



Module 3: Soil Science & Soil Health

Think-Pair Share Activity A: Soil infiltration

Lesson A

Grouping: Pairs or small groups (3–4)

Time: 25–30 minutes

Materials:

- Excerpt/diagram from NRCS “Soil Infiltration” PDF
- Access to the two short YouTube explainers (or teacher summary if no internet)
- Student notebooks or worksheet copy

Objectives:

Students will investigate how soil structure and management practices affect water infiltration and link these outcomes to soil functions and SDGs (clean water, climate resilience, biodiversity).

Your task:

You will explore how soil structure and management practices influence water infiltration and ecosystem services. First, review the infiltration diagram and video examples. Then, identify one factor that improves infiltration and one factor that reduces it. In pairs, discuss a practice that could be applied in your school garden or community to increase infiltration and connect it to one soil function. Finally, share your group’s idea with the class and link it to a Sustainable Development Goal (SDG).

Instructions:

Step 1: Think (Individual)

Write your own ideas before discussing with a partner.

- 1. Factor that improves infiltration:**
 - Healthy soil structure with aggregates
 - High organic matter content
 - Plant cover (roots + residues)
 - Mulching or cover crops
- 2. Factor that reduces infiltration:**
 - Soil compaction (from machinery or trampling)
 - Bare soil → crusting from raindrop impact
 - Excessive tillage breaking down aggregates
 - High clay soils without organic matter
- 3. Why infiltration matters (for farmers & ecosystems):**
 - Prevents water runoff and erosion
 - Stores more water for crops (drought buffer)
 - Reduces flooding risk
 - Improves groundwater recharge and water quality

Step 2: Pair (Discussion)

Discuss with your partner and record your group’s ideas.

Factors match or differ?

- Most students will agree on compaction reducing infiltration; they may differ on improvement factors (e.g., roots vs. mulch).

One practice to increase infiltration:

- Planting cover crops
- Adding organic amendments (compost, mulch)
- Reducing tillage / avoiding soil disturbance
- Using rotational grazing to prevent compaction

Soil function supported:

- *Regulate water* → better infiltration, less runoff
- *Cycle nutrients* → water carries nutrients deeper
- *Provide stability* → roots anchor soil, reduce erosion

Step 3: Share (Class Discussion)

Fill in during class share-out.

Practice Shared	Soil Function Supported	SDG Link
Mulching bare soil	Regulate water	SDG 6
Planting cover crops	Cycle nutrients	SDG 15
Reduced tillage	Provide stability	SDG 13
Adding compost	Regulate water	SDG 2

Reflection Prompt

Easiest in a school garden: mulching, compost addition, cover cropping (small scale, low cost).

Hardest on large farms: reducing compaction (requires heavy equipment management), large-scale cover crops (seed cost, timing).

Why: scaling requires more labor, cost, and management, while small spaces allow quick and direct interventions.

Skills you'll use:

- Observation & Data Interpretation – noticing soil structure, cover, and infiltration differences.
- Systems Thinking – connecting soil practices to water, nutrients, microbes, and ecosystem services.
- Collaboration & Communication – comparing ideas with a partner and sharing with the class.
- Evidence-Based Reasoning – linking practices to soil functions and Sustainable Development Goals (SDGs).
- Problem-Solving – suggesting realistic soil management strategies for gardens and farms.

Example:

Scenario: A team observes that one garden bed has bare soil and another is covered with mulch and plant residues.

- Factor Improving Infiltration: Mulched bed → organic matter protects the soil, reduces crusting, and allows water to soak in.

- Factor Reducing Infiltration: Bare bed → surface compaction and raindrop impact cause crusting, leading to runoff.
- Proposed Practice: Apply mulch or plant a cover crop in the bare bed.
- Supported Soil Function: Regulate water (improved infiltration reduces runoff and erosion).
- Linked SDG: SDG 6 (Clean Water) — because better infiltration keeps water clean and reduces sediment pollution.