

FIELD INVESTIGATION GUIDE



Read the Landscape like a Soil Scientist

INVESTIGATE SOIL HEALTH CLUES

What story is the field telling us?



INVESTIGATING QUESTION

- Healthy soil leaves evidence everywhere—you just have to know what to look for.
- Scientists rarely see billions of bacteria or miles of fungal threads directly. Instead, they look for the signs those organisms leave behind.



BIG IDEA

What story
is the field
telling us?



QUICK FACTS:



Investigation Time | Reset Time

- 60 MINUTES
(10 MINUTE INTRO + (5) 8-MINUTE ROTATIONS + 10 MINUTE DEBRIEF
- 3-5 MINUTES



Audience

GRADES 4-ADULT
FAMILIES
COMMUNITY EVENTS
PROFESSIONAL DEVELOPMENT

Group Size

UP TO 40 WHEN
WORKING IN PAIRS



Learning Goals

- Observe visible clues that reveal soil health.
- Collect evidence before drawing conclusions.
- Explain how healthy soil supports plants and water.
- Connect field observations to conservation practices.

Walk the Field

20 Soil Detective Kits, each Kit Includes:

- ☐ Hand Trowels
- ☐ Hand Lenses
- ☐ Clipboard
- ☐ Pencils
- ☐ Field Journal Observation Sheets
- ☐ Laminated Field Guides: Signs of Soil Health, Reading Water's Clues, and Reading the Landscape



EQUIPMENT CHECKLIST

Station 1: Ground Cover Detective

- ☐ Station Flag
- ☐ (4) 1' x 1' PVC Observation Frames
- ☐ Shovels
- ☐ Laminated NRCS Picture Your Residue Cards



Station 2: Root Explorer

- ☐ Station Flag
- ☐ Shovels



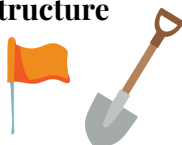
Station 4: Life Beneath Your Feet

- ☐ Station Flag
- ☐ Shovels



Station 3: Soil Structure Sleuth

- ☐ Station Flag
- ☐ Shovels



Station 5: Water's Path

- ☐ Station Flag



QUICK SETUP

Estimated Setup Time: 15–20 minutes

Before Participants Arrive

1. Select a safe field location that includes a variety of soil health clues such as crop residue, living plants, bare soil, or evidence of soil organisms.
2. Walk the area to identify interesting observation points and any potential hazards.
3. Place station markers at each investigation station in the order participants will visit them.
4. Set out one Soil Detective Kit for each team of two participants.
5. Place the laminated Station Guide and any demonstration materials at each station.
6. Display the Brooke QR code and introduce the investigation area.
7. Distribute one Soil Detective Field Journal to each participant.

Walk the Field



QUICK SETUP CONTINUED:

Set Up Each Investigation Station:



Station 1 — Ground Cover Detective

- Place PVC Observation Frames at the station.
- Position the frame over a representative section of the field.
- Ensure participants can observe crop residue, living plants, and exposed soil.



Station 2 — Root Explorer

- Select an area where participants can carefully dig to expose healthy roots.
- Provide one shovel or hand trowel per team.
- Have sample roots available if field conditions are limited.



Station 3 — Soil Structure Sleuth

- Identify an area suitable for digging.
- Participants will remove a small shovel of soil and gently examine soil aggregates, pore spaces, and soil texture.
- Place soil probes nearby for optional deeper observations.



Station 4 — Life Beneath Your Feet

- Choose an area likely to contain earthworm castings, insects, residue, fungal strands, or other biological activity.
- Encourage participants to use their hand lens while searching.



Station 5 — Water's Path

- Select an area where participants can observe evidence of water movement, infiltration, runoff, ponding, erosion, or surface crusting.
- If available, include examples of both healthy infiltration and compacted soil.



OPENING CONVERSATION

HOSTING GUIDE

Hold up a handful of soil.

"What do you see?"

Allow participants to answer.

Then ask: "If I asked you what was happening inside this handful of soil, what would you say?"

After a few responses: "Today we're going to become Soil Detectives. Our job isn't to decide whether this field is 'good' or 'bad.' Our job is to notice clues. Every field has a story, and today we're going to learn how to read it."

DURING THE ACTIVITY



Before Participants Begin

- Divide participants into teams of two.
- Give each team a Soil Detective Kit and Field Journal.
- Assign each team a starting station.
- Explain that teams will rotate every 8 minutes. After 8 minutes is up say, "Soil Detectives, finish your final observation and rotate to your next investigation."

While Teams Are Investigating Encourage participants to:

- ✓ Slow down and observe before writing.
- ✓ Use evidence to support their answers.
- ✓ Sketch what they see.
- ✓ Discuss observations with their partner.
- ✓ Compare clues—not just answers.

If participants get stuck:

"What do you notice?"

"What evidence supports that idea?"

"What surprised you?"

"What might this clue be telling us?"

"What else do you wonder?"

Questions to Ask During the Investigation



Observation

- What caught your attention first?
- What do you notice that you might have missed at first glance?
- Which clue surprised you the most?

Thinking Like a Scientist

- What evidence supports your idea?
- Could there be another explanation?
- What patterns are you starting to notice?

Making Connections

- How might this clue affect water movement?
- What role do living roots play here?
- How might soil organisms benefit from what you're seeing?
- Which soil health principle does this observation connect to?



Invite participants to gather in a circle or near the trailer.
Ask everyone to bring their completed Field Journals.

What Story Is This Field Telling?

Teacher/Host Opening

“Each team investigated one small part of the field. Now let’s put all of our clues together. Did everyone see the same thing?”

Then work through the stations together:

- Ground Cover: What percentages did different teams estimate? Where was cover highest or lowest?
- Living Roots: What kinds of roots did you find? Did anyone see root hairs, soil clinging to roots, or nodules?
- Soil Structure: Did your soil crumble into small aggregates, break into clods, feel compact, smell earthy, or show worm channels?
- Soil Life: What evidence of living organisms did you find? Which clues were easy to see? Which were harder?
- Water’s Path: Based on everything you observed, where would rain likely soak in? Where might it run off or collect?

Build the Field Story Together

The host records the group’s answers on a poster, whiteboard, or laminated sheet:

- Clues that may help water soak in:
- Clues that may increase runoff risk:
- Patterns we noticed across the field:
- Something that surprised us:
- A question we still have:

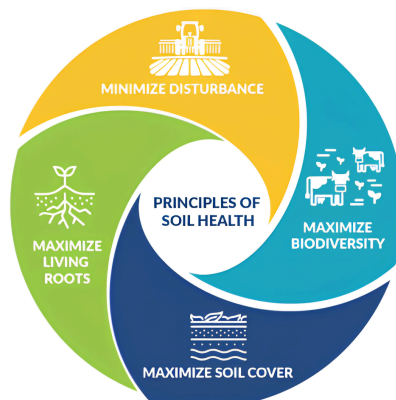
Synthesize: Make a prediction from evidence, not guess.

“If an inch of rain fell on this field tonight, what do you predict would happen — and what evidence supports your answer?”

NRCS soil health principles:

“Think back through everything you found today. Can you see where these four principles showed up in your observations?”

Keep the soil covered.
Maximize living roots.
Minimize disturbance.
Maximize biodiversity.



STATION

1

GROUND COVER

Detective

Investigating Question: How well is the soil protected?

OBSERVE

Place your 1' x 1' observation frame on the ground. Without moving anything, look closely for 1 minute. Fill in what you see.



WHAT DID YOU FIND?

Estimate each item as a percent of the area inside your frame.

-  Living Plants _____ %
-  Crop Residue _____ %
-  Bare Soil _____ %
-  Rocks _____ %
-  Moss / Lichens _____ %

Total = 100%

Healthy soil needs a blanket!
What clues can you find?



MY ESTIMATE:

_____ % cover

Did my field meet the 30% benchmark?

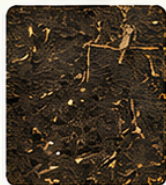
- ☐ Yes
- ☐ No
- ☐ Not sure

CONSERVATION TILLAGE CHALLENGE

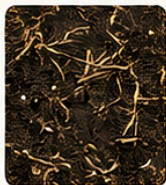
According to NRCS, a field with 30% or more crop residue covering the soil after planting meets the minimum definition of conservation tillage.

Look straight down. Which photo most closely matches your observation area?

10%



15%



20%



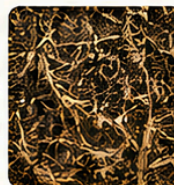
★ 30% ★



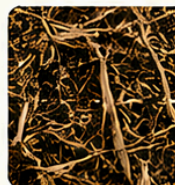
40%



50%



60%



70%



Most soil exposed

Most soil covered

THINK

Was your first estimate close?

- ☐ Yes
- ☐ No

Why do you think estimating residue is harder than it looks?

CONNECT

Ground cover helps:

- Protect soil from raindrop impact
- Reduce erosion and runoff
- Conserve moisture
- Keep soil cooler
- Feed soil organisms



BROOKE'S NOTE

Looking across a field can make residue look like more than it really is. Soil scientists look **STRAIGHT DOWN** and use a frame to get an accurate estimate.

You are *thinking like a soil scientist!*



LAND & WATER CONNECT US

Every clue tells part of the story.



ROOT EXPLORER

Investigating Question:

Who is feeding the underground community?



LET'S DIG
DEEPER!

The best clues
are often
underground.



OBSERVE

Using your hand trowel, carefully dig a small hole (4–6 inches deep).

Gently expose a section of roots without pulling them apart.

Use your hand lens to look closely.



WHAT DID YOU FIND?

Check all that you observed.



Fine roots
(thin, thread-like)



Thick roots



Root hairs
(tiny, fuzzy threads)



Living roots
(white, tan, or green)



Old / decomposing roots
(brown, brittle)



Nitrogen-fixing nodules
(on legume roots)



Earthworm or
worm channel



Soil clinging to roots
(look closely!)



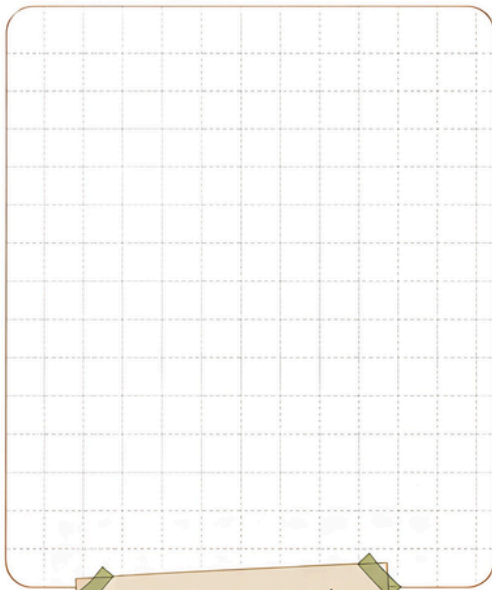
Soil aggregates around roots
(crumbs or clumps)

Other: _____

DRAW WHAT YOU OBSERVED

Sketch the roots and soil using labels.

What did you find most interesting?



Scientists often sketch
before they explain!

ROOT DETECTIVE CHALLENGE

Which statement best matches your observations?

- ☐ Most roots were growing near the soil surface.
- ☐ Roots extended deeper than I expected.
- ☐ The soil stuck tightly to many of the roots.
- ☐ I found very few living roots.
- ☐ I found roots growing through old crop residue.
- ☐ Other: _____

BROOKE'S NOTE

Did you notice soil clinging tightly to the roots?

That's the **rhizosphere**—the tiny zone surrounding each root where plants feed billions of microscopic helpers. Plants release sugars called **root exudates** that attract bacteria, fungi, and other soil organisms. Healthy roots don't just grow through the soil—they help bring it to life.



THINK

Which observation surprised you most?

Why do you think most roots grow where they do?

CONNECT

Living roots help...

- ☒ Feed soil biology
- ☒ Hold soil in place
- ☒ Build stable soil aggregates
- ☒ Improve water infiltration
- ☒ Recycle nutrients
- ☒ Support healthy crops



BROOKE'S FIELD CHALLENGE

Can you find another plant nearby and compare its roots?

How are they similar?

How are they different?



INSIDE THE SOIL

Soil Structure Sleuth

Investigating Question: How is this soil put together?

OBSERVE

Using your shovel, dig a small hole 4–6 inches deep.
Carefully remove one shovel of soil.
Instead of squeezing it...
Gently break it apart with your fingers.
Use your hand lens to examine the soil closely.



WHAT DID YOU FIND?

Check all that you observed.

- ☐  Small crumb-like aggregates
- ☐  Large clods
- ☐  Soil that easily crumbles
- ☐  Powdery soil
- ☐  Organic matter
- ☐  Earthworm channels
- ☐  Tiny pore spaces (little holes)
- ☐  Plant roots growing through aggregates
- ☐  Moist soil
- ☐  Dry soil
- ☐ Other: _____

Every handful
of soil has
a story to tell!



DRAW WHAT YOU OBSERVED

Sketch the soil as you saw it. Label the clues you found.



Scientists sketch before they explain.



SOIL STRUCTURE CHALLENGE

How does your soil behave? Carefully break apart one handful of soil.
Check every description that matches what you observe.

- ☐ Breaks into small crumb-like pieces
- ☐ Breaks into large clods
- ☐ Falls apart into dust
- ☐ Feels loose and easy to break apart
- ☐ Feels hard or compact
- ☐ Has an earthy smell
- ☐ Has very little smell
- ☐ Roots move easily through the soil
- ☐ Roots mostly follow cracks
- ☐ Earthworms or worm channels are present



What clues did YOUR soil give you today?
Write or draw your observations.



BROOKE'S SOIL CLUES



Here are some clues soil can give us and what they might tell us.

	Small crumb-like aggregates	Soil organisms and roots are helping build soil structure.
	Earthy smell	Active soil biology and decomposing organic matter are present.
	Earthworm channels	Soil animals are helping create pathways for water and roots.
	Roots growing in many directions	The soil allows roots to explore freely.
	Moist soil inside aggregates	Soil can store water for plants.

Not every field will have all these clues—and that's okay.
Every field has a history. Today we're learning to read its story.



THINK

If this soil could talk, what would it tell you?

Why do you think crumbly soil might be better than large hard clods?



CONNECT

Healthy soil structure helps...

- ✓ Water soak into the soil
- ✓ Plant roots grow deeper
- ✓ Air move underground
- ✓ Reduce erosion
- ✓ Support soil life
- ✓ Store water for crops



BROOKE'S FIELD CHALLENGE

Can you find another spot nearby with different soil?

How are they alike?

How are they different?

What might explain the difference?



LAND & WATER CONNECT US



Healthy soil
creates a path
from field to lake.



LIVING ROOTS



SOIL BIOLOGY



STABLE AGGREGATES



PORE SPACES



WATER SOAKS IN



CLEANER WATER
FOR ALL

Observe. Discover. Connect. Your curiosity helps build healthy soil and clean water.

LIFE BENEATH YOUR FEET

Investigating Question:

What clues tell us this soil is alive?



Look closely!
Tiny clues tell
big stories.



OBSERVE



Slow down. Use your hand lens.
Carefully look beneath crop residue,
around living roots, and on the soil
surface. You're looking for evidence
of life, not perfection!



WHAT DID YOU FIND?

Check all that you observed.



PLANTS & ROOTS

- ☐ Living roots
- ☐ Root hairs
- ☐ Decaying roots
- ☐ Crop residue



ANIMALS

- ☐ Earthworm
- ☐ Earthworm casting
- ☐ Beetle
- ☐ Ant
- ☐ Spider
- ☐ Other insect



TINY CLUES

- ☐ Small tunnels or burrows
- ☐ White fungal threads (mycelium)
- ☐ Organic matter breaking down
- ☐ Soil sticking tightly to roots
- ☐ Tiny pores

Other: _____



DRAW WHAT YOU OBSERVED

Sketch the clues you found.
Label them.

*Scientists sketch
before they explain.*

SOIL CLUE FIELD GUIDE

Use your laminated
guide to help you
identify what you
find in the soil.



Earthworm Casting
Earthworms eat soil
and leave behind
nutrient-rich castings.



Fungal Threads (Mycelium)
Fungi help plants get
nutrients and build
stable soil structure.



Root Hairs
Tiny hairs help roots
absorb water and
nutrients.



Ground Beetle
Predator that helps keep
other insect populations
in balance.



Springtail
Tiny decomposers
that help break down
organic matter.

*So many
helpers—
most are
too small
to see!*



SOIL DETECTIVE CHALLENGE

Which clue surprised you the most?

- ☐ Earthworm
- ☐ Earthworm casting
- ☐ Fungal thread
- ☐ Root hairs
- ☐ Tiny insect
- ☐ Organic matter
- ☐ Other: _____

Which clue do you think gives the strongest
evidence that this soil is alive? Why?

BROOKE'S NOTE

Healthy soil is one of the busiest ecosystems on Earth—even if most of its residents are too small to see.
Living roots release tiny droplets of sugar (root exudates) that feed bacteria, fungi, protozoa, and other microscopic organisms in the rhizosphere.
Earthworms, insects, fungi, and microbes work together to recycle nutrients, build soil structure, and create pathways for water and roots.

You won't always see the organisms themselves—but you'll almost always find the clues they leave behind.



THINK

What evidence convinced you this soil is alive?

Why do you think healthy soil supports
so many different living things?



CONNECT

Healthy soil life helps...

- ✓ Recycle nutrients
- ✓ Build soil aggregates
- ✓ Create pore spaces
- ✓ Feed plants
- ✓ Improve infiltration
- ✓ Support healthy ecosystems



BROOKE'S FIELD CHALLENGE

Choose one clue you found today.
Become the scientist!

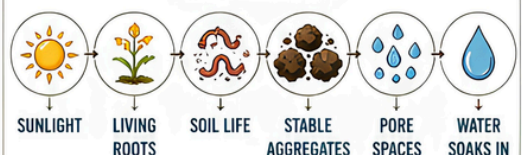
Explain to your teammate:

- What did you find?
- Why do you think it matters?
- What might it tell us about this field?



LAND & WATER CONNECT US

Today's Discovery



STATION 5

WATER'S PATH



Investigating Question:
If it started raining right now,
where would the water go?

OBSERVE



Stand quietly for a moment.
Imagine a heavy spring rain falling on this field.
Walk around your observation area.
Look for clues that tell the story of water.



Every clue
helps us predict
where the next
rain will go!

WHAT DID YOU FIND?

SIGNS WATER SOAKS IN ↓

- ☐ Earthworm holes
- ☐ Soil pores
- ☐ Crumbly soil
- ☐ Living roots
- ☐ Good ground cover
- ☐ Water could move between aggregates

SIGNS WATER MAY RUN OFF →

- ☐ Bare soil
- ☐ Surface crust
- ☐ Ponding
- ☐ Rills or small channels
- ☐ Exposed roots
- ☐ Sediment deposits
- ☐ Compacted soil

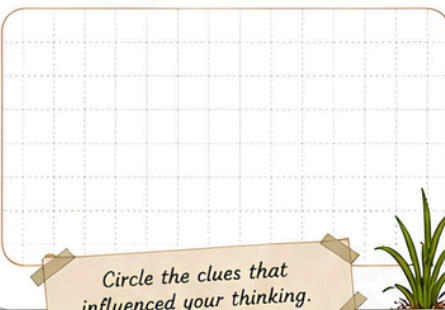
Other: _____

DRAW WHAT YOU OBSERVED

Draw where you think water would travel
across—or into—the soil.

Use arrows to show:

- ↓ Water soaking in
- Water moving across the surface



Circle the clues that
influenced your thinking.

BROOKE'S NOTE

*Water is a great detective.
It follows the easiest path
it can find.*

If the soil has living roots, stable
aggregates, pore spaces, and plenty
of ground cover, much of the rain
can soak into the ground.

If the soil is bare, compacted, or
sealed at the surface, water has
fewer places to go and is more
likely to run off, carrying soil
with it.

Every clue you've discovered today
helps tell the story of where the
next rainstorm will go.

CONNECT

Healthy soils help...

- ✓ Slow runoff
- ✓ Increase infiltration
- ✓ Store water for crops
- ✓ Reduce erosion
- ✓ Protect streams and lakes
- ✓ Build resilience during dry periods



TWO SOILS, TWO DIFFERENT PATHS

How soil health affects where water goes.

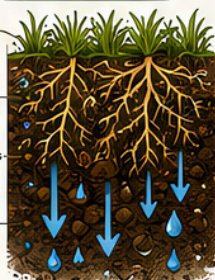
HEALTHY SOIL

Residue
protects surface

Living roots
create pathways

Stable aggregates
store water

Water soaks in!



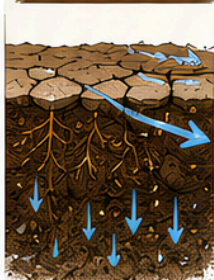
COMPACTED/BARE SOIL

Bare soil is
exposed

Surface crust
blocks water

Few pores or
pathways

Water runs off!



THINK

What clues helped you make your prediction?

Which station helped answer today's question the most?

- ☐ Ground Cover
- ☐ Living Roots
- ☐ Soil Structure
- ☐ Soil Life

Why?



BROOKE'S FIELD CHALLENGE

Find the highest point nearby.

Now find the lowest point.

If rain fell today...

Draw the path you think a raindrop would take.



Where would it end up?

SOIL CLUE FIELD GUIDE

Look closely. Tiny clues tell big stories.

You don't always see life—but you can see the clues it leaves behind!



EARTHWORM

WHAT YOU'RE SEEING:
An earthworm moving through the soil.

WHY IT MATTERS:
Earthworms eat soil and residue, create channels, and mix nutrients—helping air, water, and roots move more easily.



FUNGAL THREADS (MYCELIUM)

WHAT YOU'RE SEEING:
White, cottony or thread-like strands in the soil or on residue.

WHY IT MATTERS:
Fungi help plants get nutrients and water, build soil structure, and store carbon.



EARTHWORM CASTINGS

WHAT YOU'RE SEEING:
Small, dark, lumpy piles on the soil surface.

WHY IT MATTERS:
Castings are packed with nutrients and beneficial microbes—nature's fertilizer!



ROOT HAIRS

WHAT YOU'RE SEEING:
Tiny, fuzzy hairs on young roots.

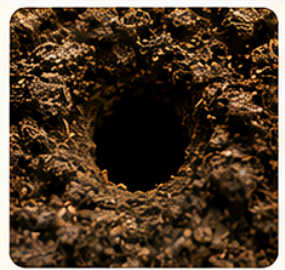
WHY IT MATTERS:
Root hairs increase the root's surface area, helping the plant take in more water and nutrients.



GROUND BEETLE

WHAT YOU'RE SEEING:
Small, fast-moving beetles on the soil surface.

WHY IT MATTERS:
Ground beetles are predators that help keep pest populations in balance.



WORM CHANNELS

WHAT YOU'RE SEEING:
Holes or tunnels in the soil.

WHY IT MATTERS:
Channels created by earthworms and other soil creatures allow air and water to move deep into the soil.



SPRINGTAIL

WHAT YOU'RE SEEING:
Very tiny, pale insects that jump when disturbed.

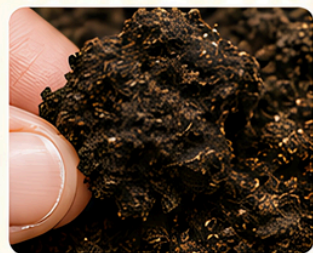
WHY IT MATTERS:
Springtails feed on fungi and organic matter, helping break it down.



ORGANIC MATTER

WHAT YOU'RE SEEING:
Decaying leaves, stems, and plant residue.

WHY IT MATTERS:
Organic matter feeds soil life and helps build stable soil aggregates.



SOIL AGGREGATES

WHAT YOU'RE SEEING:
Small, crumb-like clumps of soil that hold together.

WHY IT MATTERS:
Aggregates create pore spaces for air, water, and roots—key to healthy soil.



ROOT NODULES

WHAT YOU'RE SEEING:
Small, round bumps on roots of legume plants (like clover or beans).

WHY IT MATTERS:
Nodules house bacteria that "fix" nitrogen, a nutrient plants can use.

**EVERY CLUE
COUNTS!**



Healthy soil is full of life working together.
The more clues you find, the healthier the soil story. 



SOIL SCIENTIST TIP

Slow down, look closely, and use your hand lens. Some of the most important clues are tiny!



Land & Water Connect Us • *Healthy Soil. Healthy Water. Healthy Future.*



READING WATER'S CLUES



A FIELD GUIDE TO RUNOFF RISK

Every rainstorm leaves clues behind. If you know what to look for, you can tell where water slowed down, soaked in, or rushed across the landscape.



Brooke says:
Look for patterns.
One clue never tells the whole story.

1 SURFACE CRUSTING



WHAT YOU'RE SEEING:

A thin, hard layer on the soil surface that forms when raindrops break apart soil aggregates and fine particles settle into a dense crust.



WHY IT MATTERS:

Surface crusts reduce infiltration, making it harder for rainwater to soak into the soil. Seeds may also struggle to emerge through the crust.

2 COMPACTED SOIL



WHAT YOU'RE SEEING:

Soil particles have been pressed tightly together, leaving fewer spaces for water, air, and roots. You may see few pores and roots growing mostly sideways.



WHY IT MATTERS:

Compacted soil slows infiltration and limits root growth. During heavy rain, more water is likely to move across the surface instead of into the soil.

3 PONDING



WHAT YOU'RE SEEING:

Water remains on the soil surface because it cannot soak in as quickly as it is falling.



WHY IT MATTERS:

Ponding often indicates slow infiltration, compaction, surface sealing, or poor drainage.

4 RILL EROSION



WHAT YOU'RE SEEING:

Small, narrow channels carved into the soil by moving water after rainfall.



WHY IT MATTERS:

Rills show that runoff had enough energy to detach and transport soil particles.

5 SEDIMENT DEPOSITS



WHAT YOU'RE SEEING:

Patches or fans of lighter-colored soil collected behind residue, grass, fences, or other objects.



WHY IT MATTERS:

Sediment deposits reveal where erosion occurred upslope and where transported soil came to rest.

6 GULLY EROSION



WHAT YOU'RE SEEING:

Deep channels cut into the field that cannot be removed with normal tillage.



WHY IT MATTERS:

Gullies represent severe erosion and can remove large amounts of valuable topsoil while carrying sediment and nutrients to streams and lakes.

PROTECTIVE CLUES

Not every clue points to runoff.

Healthy fields often contain evidence that helps rain soak in.



LIVING ROOTS



CROP RESIDUE



STABLE AGGREGATES



EARTHWORM CHANNELS



GOOD GROUND COVER



CRUMBLY SOIL STRUCTURE

These clues suggest water has more opportunities to infiltrate rather than run off.



BROOKE'S DETECTIVE TIP

Look across the whole field. Where are the clues most common? What story is the land telling about how water moves here?



THE MORE CLUES YOU FIND, THE BETTER YOU CAN UNDERSTAND HOW WATER MOVES ACROSS THE LANDSCAPE.

READING THE LANDSCAPE

A FIELD GUIDE TO HOW LAND INFLUENCES WATER

Shape, position, and plant cover all influence where water goes, how fast it moves, and what it carries. Use these clues to understand the landscape's story.



1 GROUND COVER

What's protecting the soil?



WHAT YOU'RE SEEING:
Residue, mulch, living plants, or cover crops covering the soil.

WHY IT MATTERS:
Cover protects soil from raindrop impact, slows runoff, and helps keep the soil in place.

2 LIVING ROOTS

What's growing below?



WHAT YOU'RE SEEING:
Roots holding soil together in place.

WHY IT MATTERS:
Roots create channels for water, increase infiltration, and help prevent erosion.

3 SLOPE POSITION

Where are you on the slope?



WHAT YOU'RE SEEING:
Upland, midslope, or low areas on the landscape.

WHY IT MATTERS:
Water speeds up on steep slopes and slows down in low spots.

4 LOW SPOTS

Where does water collect?



WHAT YOU'RE SEEING:
Areas where water gathers or stays after it rains.

WHY IT MATTERS:
Water slows down here and may soak in—or cause ponding if the soil can't absorb it.

5 WATERWAYS

Where does water flow?

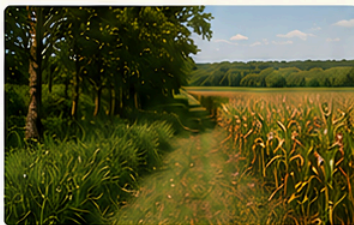


WHAT YOU'RE SEEING:
Natural or man-made channels like streams, ditches, or swales.

WHY IT MATTERS:
Waterways move water off the land. Vegetation along them slows flow and traps sediment.

6 FIELD EDGES

What's at the boundary?



WHAT YOU'RE SEEING:
Transitions where fields meet woods, roads, ditches, or grass areas.

WHY IT MATTERS:
Edges can trap sediment, reduce runoff, and filter water before it leaves the field.

7 RESIDUE DISTRIBUTION

How is residue spread out?



WHAT YOU'RE SEEING:
Evenly spread residue or areas where it's clumped, blown away, or removed.

WHY IT MATTERS:
Residue cover varies across the field, affecting how well soil is protected and how fast water can move.

8 INFILTRATION CLUES

How does water enter the soil?

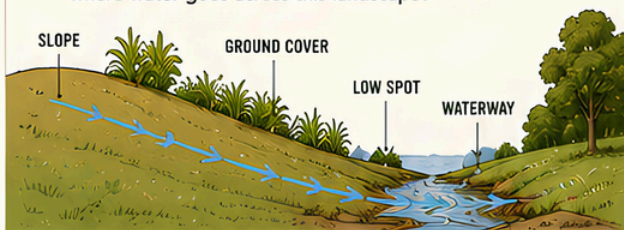


WHAT YOU'RE SEEING:
Water soaking in quickly, slowly, or not at all.

WHY IT MATTERS:
Good infiltration means more water is stored for plants and less is lost to runoff.

PUTTING THE CLUES TOGETHER

No single clue tells the whole story. Look for patterns! How do these clues work together to influence where water goes across this landscape?



Water flows from high to low along the path of least resistance.

BROOKE'S DETECTIVE TIP

Walk the landscape.
Look up, down, and around.
Ask yourself:

- Where did the water come from?
- Where is it going?
- What might slow it down?
- What might speed it up?
- What clues tell me that?

The more you observe, the better you understand the story of this place!



WHY IT MATTERS

Understanding the landscape helps us:

- Protect soil from erosion
- Improve water infiltration
- Keep nutrients where they belong
- Protect streams, rivers, and lakes
- Build resilience for crops and communities



RESEST CHECKLIST



Soil Detective Kits

- ☐ Collect all Soil Detective Kits
- ☐ Return hand lenses, trowels and other tools to each kit
- ☐ Replace pencils or participant materials as needed
- ☐ Wipe off muddy tools and clipboards
- ☐ Restock Field Journals / observation sheets
- ☐ Return laminated Field Guides to each kit

Stations

- ☐ If possible, shift the observation areas slightly so the next group investigates an undisturbed patch
- ☐ Wipe excess soil from equipment



TROUBLE SHOOTING

Problem

Try This

- There isn't much residue or ground cover to examine.
- That's still evidence. Have participants estimate what is present and look for exposed soil. Ask how the surface might respond to rainfall.
- Participants can't agree on ground-cover percentage.
- That's okay. Have them compare the field to the visual residue guide and explain the evidence behind their estimates. The goal is observation, not an exact measurement.
- The soil is too hard or dry to dig.
- Move to a nearby representative area if possible. Use a soil probe or hand trowel first to loosen the surface. If digging isn't practical, focus on what the hard/dry condition itself tells participants.
- Soil doesn't form nice crumbly aggregates.
- Have participants describe exactly what they see: hard clods, plates, loose particles, crusting, etc. The purpose is to read this field

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Walk the Field