

## Photo Description



The ground is very dry and cracked into many pieces. Small plants are trying to grow in the cracks. The dirt looks hard and broken like puzzle pieces that don't fit together anymore.

## Scientific Phenomena

This image represents the Anchoring Phenomenon of soil desiccation and drought conditions. The cracking occurs when clay-rich soil loses moisture through evaporation. As water molecules leave the soil, the clay particles shrink and contract, creating tension that causes the ground to crack in polygonal patterns. This process demonstrates how water availability directly affects Earth's surface materials and the organisms that depend on them.

## Core Science Concepts

1. Water Cycle in Action: The cracked soil shows evaporation happening - water from the ground goes up into the air as invisible water vapor.
2. Plant Survival Needs: The small plants growing in cracks demonstrate that plants need water, soil, and sunlight to survive, even in difficult conditions.
3. Earth Materials Change: Soil can change from soft and muddy when wet to hard and cracked when dry, showing how Earth materials have different properties.
4. Weather Effects on Land: Hot, dry weather can change the land by removing water and making the ground crack.

### Pedagogical Tip:

Use a wet sponge that dries out over several days to help students visualize how water leaving the soil causes cracking. Let them feel the sponge when wet versus dry.

### UDL Suggestions:

Provide multiple ways for students to explore this concept: tactile experiences with wet/dry clay, visual comparisons of before/after photos, and kinesthetic activities like acting out water evaporating from soil.

## Zoom In / Zoom Out

1. Zoom In: At the microscopic level, tiny clay particles are held together by thin films of water. When the water evaporates, these particles shrink and pull apart, creating the visible cracks we see.

2. Zoom Out: This cracked soil is part of larger drought patterns that affect entire regions, impacting farming, water supplies, and ecosystems across vast areas of land.

### Discussion Questions

1. What do you think happened to make the ground look like this? (Bloom's: Analyze | DOK: 2)
2. How might the plants in the cracks be getting the water they need? (Bloom's: Apply | DOK: 2)
3. What do you predict will happen to this ground when it rains? (Bloom's: Evaluate | DOK: 3)
4. Where else have you seen things crack when they get dry? (Bloom's: Remember | DOK: 1)

### Potential Student Misconceptions

1. Misconception: "The ground is broken and needs to be fixed."

Clarification: Cracked soil is a natural process that happens when water evaporates, and it can return to normal when it rains again.

2. Misconception: "Plants can't grow in cracked ground."

Clarification: Some plants are very good at finding water deep in the cracks and can survive even when the top soil is dry.

### Cross-Curricular Ideas

1. Math - Patterns & Shapes: Have students trace and count the polygon shapes created by the cracks in the soil. They can create their own cracked soil patterns using paper plates divided into sections, reinforcing geometry and spatial reasoning.
2. ELA - Descriptive Writing: Read books about droughts and dry lands, then have students draw their own cracked soil and write simple sentences describing what they see using words like "hard," "dry," "cracked," and "broken." This builds vocabulary and descriptive language skills.
3. Social Studies - Community Helpers: Discuss how farmers and weather scientists help communities during dry times. Students can role-play as farmers checking their fields or meteorologists predicting rain to help people prepare.
4. Art - Texture & Mixed Media: Create a tactile soil art project using actual dried mud, clay, or salt dough that students can crack and manipulate. They can paint the cracks with watercolors to show contrast between dry and wet states, exploring cause-and-effect through art.

### STEM Career Connection

1. Soil Scientist (Pedologist): These scientists study soil to understand what plants need to grow and how water moves through the ground. They help farmers know when to water their crops and when the soil is healthy. Average Salary: \$65,000 - \$75,000 USD per year
2. Weather Forecaster (Meteorologist): These scientists watch the weather and predict when it will rain or if a drought is coming. They help communities prepare for dry times and warn people about severe weather. Average Salary: \$70,000 - \$85,000 USD per year
3. Farmer or Agricultural Specialist: These workers grow food and care for plants and animals. They use their knowledge of soil and water to decide when to plant seeds and how to keep their land healthy during dry periods. Average Salary: \$60,000 - \$90,000 USD per year (varies by farm size and location)

## NGSS Connections

- Performance Expectation: K-ESS2-1: Use and share observations of local weather conditions to describe patterns over time
- Disciplinary Core Idea: K-ESS2.D - Weather and Climate
- Crosscutting Concept: Patterns

## Science Vocabulary

- \* Evaporation: When water changes from liquid to invisible gas and goes into the air
- \* Drought: A long time with very little rain when the ground gets very dry
- \* Soil: The dirt that plants grow in, made of tiny pieces of rock and dead plants
- \* Crack: A line where something splits apart or breaks
- \* Survive: To stay alive even when things are hard

## External Resources

Children's Books:

- The Magic School Bus Wet All Over: A Book About the Water Cycle by Joanna Cole
- Water Is Water: A Book About the Water Cycle by Miranda Paul
- A Seed Is Sleepy by Dianna Hutts Aston