could still smell the pine forest. At 5 km, you couldn't. That olfactory boundary — draw it." The resulting sensory boundary lines will not coincide perfectly with the watershed, the geology, or the vegetation — creating a richer, multi-layered boundary discussion that no single data source could produce.

Output: A composite map with multiple layers and a proposed (possibly contested) bioregional boundary, annotated with rationale. Photograph at high resolution for digital archiving.

C.4 The GIS Track: Digital Mapping Workflow

Tools (all free/open-source): - QGIS (desktop GIS, https://qgis.org) — the core tool - OpenStreetMap data (via QuickOSM plugin or Overpass API) - Copernicus Land Monitoring Service (European land cover and vegetation data) - National geological surveys (in Germany: BGR GeoViewer; adapt for other countries) - openSenseMap or equivalent (for IoT sensor locations and data) - iNaturalist export (species observations as a data layer)

Data Layers to Prepare Before the Workshop:

A facilitator or technical assistant should prepare the following GIS project in QGIS before the mapping session. Each layer should be styled for clarity and ready for participant exploration:

Layer 1 — Basemap: OpenStreetMap or satellite imagery (e.g., Sentinel-2 via Copernicus, or Bing Satellite through QGIS).

Layer 2 — Hydrology: Stream network and watershed boundaries. In Germany, these are available from the Wasserrahmenrichtlinie datasets (LAWA). Elsewhere, the HydroSHEDS global dataset provides stream networks and catchment boundaries. If no pre-computed watershed is available, QGIS can derive one from a DEM (Digital Elevation Model) using the GRASS r.watershed tool — but this requires technical skill.

Layer 3 — Elevation and Terrain: A Digital Elevation Model (DEM), ideally at 10–30 m resolution. Copernicus DEM (free, global, 30 m) is a good default. Display as a hillshade for readability. Derive slope and aspect maps if relevant.

Layer 4 — Geology and Soils: National geological survey data. In Germany, the BGR provides 1:200,000 geological maps and the BÜK200 soil map as WMS services that can be loaded directly into QGIS. Other countries have equivalent national geological surveys.

Layer 5 — Land Cover: CORINE Land Cover or the higher-resolution Copernicus Urban Atlas / Riparian Zones datasets. These provide classified land-use data (forest, agriculture, urban, water, wetland) at 25–100 m resolution across Europe.

Layer 6 — Protected Areas: Natura 2000 sites, national parks, nature reserves, landscape protection areas. Available from the European Environment Agency's Common Database on Designated Areas (CDDA) or national databases.

Layer 7 — Historical Maps (georeferenced): If historical maps have been scanned and georeferenced (a rewarding volunteer task in itself), they can be overlaid as semi-transparent layers. The Prussian Urmesstischblätter (1:25,000, ~1850s) are available digitized for Brandenburg.

Layer 8 — Citizen Science Data: Export species observation data from iNaturalist (as CSV with coordinates) and import as a point layer. Filter by taxonomic group if needed. Overlay IoT sensor locations from openSenseMap or the initiative's own sensor network.

Layer 9 — Administrative Boundaries: Municipal, district, state, and national boundaries from OpenStreetMap or national geodata portals.

Participant Interaction with GIS:

Not all participants will be comfortable with GIS software. The recommended approach is to have one or two operators at a projected screen or large monitor, with the rest of the group giving verbal instructions: "Zoom in there," "Turn on the geology layer," "Can we see where the elevation drops?" This allows collective exploration without requiring individual software literacy.

Key GIS operations for the workshop:

- **Toggle layers** to see how different boundaries align or diverge
- **Measure distances** between the site center and proposed bioregional boundaries
- **Buffer analysis** around the site center at various radii (2 km, 5 km, 10 km) to explore what falls within different definitions of "local"
- **Overlay walking transect GPS tracks** (imported from smartphones or GPS devices) and compare with landscape data layers
- **Create a composite "boundary candidates" layer** where participants digitize proposed bioregional boundaries directly into QGIS using the editing tools

Output: A QGIS project file with all layers, plus exported maps (PDF or PNG) at A1 print scale for comparison with the analog map.

C.5 Synthesis: Analog Meets Digital

The most productive moment in the mapping protocol comes when the two tracks are compared side by side. The analog map contains information the GIS map cannot: felt transition-points, elder testimony, smell memories, cultural associations, contested boundaries drawn in yarn. The GIS map contains information the analog map cannot: precise watershed delineation, elevation profiles, land-cover statistics, species-density heat maps.

Proxemic note: The analog map is made at personal-to-intimate proxemic distance — participants lean over it, touch it, place markers on it with their hands. Its information is processed through multiple sensory channels (visual pattern recognition, haptic placement, spatial memory from walking). The GIS map is made at public proxemic distance — viewed on a screen, operated through a mouse, its information processed visually only. The productive tension between the two is a proxemic tension: the analog map carries embodied knowledge that the GIS cannot represent; the GIS carries analytical precision that the analog hand cannot achieve. Neither is complete. Together they form the fullest possible map — one that spans the entire proxemic range from intimate body-knowledge to public data-knowledge. The facilitator should help participants name this complementarity rather than treating the GIS as the "real" map and the analog as the "preliminary" one.

Synthesis Questions: - Where does the analog boundary match the GIS-derived watershed? Where does it deviate — and why? - Are there cultural boundaries (from elder testimony, from language shifts, from market-town catchments) that correspond to no ecological boundary? - Are there ecological boundaries (from vegetation, soil, or species data) that no participant identified during the transects? What were they not seeing? - If the bioregion crosses an administrative border (district, state, national), what practical implications does this have for environmental management, education, and community cooperation?

Final Map:

The goal is a single composite map — digital or hand-drawn or both — that represents the group's best collective understanding of the sub-bioregion. It should include:

- Proposed bioregional boundary with annotation explaining the rationale at each section
- Major ecological features (water, forest, soil zones, elevation)
- Major cultural features (settlements, heritage sites, gathering places)
- Sensor and citizen-science observation points
- Pattern locations from Rings 1–3, placed spatially
- Acknowledged uncertainties and open questions
- A note on who made this map, when, and under what conditions (season, weather, participant composition)

This map is both a scientific document and a cultural artifact. It should be treated with the same seriousness as the pattern cards — it is the spatial framework within which the pattern language operates.

C.6 Minimum and Maximum Versions

Minimum (no GIS, no printed maps): Participants draw their own map from memory and walking experience on a large sheet of paper, adding features as they are discussed. This "sketch map from embodied knowledge" is itself a valuable exercise and can be surprisingly accurate. Suitable for groups with no technical resources.

Moderate (printed maps, no GIS): The facilitator prints topographic maps and satellite imagery at A1 scale (many national map services allow free PDF download at print quality). The full analog protocol is followed. No GIS analysis.

Full (GIS + analog in parallel): Both tracks run simultaneously as described above. Requires one person with basic QGIS competence, a laptop, a projector or large screen, and the pre-prepared data layers. This is the richest version and is recommended where resources permit.

Appendix D: Alignment with Education for Sustainable Development Quality Frameworks

D.1 Purpose and Scope

This appendix demonstrates how the pattern-discovery method aligns with formal Education for Sustainable Development (ESD/BNE) quality frameworks. It uses the Brandenburg BNE Quality Catalog (Qualitätskatalog für BNE außerschulischer Anbieterinnen und Anbieter, MLUK Brandenburg, April 2023) as its primary reference, because the toolkit was developed in Brandenburg and this framework is directly applicable to the Erdpuls context.

However, the appendix is written as a **model** that initiatives in other German states or other countries can adapt to their own quality frameworks. The Brandenburg catalog is one of the most detailed in Germany, and its structure — seven quality areas covering both offer quality and organizational quality — provides a useful template for mapping any experiential sustainability education program against formal criteria.

This appendix is optional. It is relevant for initiatives seeking formal BNE recognition, applying for state or federal education funding, or wanting to demonstrate their pedagogical rigor to partner institutions. It is not required for the pattern-discovery method to work.

D.2 The Brandenburg BNE Quality Catalog: Structure

The catalog evaluates non-formal education providers across seven areas (Bereiche), each containing multiple quality criteria (Qualitätsmerkmale). Areas 1–4 concern offer quality (Angebotsqualität), areas 5–7 concern organizational quality (Organisationsqualität). Each area has minimum requirements (Mindestanforderungen) that must be met for certification.

Area	Title	Focus
1	Goals and Target Groups	Relevance, needs analysis, target group definition
2	Approach	Thematic breadth, multi-dimensionality, controversy, global-local linkage
3	Methods	Action-orientation, situated learning, participation, reflection, interaction
4	Design Competencies (Gestaltungskompetenz)	12 sub-competencies across methods, social, and self domains
5	Quality Development	Development goals, evaluation, cooperation

Area	Title	Focus
6	Facilitator Qualification	Formal and personal qualification, continuing education
7	Organizational Conditions	Mission statement, structural embedding, infrastructure

D.3 How the Pattern-Discovery Toolkit Maps to the Quality Areas

Area 1 — Goals and Target Groups

The toolkit addresses the values-action gap (84% of young Europeans value sustainability, only ~30% act on it) as its central problem. Target groups are defined by the concentric ring structure: Ring 0–2 serve participants with a direct relationship to the site (school groups, local residents, workshop attendees); Ring 3 extends to the settlement community including elders and long-term residents; Ring 4 engages a broader public including cross-border and intergenerational participants. The 4A-Pathway (Awareness → Acknowledgment → Attitude → Action) provides measurable pedagogical goals at each stage.

Minimum requirements: Met. Goals are concrete, target-group-specific, and needs-based.

Area 2 — Approach

The toolkit is inherently multi-dimensional: ecological (soil, water, biodiversity observation), economic (token economy, reciprocity principles), social (collective pattern-naming, intergenerational dialogue), and cultural (heritage reading, multilingual naming, toponymy). It is inter- and transdisciplinary by design — biology, geology, history, architecture, economics, philosophy, and art are woven through the rings, not taught as separate subjects. Controversy is structural: the Ring 4 boundary-deliberation exercise requires participants to negotiate competing definitions of "their place," and the tension between administrative and bioregional boundaries is inherently political. The global-local connection is made through citizen science platforms (local data enters global databases) and through the Ubuntu framework (local reciprocity as expression of universal ethical principle).

Minimum requirements: Far exceeded. All four sustainability dimensions, multiple SDGs, and structural controversy.

Area 3 — Methods

This is where the toolkit is strongest. The Brandenburg catalog identifies eight methodological qualities. The toolkit addresses them as follows:

Quality Criterion	How the Toolkit Addresses It
3.1.1 Experiential, hands-on (erleben, erproben)	Ring 0 body-calibration; Questions to the Soil (direct sensory contact with earth); sensor building and reading; walking transects
3.1.2 Situated (situiert)	All activities embedded in the specific site and its landscape. Patterns are always *this* place's patterns, not generic examples
3.1.3 Activating (aktivierend)	Multiple entry points per ring; playful and serious modes; partial successes built in (every pattern card is an achievement)
3.1.4 Self-determined, participatory (selbstbestimmt-partizipativ)	Participants name patterns in their own language, choose observation foci, collectively deliberate bioregional boundaries. Collective Threshold Model for access
3.1.5 Reflective (reflektiert)	The 4A-Pathway structures reflection at every stage. Goethean observation discipline: observe before analyze. Question 13 of the soil protocol ("What would you do?") bridges observation and ethical reflection
3.1.6 Interactive (interaktiv)	Sensor dashboards provide real-time feedback; group pattern-naming is inherently dialogic; the analog/GIS mapping synthesis requires negotiation
3.1.7 Holistic (ganzheitlich)	Three streams (Head/Hands/Heart) integrated at every ring: data interpretation (Head), soil handling and walking (Hands), phenomenological perception and ethical response (Heart)
3.1.8 Multimedial (multimedial)	Sensor platforms, GIS tools, photography, sketching, oral testimony, multilingual documentation. Digital and analog in parallel at Ring 4

Minimum requirements (2 of 8): Far exceeded — 7 of 8 fully met, 1 (multimedial) dependent on initiative's technical capacity.

Proxemic quality dimension (supplementary, not in the Brandenburg catalog):

The toolkit addresses a quality dimension that no institutional framework currently measures: the *proxemic depth* of the learning experience. Drawing on Edward T. Hall's proxemics, we can characterize each workshop phase by the proxemic zone in which it operates (intimate, personal, social, or public) and the number of sensory channels active (haptic, thermal, olfactory, auditory, visual). The toolkit's consistent finding is that learning depth correlates with proxemic depth — workshops that bring participants into intimate/personal distance with the subject matter (soil handling, repair work, close

observation) produce stronger engagement, more detailed recall, and higher quality ratings than workshops that keep participants at social/public distance (lectures, screen-based activities, passive observation).

This proxemic quality dimension operates across all eight methodological criteria in the Brandenburg catalog: - Experiential learning (3.1.1) is most powerful at intimate/personal distance - Situated learning (3.1.2) gains depth through multi-sensory engagement, which requires proximity - Participatory learning (3.1.4) is enabled by sociopetal spatial arrangements - Reflective learning (3.1.5) benefits from the quieter, more focused attention available at personal distance - Interactive learning (3.1.6) requires personal-to-social distance and sociopetal space

Erdpuls proposes the proxemic depth of learning encounters as a supplementary quality indicator for BNE frameworks — one that can be assessed through the Proxemic Audit tool developed in the Proxemic Integration supplement. Over time, the accumulated Proxemic Audit data from multiple workshops will demonstrate the correlation between sensory proximity and educational quality, contributing to BNE Area 5 (quality development through evidence-based practice).

Area 4 — Design Competencies (Gestaltungskompetenz)

The Transfer 21 framework identifies 12 sub-competencies across three domains. The toolkit addresses all twelve:

Sub-Competency	Toolkit Element
4.1.1 Openness to new perspectives	Multilingual pattern-naming; cross-border and intergenerational participation; phenomenological discipline of "seeing anew"
4.1.2 Foresight and scenario analysis	Sensor data for future projections; soil history as basis for anticipating change; bioregional boundary-drawing as scenario exercise
4.1.3 Interdisciplinary action	Every ring integrates multiple disciplines; pattern cards require ecological, historical, and social reasoning simultaneously
4.1.4 Risk and uncertainty recognition	Sensor uncertainty vs. phenomenological observation; contested bioregional boundaries; the "Status" field on pattern cards (first observation / confirmed / contested)
4.2.1 Collaborative planning and action	All ring activities are group-based; Ring 4 boundary deliberation is a democratic planning exercise; Collective Threshold Model for workshop governance
4.2.2 Recognizing goal conflicts	Heritage preservation vs. modernization; administrative vs. bioregional boundaries; data privacy vs. open science; economic access vs. quality

Sub-Competency	Toolkit Element
4.2.3 Participation in decision-making	Token-based governance (Appendix B); collective boundary-drawing; four participation pathways ensuring access
4.2.4 Motivating self and others	The joy of discovery; each pattern card as tangible achievement; seasonal repetition as deepening engagement; token recognition
4.3.1 Reflecting own values	Question 13 ("What would you do?"); the 4A-Pathway beginning with Awareness/Acknowledgment; Plant Wisdom as values mirror
4.3.2 Independent planning and action	Participants choose observation foci; develop own pattern cards; propose own bioregional interpretations
4.3.3 Showing empathy	Ubuntu framework; elder integration in Ring 3; the phenomenological attention to other beings (Question 7 — soil life); cross-cultural naming
4.3.4 Justice as a basis for action	Reciprocal token economy; four participation pathways; intergenerational knowledge justice; the principle that those who know the place deserve access

Minimum requirements (1 sub-competency from 1 domain): Far exceeded — all 12 addressed.

Proxemic awareness as unlisted competency: The capacity to read spatial arrangements, understand how distance and sensory engagement shape learning, recognize cultural differences in spatial behavior, and design sociopetal environments for collaboration is not listed among the 12 Gestaltungskompetenzen but underlies several of them — particularly 4.1.1 (openness to new perspectives, which requires the ability to enter another's proxemic space across cultural boundaries), 4.2.1 (collaborative planning, which requires sociopetal spatial design), and 4.3.3 (empathy, which Hall's work reveals to be fundamentally a proxemic capacity — you cannot empathize with what you cannot sense, and you cannot sense what is beyond your proxemic reach). Erdpuls cultivates proxemic awareness explicitly through the Proxemic Facilitator's Guide and the Proxemic Audit, and proposes it as a candidate for inclusion in future revisions of the Gestaltungskompetenz framework.

D.4 Adapting to Other Quality Frameworks

The Brandenburg catalog is one of the most comprehensive German BNE quality frameworks, but it is not the only one. The following table indicates equivalent frameworks in other German states and selected international contexts. Initiatives outside Brandenburg should conduct an equivalent mapping exercise using their local framework.

German Federal and State Frameworks:

Jurisdiction	Framework	Key Reference
Federal (Germany)	Nationaler Aktionsplan BNE	UNESCO/BMBF, 2017
Baden-Württemberg	BNE-Kompass (quality criteria for non-formal education)	Ministerium für Umwelt BW
Bavaria	Qualitätskriterien Umweltbildung.Bayern	StMUV Bayern
North Rhine-Westphalia	BNE-Zertifizierung NRW	NUA NRW
Saxony	Sächsische Landesstrategie BNE	SMK Sachsen
Schleswig-Holstein	Zukunftsschule.SH / BNE-Qualitätssiegel	IQSH
Thuringia	Thüringer Qualitätsrahmen BNE	TMUEN

International Frameworks:

Context	Framework	Notes
UNESCO Global	ESD for 2030 Framework	Emphasizes whole-institution approach, learner agency, structural transformation
European Union	GreenComp: European Sustainability Competence Framework	12 competencies across 4 areas; maps well to the toolkit's Head/Hands/Heart structure
United Kingdom	Sustainable Schools Framework (DfES)	8 doorways including food, energy, community, and global dimension
Australia	Sustainability Curriculum Framework (ACARA)	Cross-curriculum priority embedded in national curriculum
Poland	Strategia Edukacji dla Zrównoważonego Rozwoju	Relevant for cross-border DE/PL initiatives
OECD	Learning Compass 2030	Broader competency framework including sustainability as transversal theme

Each of these frameworks uses different terminology and category structures, but they converge on shared principles: multi-dimensionality, learner participation, action-orientation, critical thinking, and global-local connection. An initiative adapting the toolkit to a new framework should:

1. Obtain the full text of the relevant quality framework
2. Create a mapping table (as in D.3 above) aligning toolkit activities to framework criteria
3. Identify any criteria not addressed by the toolkit and develop supplementary activities or documentation
4. Use the mapping as evidence in certification applications or funding proposals

D.5 Documentation for Certification

For initiatives seeking formal BNE certification, the pattern-discovery process generates substantial documentation that can serve as evidence:

- **Pattern cards** demonstrate situated, experiential, reflective learning (Area 3)
- **The collective bioregional map** demonstrates collaborative, interdisciplinary action (Areas 2, 4)
- **Sensor data logs** demonstrate evidence-based sustainability literacy (Area 3)
- **Multilingual pattern names** demonstrate openness to new perspectives (Area 4.1.1)
- **Token transaction records** demonstrate participatory governance and fair access (Areas 4, 7)
- **Seasonal repetition records** demonstrate longitudinal engagement and quality development (Area 5)
- **Photographs and sketches** from the process provide visual evidence of methodology
- **The Questions to the Soil completed notebooks** demonstrate holistic, sensory learning (Area 3.1.7)

The toolkit, used fully, produces a body of evidence that exceeds the documentation requirements of most BNE quality frameworks. The challenge is not generating evidence but organizing it — initiatives should designate a documentation lead to archive materials systematically.

D.6 The Proxemic Dimension of Quality Evaluation

Quality evaluation is itself a proxemic act, and the distance at which evaluation occurs determines the quality of the evaluation data.

Public-distance evaluation (written surveys, online forms, standardized questionnaires) produces quantifiable but shallow data. The participant is removed from the learning experience — temporally (filling in a form after the event) and spatially (seated at a desk, not in the garden or the workshop). The evaluative attention is directed at abstract categories ("Rate your satisfaction on a scale of 1–5") rather than at specific, sensory, embodied experience.

Personal-distance evaluation (face-to-face debrief, Quality Compass worksheets completed during the workshop, Elder Wisdom Circles reflecting on learning quality) produces richer, more contextual data. The evaluator-participant distance is close enough for all non-verbal communication to be readable — facial expression, gesture, posture, tone of voice. The evaluation happens *within* the learning space, surrounded by the materials and artifacts of the workshop.

Intimate-distance evaluation (the Quality Star dot-voting by children who have just been kneeling in the soil, the residency Quality Reflection written after three weeks of daily practice on-site) produces the deepest data — evaluative responses grounded in sustained, multi-sensory, embodied experience.

The toolkit's approach to quality evaluation — developed in the five BNE Quality Framework Living Experience Guides — operates primarily at personal and intimate distance. The evaluative activities (Quality Star, Quality Compass, Elder Quality Criteria, Residency Quality Reflection, Framework Comparison Matrix) are all designed to be conducted *within* the workshop space, *by* participants who have just completed the learning experience, *using* their own observations as evidence. This proxemic design produces evaluation data of a quality that no post-event survey can match.

The Proxemic Audit as quality tool: The Proxemic Audit template (developed in the Facilitator's Implementation Handbook) provides a pre-workshop diagnostic that is itself a quality development tool. A facilitator who audits the proxemic profile of each planned phase — zone, active channels, spatial arrangement, vertical dynamics — and adjusts the design to maximize multi-sensory engagement at appropriate distances is performing quality development (BNE Area 5.1.1) through a novel mechanism that the Brandenburg catalog does not anticipate but would recognize as valid evidence of reflective practice.

Over time, accumulated Proxemic Audit data across multiple workshops creates a quality dataset: Which workshop formats produce the highest proportion of intimate/personal-distance engagement? Which produce the most sensory-channel diversity? How does proxemic profile correlate with Quality Star ratings, Quality Compass responses, and return rates? This data contributes to BNE Area 5.2.2 (systematic evaluation evidence) and Area 5.1.2 (internal evaluation instruments).

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