



Decomposing Leaf Timeline

Connected Next Generation Science Standards

2-ESS1-1 Use information from several sources to provide evidence that earth events can occur quickly or slowly.

Featured Science and Engineering Practices

Developing and Using Models

Featured Cross-Cutting Concepts

Stability and Change

Materials

- Teacher - small whiteboard or chalkboard
- Garden notebooks or Decomposing Leaf worksheet and clipboards
- Pencils
- Optional - magnifying glasses

Settings

- School garden or green space
- Can be taught anytime of year but works the best in the fall or early winter when fallen leaves are decomposing.

Overview

This lesson is a great introduction to decomposition and nature journaling. Plants rely on decomposers to create healthy soil and decomposers need dead plant matter as a food source. Students will observe and diagram the complex process of decomposition.

Students will

- Search for evidence of living and decomposing matter.
- Identify characteristics of decomposition.
- Create a model diagram of decomposing leaves.

Teacher Preparation

- Look around trees or the compost pile for decomposing leaves. If unable to find leaves, you may want to use decomposing sticks, bark, or another natural item that is present in the garden in multiple stages of decomposition.
- Optional: Collect a large pile of fallen leaves from the same type of plant.

Guiding Question - What happens to a leaf after it falls off a plant?



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Matter is everything that has mass and takes up space. Younger students may think of matter as everything around them.

Students may need to be reminded of the difference between **non-living** and **living** things. When we talk about things that have died, they were still once living organisms. In contrast, matter like rocks and water were never living things and are considered non-living.

For younger students who aren't familiar with the term **evidence**, **clues** can be used instead.

Explore

- Once you are in the garden, say to students, Look at all of the living things around us. Where do you think plants and other living matter go once they have died? Have students turn to a partner and discuss their ideas.
- By a show of hands, ask students, Have you ever watched a show or read a book about a detective? What makes someone a good detective? Popcorn a few responses and detective examples.
- Explain that detectives use evidence to solve mysteries. Next, ask students: What does the word "evidence" mean to you?
- After students share out responses, tell them that today they are going to be detectives to solve a garden mystery - Where do the garden's plants go once they die? Students will be making close observations of leaves in different stages of decomposition to solve this mystery.
- Divide students into pairs and pass out magnifying glasses and garden journals or Decomposing Leaf worksheets. Their first job is to find and carefully observe a leaf that is still connected to a plant.
- Demonstrate how to create a scientific drawing by tracing around the leaf, adding labels, and creating symbols to capture your observations. Ask students, What other details could you add to the drawing?
- They will then use their journals or worksheet to sketch the leaf and label observations they make, noting details like size, color, texture, holes, marks, and other interesting characteristics. The drawing is about capturing information, not making a pretty picture.



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Field journals are important tools for making scientific observations in nature. Students may need an introduction to field journaling before this activity. Guide students as they journal, encouraging sketching or tracing as they draw the object, in addition to the use of strong descriptor words and labels. The use of magnifying glasses is recommended so students can zoom in on the smaller details of the object.

- After they have completed their first journal entry, tell students they will now repeat this journaling activity 2 more times. This time, they will find 2 dead leaves of the same species as the first. The leaf that looks the oldest (or most decomposed) will go at the bottom of the page. The leaf that is less decomposed will go in the middle of the page.
- Students can find their own leaves or use leaves you provide.

Digging Deeper

- After journaling, bring the students back together and form a circle. Explain that you are going to ask some questions about what they observed, and if they, too, made a similar observation to what they hear another student share, then they should take a step forward in the circle.
- Ask the group, What observations did you make about the first leaf? Have students take turns sharing observations they made, reminding students to step forward in the circle to show agreement each time they made a similar observation about their leaf.
- After students have shared out a handful of observations, repeat this discussion routine with the decomposing leaves. Ask students, What did you notice about your decomposing (or older) leaves? How were they different from the first leaf?
- What do they think will happen to leaves if they stay in the garden for another year? Have students turn and talk to a neighbor.



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Variations for younger students: Tell students they can trace their leaves and add detail with crayons or colored pencils, instead of sketching it and using labels. Use **plants and animals** instead of **organisms**. You may also use the phrase "breaking into smaller pieces" instead of the term **decomposition**.

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- Explain to students that the process organisms go through once they die is called **decomposition**. **Decomposition** is the breaking down of dead matter into smaller parts. Once natural matter decomposes completely, it becomes part of the soil.

Making Connections

- Have each student find another student and compare leaf diagrams. Encourage students to ask questions or make comments on one another's diagrams regarding observations that were included to reflect decomposition.
- Circulate as the students share, assessing their understanding and probing for explanations as needed.
- Bring the students back together.
- Have the class list characteristics that would help someone identify a leaf that is still living. Next, ask them to list some characteristics that would help them identify a decomposing leaf.
- Ask students to think about other places they may have seen decomposition occurring. Does the decomposing leaf remind them of anything else they have seen in the garden or other places? (possible responses: moldy food, pumpkin graveyard, dead tree logs) What other factors or living things in the garden might be involved in the process of decomposition? (possible responses: air, heat, time)