Creativity at the Core

Module 18

Reuse STEAM

Developed by Humboldt County Office of Education and SCRAP Humboldt

Section: K-2 unit: Part 2

Section Title: **Fibers at the Factory**

A Professional Learning Module Designed for: K-2 Teachers

CONTENT OUTLINE

Purpose:

In Part 2 students learn how paper is made and recycled. They also learn how recycling impacts paper fibers and look for evidence of recycled content in their paper samples.

Time: 1 hour

Grouping: Whole class and small groups

Standards:

Please see associated standards files

Slides: 15-42

Handouts:

"Handout Module 18 K-2 Graphic Organizer.pdf"
"Papermaking process images - Part 1.pdf"
"Papermaking process images - Part 2.pdf"

Materials:

paper samples that students collect, magnifying glasses and/or microscopes, Papermaking Process images handouts copied and cut into cards (one set for each small group), equipment necessary to view YouTube video

Media Resources:

See description in next section

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PROCESS/ACTIVITY

1. We know paper comes from trees, but ask students ***how*** a tree is transformed into paper. Using cards of photographic images from the paper manufacturing process, ask students to work in small groups to arrange them in sequence – from tree to finished paper.

2. Show students video footage of the paper making process and learn about the resources used to create a piece of paper.

♣ "How It's Made: Copy Paper", 4.5 minutes (Note that video uses the word "paste" instead of "pulp"): https://www.youtube.com/watch?v=9Kt5dHMBvYM)

♣ "From Tree to Paper: How It's Made", 1.5 minutes: https://www.youtube.com/watch?v=fZ3HQ9lBHuA

♣ This website is rich with information on the papermaking process and can help answer questions students may have: http://www.paperonline.org/paper-making/paper-production/papermaking

Read this description, provided by Wonderopolis, if needed to summarize and simplify the process.
http://wonderopolis.org/wonder/how-do-you-make-paper-from-a-tree
"Wonderopolis is brought to life by the National Center for Families Learning"

3. Students revisit their cards to check for accuracy and add input cards of WATER, HEAT, CHEMICALS where they are used in the process.

4. Students see video footage of paper being recycled and add additional cards to their sequence to allow for recycled content input.
"How It's Made: Paper Recycling", 5.5 minutes: https://www.youtube.com/watch?v=2c8YxMb0tlk

♣ *What steps in the process are not needed when paper is recycled? What resources are saved by recycling old paper fibers? Instead of all the steps making a straight line, do they now make a circle?*

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PROCESS/ACTIVITY

5. Students explore their collection of paper types to look for recycled content symbols and information. See samples and explanation of symbols in PowerPoint presentation.

♣ When a marketer says a product was made with recycled content, it should be able to show the product was made from materials recovered or separated from the "waste stream" and re-used. A manufacturer may use:

○ ***pre-consumer*** *recycled content from the manufacturing process. For example, paper scraps left over when envelopes are cut.*

○ ***post-consumer*** *recycled content from products that people or businesses already used. For example, newspapers, shipping boxes, magazines, etc.*

♣

If a product says it's made with recycled materials, look for specifics. Are the claims about the product, the packaging, or both? How much of the product or package is made with recycled content? Unless the product or package contains 100 percent recycled materials, the label should tell you what portion is recycled.

♣ The universal recycling symbol tells you a product or package is recyclable or was made with recycled content.

♣ *Do some groups have more recycled content than others?*
Is there a connection between recycled content and the descriptive words or strength test results for each group? When observing your paper fibers, did you see any evidence of recycled content?

Typically, paper used made from recycled content will have fibers of multiple colors (and/or remnant specks of ink) that are broken, jagged or bent in many places, and relatively short in appearance – a result of going through the paper making process multiple times. These fibers are often more weak, or have less "integrity", as a result. They are more common in disposable products (paper used for cleaning/hygiene, egg cartons, newspaper, chipboard – cereal and cracker boxes, and cardboard).
Each time a fiber goes through the paper making process it is "chopped" and becomes, literally, shorter. A singular paper fiber can make it through the process roughly ten times before it is too small to be captured by the screen where pulp is collected to make new sheets of paper.

♣ *Having learned that each paper fiber is chopped up by the recycling process and can only survive the process at most ten times (losing strength in each "life"), does paper strength correlate to recycled content?*