

Second Grade: Transforming Trash

Standard

Obtain, evaluate, and communicate information about the properties of matter and changes that occur in objects.

2-P1a. ask questions to describe and classify different objects according to their physical properties (GSE S2P1a)
(Clarification statement: Examples of physical properties could include color, mass, length.)

1b. analyze data obtained from testing different materials to determine which materials have the properties that are best suited for an intended purpose * [Clarification Statement: Examples of properties could include, strength, flexibility, hardness, texture, and absorbency.]

1c. construct an explanation for how structures made from small pieces (e.g., linking cubes, building blocks) can be disassembled and then rearranged to make new and different structures (GSE S2P1b)

Background

Ideally, students will have already explored properties of matter and changes in matter (GSE S2P1a) before doing this lesson. Directions for this lesson and design challenge are written for adult use. Students may use the K-2 lab report template from the appendix, which has larger space for drawing and writing. Safety Considerations:

- Do not allow students to use iron. Be careful where iron is set up to avoid inadvertent contact.
- Do not allow students to reach into blender or to clean blade assembly.
- Preselect trash and recycling bins from which student may choose trash to remake into paper.

Teaching Tips

Preparation Obtain used white paper (not slick or glossy) from recycling bin or classroom container where it is collected.

Directions for this lesson and design challenge (on next page) are written for adult use. Students will use the K-2 student lab report template from the appendix, which has larger space for drawing and writing. Discuss safety. After the paper dries, allow student to make cards. The inclusion of pressed flowers or flower petals in the paper making process can make this a great tie in with holiday cards, event invitations, pen pal letters or similar occasions.

Phenomenon: Present phenomenon in lesson without explanation before or after students view it.

What Do you Notice? Engage students in writing a tentative explanation (or making a labeled drawing) that tells what they observed.

What Do you Wonder? Engage students in asking their own questions, which will form the basis for research.

Student Research After each student writes a question, consider placing each question on a sticky note, grouping them in categories, and allowing students to learn more in small groups according to their interests.

Teacher-Directed Activity Show one or more explainer videos to students from Teacher Resources section below.

Zero Heroes Lesson Activity This lesson is an Eco-Engineering Challenge to make recycled paper from bits of used paper.

Revised Explanation Allow students to return to and revise their initial explanations of the phenomenon. Address misconceptions by clarifying that some materials can be disassembled and re-assembled while others cannot. Materials that can be reused (in the same form) or recycled (taken apart and remade) reduce the amount of waste compared to items that are used once and thrown away; and recycling or reusing materials also reduces the amount of natural resources needed to make products for people (such as the number of trees that are cut down to make paper).

Teacher Resources

Boston Children’s Museum: Do It Yourself Papermaking for Sustainable Kids (video): <https://www.youtube.com/watch?v=wVlyhgZI-X0>

Simplest approach to paper-making: [Kid Science: Making Paper](#)

Recycled Items that are Broken Down and Remade: <https://www.maine.gov/dep/waste/recycle/whatrecyclablesbecome.html>

Repurposed Items that are Transformed: <https://www.goodnet.org/articles/10-most-amazing-repurposed-items-youll-ever-see-list?>

Things that Cannot be Recycled: <https://www.bobvila.com/slideshow/20-surprising-things-you-can-t-recycle-52079>



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2nd Grade Eco-Engineering Challenge: Transforming Trash

The Phenomenon

What do you Notice? (tentative explanation)



[Building Block Time Lapse Video](#)

Engage students in drawing and labeling what they noticed **without** explaining the phenomenon to them (objects can be made from small pieces and disassembled to make into different objects). Their labeled drawings will serve as their tentative explanations. At the end of the lesson, allow students to revise and refine their explanations to reflect new understandings. Use the K-2 student lab report template.

What do you Wonder? (student questions)

Engage students in **asking their own questions** about the unexplained phenomenon. These questions will form the basis for student research. Depending on questions asked, these videos may provide some answers:

Where Does Paper Come From? and *How Recycled Paper is Made;*

Eco-Engineering Challenge: Make Recycled Paper from Bits of Used Paper

Your students' challenge is to make paper from bits of old, used paper. Discussion points: Paper comes from trees that are cut down and ground up into bits. Then the bits are mixed with water and dried to make them into recycled paper. How is making paper like building with blocks? Can we reduce the number of trees that are cut down to make new paper? One way is to use less paper. How could we do that? Another way is to save our old used paper and recycle it into paper again.

Constraints

Time Allotted: _____

Safety considerations for students: No touching iron. No reaching inside blender. Only hold blender button on as long as it takes to count to 3. Supervision required.

Materials: Choose any previously used paper from recycling bin (or trash)

Materials Needed

- Variety of paper / cloth materials: copy paper, paper bags, fabric, scraps
- Dried flower petals (optional). For more info: <https://www.ealt.ca/kids-blog/flower-petal-paper>
- Scissors to cut paper into small pieces (or tear) less than 1" x 1"
- Plastic dish tubs – 1 small and 1 large (per team)
- Framed screen (such as bacon splatter guard or screen in a picture frame)
- Absorbent towels, rolling pin
- Iron
- Hand or electric blender or food chopper

Revised Explanation

Allow students to return to their original explanation and revise it to show what they have learned.

