



Cookin' Up Some Dirt Part 2 (5th Grade)

Distance Learning Lesson



SYNOPSIS

In this lesson, students will look at how variations in temperature can affect decomposition rates of plant matter.

STANDARDS SUPPORTED

5-LS2-1: Develop a model to describe the movement of matter among plants, animals, decomposers, and the environment.

PHENOMENA

Rates of decomposition change based on temperature and ratios of materials included.

MATERIALS

- [Cookin' Up Some Dirt Slideshow](#)
- [Four Seasons Worksheet](#)
- [Cookin' Up Some Dirt Part 1](#)
- Five sealable ziplock bags
- Sharpie
- Newspaper
- Lettuce (or some kind of green leafy material)
- Thermometer (if available)
- Measuring cups
- Water
- Straws - 3 cut in half
- Scissors
- Nature Journal and/or [Data Sheets](#)

ESSENTIAL QUESTIONS

- Can we alter the speed of decomposition? How?
- How can humans use fast decomposition to solve a problem?
- What are some factors that can affect decomposition in a compost?
- Can we observe cycles of decomposition in nature?

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LESSON

Facilitator (Teacher/Parent) Does	Student Does	Questions to Move Thinking Forward
<p>Show the students pictures of a forest during each of the four seasons (these pictures are also included in the slideshow).</p> <p>Have students observe the pictures and record their observations in their journals.</p> <p>Then have students discuss findings with a small group or a neighbor.</p>	<p>Observe and wonder about the pictures of the forest during fall, winter, spring, and summer.</p> <p>Record observations, questions, and thoughts in a journal (or on the worksheet).</p> <p>Share findings with a neighbor or small group.</p>	<p>What is different about the weather in the four photos?</p> <p>What is different about the trees in the four photos?</p> <p>What about the ground?</p>
<p>Discuss and record each of the student's observations and ideas in a chart, poster, or slideshow.</p>	<p>Students share findings with the class and discuss the thought process.</p>	<p>Why do trees drop their leaves in the winter?</p> <p>Where are all the leaves by summer?</p> <p>What happened to them?</p> <p>Why didn't the grass die with all the snow from the winter? (Discuss as a class, if possible.)</p>
<p>Introduce composting, (reference Cookin' Up Some Dirt Part 1).</p> <p>We are going to recreate different seasons and see which ones decompose our material the fastest.</p> <p>Record your predictions in your nature journal.</p>	<p>Students think about which seasons will show the fastest decomposition and why; recording ideas in their journal.</p>	<p>Can we recreate the seasons in our classroom?</p> <p>Which season will our compost decompose the fastest and why?</p>
<p>Split students into five groups based on each of the four seasons, and one control group (facilitator can be the control group as an example if that is preferred) and prepare the experiment.</p>	<p>Students work in groups to gather and prepare materials for the experiment.</p>	
<p>Each group will receive one ziplock bag, half a straw, a few pages of a newspaper (or paper bags from lunch), and water.</p>	<p>Students will cut up newspapers into small pieces, working together as a group.</p>	<p>What does the brown material represent?</p> <p>Where is it in the pictures you observed earlier?</p> <p>What are some other examples of brown material?</p>

LESSON (continued)

Facilitator (Teacher/Parent) Does	Student Does	Questions to Move Thinking Forward
<p>Students will have to collect the green material for their experiment.</p> <p>Take the students outside to collect anything green (grass clippings, fresh leaves or parts of their lunch they did not want to eat like lettuce, stems, etc.).</p>	<p>Students collect various green materials as a group and cut them into small pieces.</p>	<p>Why does a compost need brown and green parts?</p> <p>What provides the green parts in nature, recall the pictures you observed earlier?</p> <p>What are some other examples of green material?</p>
<p>Groups will prepare their compost bags.</p>	<p>Fill the bag with $\frac{1}{4}$ cup brown material and $\frac{3}{4}$ cup green material.</p> <p><i>If you did the previous experiment about ingredients in a compost, use the ratio that your class discovered to work the best.</i></p>	<p>Why does the compost use this ratio?</p>
<p>Give the students a small cup of water</p>	<p>Students will add one tablespoon of water to each bag.</p> <p><i>If the material still looks dry, add more water until the mixture is moist.</i></p>	<p>Why do we need to add water to the material?</p> <p>Is there water in nature's compost?</p> <p>Think of the pictures we saw of the forest in the four seasons, where did the water come from in those pictures? Record in your journal.</p>
<p>Give students half of a straw.</p>	<p>Place the straw in the bag so it is still slightly showing out of the bag.</p> <p>Close the ziplock around the straw.</p>	<p>Why is there a straw in the bag?</p> <p>What is that adding to the mixture?</p>
<p>Discuss where each of the bags should go to recreate each of the four seasons. The control bag will remain at room temperature.</p> <p>Revisit the pictures of the forest during each of the seasons.</p> <p>Have students record observations about the weather in their journals, or as a class.</p>	<p>Observe the pictures of the different seasons.</p> <p>What do you observe about the differences in the weather?</p> <p>Record findings in a journal or as a class.</p>	<p>Where could each group put their bags to recreate the weather in each of the seasons?</p> <p>Where is the coldest? Where is the hottest?</p>

LESSON

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<p>Students should come up with and share different locations for each of the bags in the experiment.</p> <p>Bag 1: Room Temperature - Some place inside that is away from windows and ac vents (control).</p> <p>Bag 2: Warm Location - Tape one bag to a window or area that gets a lot of sunlight (spring).</p> <p>Bag 3: Hot Location - Place the bag outside in a sunny area (summer).</p> <p>Bag 4: Cold Location - Place bag in a fridge or a dark cool place like a garage (fall).</p> <p>Bag 5: Freezing (if available) - Place one bag in freezer or fridge (winter).</p>	<p>Students in each group will put their bags in each different location.</p> <p>Record initial predictions in a journal.</p>	<p>Which bag will decompose the fastest?</p> <p>Which bag will decompose the slowest?</p>
<p>Each week students will check on the different mixtures in each bag, recording any observations they have.</p> <p>If students have access to a thermometer, have them record the temperature of each of the mixtures weekly. Put the thermometer inside the straw into the material to avoid opening the bag.</p> <p><i>Make sure to add a tablespoon of water occasionally if the mixture gets dry.</i></p>	<p>Students will check on their experiment over the next few weeks recording observations and sharing those observations with classmates.</p> <p>Have students sketch, photograph, or describe changes they observe.</p> <p><i>Student can record their observations on the provided data sheet, if desired.</i></p>	<p>What changes are you noticing (sketch or describe what you see)?</p> <p>Which bag has the material inside changed the most? The least?</p>

LESSON

Facilitator (Teacher/Parent) Does	Student Does	Questions to Move Thinking Forward
<p>Repeat observations for several weeks, until there is a homogenous mixture of compost.</p> <p>Once at least one bag reaches this consistency, compare all the bags with the students.</p> <p>Open the bags to allow students to observe with as many of the senses as possible, some mixtures might be stinky.</p> <p>Record temperature before students rotate to observation stations.</p> <p><i>It is recommended to create observation stations, with one groups bags at each station. Allow students to rotate from bag to bag.</i></p>	<p>Students will observe all the bags for final observations.</p> <p>Students should try to use as many senses as possible , except for taste, while comparing each of the bags, recording observations about each one.</p>	<p>Which group’s bag changed the most from your initial observation?</p> <p>Which group’s bag changed the least?</p> <p>How did each bag smell?</p> <p>How did the mixture in each bag feel?</p> <p>Which bag reached the highest temperature?</p> <p>Which bag reached the lowest?</p> <p>Does temperature affect decomposition? How?</p>
<p>Have the students revisit the pictures of the four seasons. Do they notice anything different now that they completed the experiment?</p> <p>Have the students try to determine which season is the best for decomposition?</p> <p>Have students think and discuss what they think would happen if we didn’t have those seasons?</p>	<p>Re-observe the pictures, record any new observations. Re-visit the “moving forward questions”.</p>	<p>Why do trees drop their leaves in the winter?</p> <p>Where are all the leaves by summer?</p> <p>What happened to them?</p> <p>Why didn’t the grass die with all the snow from the winter? Discuss as a class.</p> <p>Does nature have its own compost?</p>
<p>Have the students brainstorm ways we can use decomposition to get rid of some of the trash we make. Share ideas with other classmates.</p> <p>Have students discuss where would be the best place to put their compost bin at their school, draw a model in their journals and include reasoning.</p>	<p>Students create a model of where they would put a compost at their school and reasoning behind their choices.</p>	<p>Why did you choose to put the compost there?</p> <p>Why is it important that we compost?</p> <p>What other factors affect a compost?</p>

MODIFICATIONS

Synchronous	Asynchronous	Independent Learning
<p>Facilitator shows on screen the pictures of the four different seasons and asks students to share with the whole group what they notice and what they wonder (these pictures are part of the slideshow). As the students respond, the facilitator could write on the board or type in a slideshow their findings.</p> <p>Students could be split up into groups of 4, each student in the group focusing on a different season and reporting weekly findings with the other members of their group.</p> <p>Students could share findings during large class meetings, comparing seasons across different groups.</p> <p>If students do not have access to a thermometer, the facilitator can be doing experiment simultaneously, recording temperatures for the students and sharing findings.</p>	<p>The facilitator shows a slideshow with the different pictures of the seasons. Asking students to record observations in the slide or a video recording to share with the facilitator. Once all of the findings have been submitted the facilitator can create a chart showing all of the students observations for commentary and virtual discussion.</p> <p>For the experiment, each student could do one of the seasons, recording their data in a shared sheet with other members of their class. Students could share observations, photos, drawings, recordings, and temperature with one another.</p> <p>If the facilitator decided to use a slideshow, an observation recording table could be included, students could add findings directly to the table to be shared with other students.</p> <p>Students could comment on classmates videos of the experiments to compare findings.</p>	<p>The facilitator would create a slideshow (with audio or not) or video of the information for students. The students would then go through each of the sections and submit either a picture or a document of their work and weekly experiment observations.</p> <p>If possible, the student should talk with someone in the home (parent, grandparent, sibling, etc.) about each part of the lesson.</p> <p>Students could also explore a local community garden, like the one at the Great Park’s Food + Farm Lab to see a variety of composting in action.</p> <p>There are a variety of places online that help students learn more about gardening and composting, such as Gardening Basics – Composting.</p>