

## Photo Description



A big green tractor is working in a farm field. The tractor has large wheels and is moving dirt to get the ground ready for planting seeds. There is a fence in front and trees in the back.

## Scientific Phenomena

The anchoring phenomenon shown is soil preparation for agriculture. The tractor is mechanically breaking up and turning over soil to create optimal conditions for seed germination and plant growth. This process increases soil aeration, incorporates organic matter, controls weeds, and creates a suitable seedbed. The phenomenon demonstrates how humans use tools and technology to modify Earth's surface materials to support food production.

## Core Science Concepts

1. Earth Materials and Properties: Soil is made of different parts like dirt, rocks, and old plant pieces that plants need to grow.
2. Human Impact on Environment: People use machines like tractors to change the land so they can grow food for everyone to eat.
3. Plant Needs: Plants need good soil, water, air, and sunlight to grow big and healthy.
4. Tools and Technology: Tractors are special machines that help farmers do work that would be too hard to do by hand.

### Pedagogical Tip:

Use concrete, hands-on experiences like letting students dig in actual soil or sand to feel the texture differences before and after "tilling" with small tools. This tactile experience helps kindergarteners understand the abstract concept of soil preparation.

### UDL Suggestions:

Provide multiple ways for students to explore this concept: visual learners can observe soil samples, kinesthetic learners can manipulate play dough to simulate tilling, and auditory learners can listen to tractor sounds and discuss what they hear.

## Zoom In / Zoom Out

1. Zoom In: Inside the soil are tiny spaces between dirt particles where air and water can move around. When the tractor mixes the soil, it makes more of these tiny spaces so plant roots can breathe and drink water easily.
2. Zoom Out: This farm field is part of a bigger food system that connects to grocery stores, restaurants, and our dinner tables. The crops grown here will feed families in many different places, showing how farms are connected to communities everywhere.

## Discussion Questions

1. What do you think would happen if farmers didn't prepare the soil before planting seeds? (Bloom's: Predict | DOK: 2)
2. How is the tractor helping the farmer get the soil ready for plants? (Bloom's: Analyze | DOK: 2)
3. What do plants need from soil to grow big and strong? (Bloom's: Remember | DOK: 1)
4. If you were a tiny seed in this soil, what would you want the farmer to do to help you grow? (Bloom's: Create | DOK: 3)

## Potential Student Misconceptions

1. Misconception: "Dirt is just dirt - it's all the same."

Clarification: Soil is made of many different parts including tiny rocks, old plant and animal pieces, air, and water that plants need to grow.

2. Misconception: "Plants can grow anywhere in any dirt."

Clarification: Plants grow best in soil that has been prepared with the right mix of materials, air spaces, and nutrients.

3. Misconception: "Tractors just drive around for fun."

Clarification: Tractors are important tools that help farmers prepare soil and take care of crops so we have food to eat.

## NGSS Connections

- Performance Expectation: K-ESS3-1 - Use a model to represent the relationship between the needs of different plants and animals and the places they live.
- Disciplinary Core Ideas: K-ESS3.A (Living things need water, air, and resources from the land)
- Crosscutting Concepts: Systems and System Models, Cause and Effect

## Science Vocabulary

- \* Soil: The dirt and other materials that plants grow in and get food from.
- \* Tractor: A big, strong machine that farmers use to work in their fields.
- \* Agriculture: The work of growing plants and raising animals for food.
- \* Seedbed: Soil that has been made ready for planting seeds.
- \* Germination: When a seed starts to grow into a new plant.

## External Resources

### Children's Books:

- From Seed to Plant by Gail Gibbons
- The Year at Maple Hill Farm by Alice and Martin Provensen
- Our Animal Friends at Maple Hill Farm by Alice and Martin Provensen

### YouTube Videos:

- "How Do Plants Grow? | Educational Video for Kids" - Simple explanation of plant needs and growth process: <https://www.youtube.com/watch?v=KSQP2Nj8lj4>
- "Farm Machines for Kids | Tractor Videos" - Shows various farm equipment including tractors preparing fields: <https://www.youtube.com/watch?v=1pOqWBGHl0>