How is Paper Recycled?

It is estimated that about half of all trash produced in the world consists of paper products. For this reason, recycling plays a crucial role in reducing the amount of waste, specifically paper waste, that may otherwise end up in landfills.

And we talk about recycling, but what does it look like when items are recycled? Maybe that looks like melting down what little is left of an old crayon to make a new one. Maybe it looks like old tires being shredded and turned into playground turf. In this lesson, students will get to recycle paper. They will also be able to watch a video to see how paper is made, to see the similarities between how paper is made and how it is recycled.

ILLINOIS SCIENCE STANDARDS

Next Generation Science Standards

- **K-ESS3-3** Communicate solutions that will reduce the impact of humans on the land, water, air, and/or other living things in the local environment.
    - **Science and Engineering Practices**: Obtaining, Evaluating, and Communicating Information; Analyzing and Interpreting Data
    - **Crosscutting Concepts** – Scale and Proportions
    - **Disciplinary Core Idea** – ESS3.C: Human Impacts on Earth Systems

Objective:

Given the lesson about where paper comes from, students will be able to identify materials such as paper that come from natural resources that we should work to preserve.

Materials and Resources:

- Notebook paper
- Stick
- Piece of wood like a board or block
- Vocabulary Cards
- Smartboard
- Drawing utensils
- Whiteboard or Chart Paper
- Construction Paper Scraps
- Drawing and coloring utensils

Materials and Resources for Optional Extension Activity:

- Rectangular cake pan
- Wire mesh screen (cut to be smaller than the cake pan)
- Mixing bowl
- Blender
- Rolling pin
- Water
- Paper towels or newspapers

Talk Moves
The curriculum writers suggest reviewing 9 Talk Moves to help aid in facilitating discussion between students as well as to elicit answers from individual students. The link can be found here.

Safety Concerns
Note: Instructors should maintain facility, school, and district policies regarding safety a priority when planning classroom lesson plans.

Vocabulary
- Forest: A large area of land covered with many trees and other plants.
- Recycle: To put through a process that allows used things to be reused.
- Litter: A mess of waste materials or other objects scattered about.
- Environment: The surroundings or conditions in which a person, animal, or plant lives.
- Pulp: Any soft, wet mass of material.

Career Awareness
- It is important to explain to students that you don't necessarily have to be the outdoorsy type to work to help the environment. There are so many careers out there to help the Earth. It is important to introduce students to jobs that they might not have heard of.
    - Environmental Engineer
    - Environmental Lawyer
    - Environmental Scientist
    - Environmental Educator
    - City, County, and/or State Solid Waste Management and Divisions
    - Hazardous Waste Management
    - Recycling Coordinators
    - City Planners
    - EPA Regulators

Accommodation
- Vocabulary cards will be included in the resource section of this text this will help assist students that need visual or textual language. These cards will also be available in .pdf form for easy access on devices for the classroom or printing for the educator.
- The educator can make concessions for the students that have accommodations for presenting in front of others, as they will be in groups this student can give their group peer feedback.
- Recordings of the exit slip and other materials will be made available on the Clean SoIL website for ease of access for those students with accommodations for hearing or read aloud.
- Further accommodations and modifications will be made available on the Clean SoIL website or within the printed resource section for the curriculum.

Engagement: (15 Minutes)
- To begin the lesson, the instructor will start by having students clean their desks. Ideally, this will happen at a time when students have accumulated a lot of paper.

- Students should be instructed to bring all their paper that they would normally throw out to the front of the class or a central location where it can be observed by everyone. Anything that is not paper can be thrown away.
    - Alternatively, if the instructor does not believe that this scenario would work well in their classroom, the instructor can either collect paper on their own or have students place papers they would normally throw away in a specific location.
- Once the paper has been collected and displayed for the class to see, the instructor will have their class look at all the paper they would normally throw away.
- The instructor will facilitate a discussion. Questions can include, but are not limited to:
    - Does the amount of paper here surprise you?
        - If so, why?
        - If not, why?
    - Can you name examples of paper you contributed to the pile?
    - What do we know about the paper we are seeing here?
    - How much paper do you think we use every day in the classroom?
        - How about every week?
    - What are your observations?
    - What do you wonder?
    - Based on all our observations and wonderings, what do you think the problem is?
    - Why do you think it is a problem?
    - What is a way we could figure out how much paper we throw out?

Exploration: (Over the course of several days)

- Next, the instructor will tell students that they are going to perform a waste audit.
- Things to note for the waste audit:
    - The teacher should identify a central location and container to collect paper from the classroom.
    - Depending on the school, the teacher may need to speak with janitorial staff to make sure they do not remove the paper.
    - The teacher should separate students into 5 groups.
- The instructor will instruct students that all paper that students would normally recycle or throw away should be placed in an instructor-chosen location in the classroom.
    - Make sure students know only paper should go in here. Watch out for tissues.
- At the end of each day for one week, a group of students will work with the instructor to record the number of papers that have been discarded for that day.
- After recording information for a week, the class will come together and talk about how much paper they threw out each day.
- The teacher will challenge students to see if they can use less paper over the course of the next week.
- Again, at the end of each day, a group will come up at the end of the day to work with the teacher to count and record how many pieces of paper have been thrown away.

Explain: (10 minutes)

- After the second week of recording how much paper has been thrown away, the class will come back together to compare their numbers from each day to see if they used less paper.

- If the class did use less paper, the instructor should ask questions that include, but are not limited:
    - What did we do differently?
    - Did anyone reuse paper? How?
    - Was it easy or hard to make these changes? Why?
- If the class used the same amount or more paper, the instructor should ask questions that can include, but are not limited to:
    - What made it hard to reduce the amount of paper we used?
    - Why did ____ make it hard?
    - Is there anything we didn't think about?
    - What ways could we make it easier to reduce paper?
- To encourage students to share and build on one another's ideas, the instructor can also use questions such as:
    - Can you say more about that?
    - Can you give us more examples?
    - Who could add on to what _____ said?
- Before continuing to the Elaborate section of this lesson, the teacher should ask the class:
    - Why is it important that we find ways to reduce the amount of paper we use?
    - Where does paper come from?

Note: It's important to note that one outcome is not necessarily more desirable than the other for the sake of this lesson.

Elaborate (10 minutes)

- The instructor will begin by holding up a piece of paper, a stick, and a wooden block. The instructor will ask the class where they think each item came from.
    - Students will likely recognize that the stick comes from a tree, but they may not realize that the piece of paper and the wooden block are both objects made from trees.
    - It is important to let students guess incorrectly.
- Once students have made their guesses, inform the students that the wooden block and the paper also come from trees.
- Ask students how they think a tree turns into paper. Have students take some guesses. Afterwards, ask students if they would like to learn how.
- Show this YouTube video: https://www.youtube.com/watch?v=uA56TLfEE9k
- After watching the YouTube video, the instructor should ask students questions including, but not limited to:
    - What did the video tell us about how trees are turned into paper?
    - Did anything in the video surprise you?
    - What new questions do you have?
    - What do you think some of the consequences are of not recycling paper?
    - Why is it important that we find ways to reduce the amount of paper we use?

Evaluate (10 minutes)

- To wrap up the lesson, the instructor will have students use recycled paper, construction paper scraps, markers, or other drawing utensils to illustrate why it is important to recycle paper.
- Students are welcome to create anything they want. They simply will need to explain how they used recycled materials in their creation and how those materials help reduce the amount of paper they use.
- Questions the teacher can use to prompt students in their explanation include, but are not limited to:
    - What recycled or scrap materials did you use to make this?
    - How did using those materials help you reduce the amount of paper you would have used otherwise?
- The instructor will then simulate a gallery walk so students can look at the work of other students.
- The creation can then be displayed in the hall for others to see.

Optional Extension Activity:
The instructor can choose to extend the learning by having students make their own recycled paper. For more information on creating recycled paper in your classroom, please visit Recycled Paper in the Classroom - Undercover Classroom.

References

Make your own recycled paper - activity. TeachEngineering.org. (2021, December 3). Retrieved December 8, 2021, from https://www.teachengineering.org/activities/view/make_recycled_paper.

NGSS Lead States. 2013. *Next Generation Science Standards: For States, By State*s. Washington, DC: The National Academies Press.