



5TH GRADE
STEAM & SOCIAL STUDIES



WASTE & RECYCLING
ZONE

DO NOT
CLIMB



TRASH TO CASH

Driving Question:

How can materials that would otherwise end up in the landfill be used to build infrastructure? What are the benefits of blending reused materials with other materials versus only using them in their original state?

Materials Needed:

Tetra Pak containers or similar packaging, sample of [ReWall](#), science journal or sketchbook, writing utensil, materials such as tire rubber, cardboard, plastic, etc., other materials such as water, glue or other substances to help create the new building material

In this lesson, students will:

- explore items that commonly end up in the landfill and come up with creative ideas for how to use them individually or mix them with other products to create a durable post-consumer building material.

National Learning Standards:

Science: 5-ESS3-1; 3-5-ETS1-2; 5-PS1-2; 5-PS1-4
Social Studies: III,h; X,d



SPINNING THE COCOON

Show the students the Tetra Pak containers and the ReWall sample, and ask them what they think the materials have in common. If the students don't mention it, explain that both are made from post-consumer products, although one is more of a homogenous mixture while the other clearly shows all of the materials that comprise it.

Show the class the *How It's Made* [video](#) on Tetra Pak and the production [video](#) for ReWall so they can see how recycled products can be mixed to create new, useful products. Ask students for ideas of other materials that can be recycled and what they can be recycled into. Have them elaborate on whether the new product is a mix of other products or one single recycled material, as well as explain how the materials might have changed from their original forms. Compile on the board a list of recyclable or post-consumer materials and their potential uses in infrastructure.

KERNEL OF KNOWLEDGE

It will take a plastic bottle 450 years to biodegrade naturally.



METAMORPHOSIS

Students will work in groups to identify a product they would like to create. It can be as simple as a food container or as advanced as a building material. Each group will use post-consumer materials as well as other items to create their product. The groups should take into consideration the unique qualifications of their product by answering questions such as, “Is this material safe for food products?” or “Is this product strong enough to stack in layers like you would bricks?” to help create a testable prototype. Students should document as they test different ratios and the outcome of each. Each group should record the percentage of each material in the final product as well as the steps they used to create the material. Students will present their final product and explain to classmates what materials and processes they used to create it.

THROUGH THE LENS



Instruct students to create a short video segment on Flipgrid to respond to the following questions: Landfills are getting larger daily across the United States, even with recycling efforts in effect in many cities. How can citizens reduce the size of landfills beyond just recycling? Is there a way to lobby government officials to limit the use of certain plastic products such as straws? If so, how?

UPCYCLE

Students will develop a marketing campaign for their new product. They will design an ad or film a commercial and sell three product prototypes to classmates. Consumers will test and review their product and may even improve upon the product to create competition in this new niche market.

Have students discuss how and why people have modified the environment since settling and moving west across the United States. It’s important to note that landfills were added to deal with waste build-up in cities. The long-term consequences, however, were not considered initially.



eARTh

Talk with your students about the power of advertising images. Show some examples of ads for products with which they may be familiar and talk about what they see in the images. What grabs their attention first? Did you have to tell them what the ad was for, or did they already know? If so, how did they know? Ask students, “Who is the intended audience? How can you tell?”

If the students already created an ad for their product, then have them create another one. If they have not, then they will now create two advertisements. They can work alone, or in pairs or small groups. Tell them to refer back to the examples that you looked at as a class and think about why they were or were not successful. They should create initial sketches, and then complete their final drawings on a sheet of drawing paper. Make sure they add color and keep the principles of design at the forefront of their design decisions. If needed, review these with the students.

Once they have finished with both ads, they will present them to the class and the class will vote on their favorite of the two. They should explain to the designer their selection of that particular ad. When everyone has finished, display the ads in the school and invite everyone to vote on the product that they would most likely buy.

Community Garden

- As a class, start collecting plastic bottles and jugs. Have the students bring them from home, and set out a box to collect them from the rest of the school as well. Don't forget about the cafeteria!
- Research online to find creative ways to reuse these plastic containers. Create some of these as a class and sell them!
- You can use the money to purchase the class a set of reusable straws or metal water bottles, or decide as a class what you would like to purchase to eliminate the amount of plastic waste you produce at school.



CAREER CONNECTION

Landfill Operator - Landfill operators have a variety of duties, including disposing of solid waste materials at landfills, operating heavy equipment such as bulldozer, front-end loader and compactor, and transporting solid waste materials. This career requires a high school diploma or GED and completion of a landfill operator certification course.

Recycling Sorter - Recycling sorters have several responsibilities, including sorting materials such as metals, glass, wood, paper and plastics into appropriate containers for recycling, cleaning and inspecting. They also perform routine maintenance or minor repairs on recycling equipment. Employers prefer to hire recycling workers who have a high school diploma. Some on-the-job training is also required.



CAREER HIGHLIGHT

Tetra Pak was founded by Ruben Rausing and built on Erik Wallenberg's innovation of a tetrahedron-shaped, plastic-coated paper carton from which the company's name was derived.

