What's in the Wrap?

sead : stem

Subjects

Earth Science

Topics

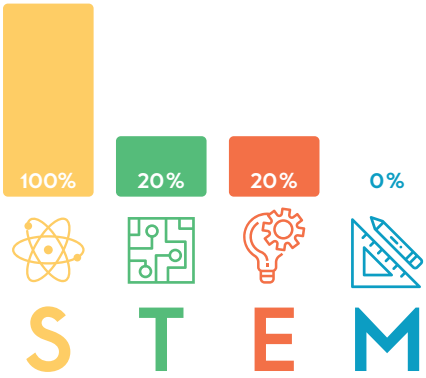
Packaging Materials | Solid Waste | Environment | Food Packaging | Repurposing

Key Words

Biodegradable | Non-Biodegradable | Recycle | Food Safety | Shelf-Life | Repurpose | Hydropulping

Connection to SDG

STEM Chart



Time for Activity

30 min. to two days

depending on the activity of choice

Introduction

Food packaging comes in many forms and sizes. Certain materials are used for food products for a number of reasons, which include, to avoid contamination and spoilage, and ensure safe transport, storage, and consumption.

The activity is designed to allow children of various ages to explore the materials used in packaging food. They will be asked to classify or group the packaging materials according to their perceived characteristics (texture, water permeability, type of material, etc.) and state the reasons for the groupings they have selected. From here, students will be encouraged to take a closer look at the food packaging and classify the packaging that they see based on what materials they are made of and what food are inside the packaging. They will then realize that similar food products may be packaged in a certain way (example, milk chocolate drinks, and juices are in tetra packs, dry food products like coffee and cereal in small amount may be contained in either sachets or aluminum wrappers or plastics, condiments in either plastic or glass bottles, chips in either cardboard tubes or sealed aluminum foil-like wrappers, etc.).

They can then open one product, a milk or juice tetra pack (and perhaps drink its contents) and examine the inside material being different from the outside material. They then conclude that depending on the contents, food packaging may consist of different layers of materials. They may also examine some food packaging that are made of one or two types of materials (beverages, mayonnaise, or condiments may come in glass bottles with tin caps, etc.).

Students are then encouraged to test the different properties of materials to explore their color, weight, texture, durability (strength), malleability, water permeability, among others.

They may infer that these materials are used in packaging food products for the purpose of protecting the contents from contamination and spoilage, and to make it convenient to transport and store, and safe to consume.

However, based on these observations and their learnings from the film, they will also conclude that many of these packaging materials may end up in landfills and the ocean, and may take a long time to decompose, thus posing a threat to terrestrial and marine life. Those in the higher grade

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levels may opt to proceed to an activity to further explore the layers of the tetra pack packaging of ready-to-drink beverages through the hydropulping experiment. This activity will strengthen their knowledge of food packaging being made up of a combination of biodegradable and non-biodegradable materials.

To cap the challenge, students are encouraged to pitch a project to design new packaging materials for certain food products, and may further go on with an extension activity to repurpose, and/or process certain packaging materials so that their use can be extended productively. They may propose new products like bags and wallets from tin foil sheets, vases and glass art from bottles and tin cans, floaters from plastic water bottles, etc.

A simple and fun activity to let students observe about the materials that are used for packaging food products. They will also be able to acquire the skills of classifying packaging materials by observing their physical properties, and infer why these are used for the products they contain. Students will be asked to perform activities by choosing which ones are appropriate for the food packaging materials they have.

Type Of Activity

Hands-on activities involving collection, classification, observation of physical properties of materials, and making inferences about why certain materials are used for particular food products. These inferences may be extended to developing ideas on what can possibly happen if food packaging wastes are not recycled, reused, or disposed of properly. There is also an option for advanced school aged students to subject milk containers (aseptic packaging or tetra packs) to *hydropulping* to be able to explore the layers of materials that go into the wrap. Based on their acquired skills, students are then asked to design products for different purposes from the food packaging materials that are just thrown away after their contents are consumed.

Fig 1

Food packaging come in many forms and sizes, and are composed of different materials. Common materials used are paper, cardboard, plastic, glass, tin, aluminum, and Styrofoam

Key Objectives

1. Observe and classify food packaging materials
2. Describe what type of materials food packages are made of
3. Explore some properties of the packaging materials
4. Infer why some packaging materials are used for certain types of food products
5. Infer the implications of having such materials as solid wastes in the environment
6. Discuss how to make responsible choices when buying packaged food products
7. Pitch an innovative product design or material that can make use of the food packaging materials (whether recycled/reused in its original form, or re-processed to suit its new intended use)

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Guiding Questions

1. What kind of materials are used in food packaging?
2. How many kinds of materials do you see in the packaging of one food products? Look for products that have several types of materials?
3. What are the characteristics of these materials used in packaging?
4. Why do you think the manufacturers of the food products chose to package them that way? What are the advantages of using such materials?
5. What are the disadvantages of using such materials?
6. What are the costs of using such materials to the environment? Can the packaging materials be recycled when everyone is through with it?
7. Can you think of other ways to package these food products?
8. Do you know of other food products in the market that use more environment-friendly materials? If so, describe how they are packed.
9. What are the various ways to avoid having so much of these packaging materials ending as wastes in our landfills, rivers, and oceans?

Basic Activities: What's in the Wrap – Part 1

Materials

Different packaged food products from the kitchen (milk tetra packs, plastic bottles, glass bottles, sachets of sugar/creamer/coffee/chocolate powder/oatmeal, food products wrapped in plastic bags, chips in foils and carton tubes, etc.)

Tasks

1. Gather about six items of food products in your kitchen.
2. Group them according to the similar characteristics that you see.
3. Explain to your group (your sister or brother) why you grouped them that way.
4. Look closely at the products and examine their characteristics . What materials are they made of?
5. Check out for any label about the material(s) , its contents, or how it should be disposed. What information do these packaging contain? Are there directions regarding storage, expiration date, nutrition information, etc. ?
6. Research on the meaning of the symbols that you may find on the label.
7. Now, try to explore the characteristics of the packaging materials used in the different items. Describe them as you would know, see, and/or feel them (hard, light weight, water proof, durable, perishable etc.).

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Use the table (columns 1-5) provided below.

Food Products (1)	Packaging Material(s) Used (2)	Information Found on the Label Regarding the Contents (3)	Information Found on the Label Regarding Packaging Material/Disposal (4)	Observed or known characteristics of the packaging material(s) (5)	Suggested Alternative Packaging Material(s) (6)

8. Can you think of other ways these food items can be packaged or contained? Write them using column 7 on the above table.

Advanced Activities (G5-10): What's (more) in the Wrap? – Part 2

Materials

1. Empty tetra pack cut into half
2. A large bowl with water

Procedure

Day 1

1. Submerge one half of their drink boxes in the water.
2. Leave it this way overnight.
3. Draw a diagram of the dry drink box portion. identify the layers.

Day 2

4. Observe the submerged juice boxes.
5. Draw a diagram of the drink box portion that has soaked in water overnight, identify the layers
6. What do you notice? Did the layers of material separate from each other ? If so, how many layers do you see and what could be done with them? If not, why not?
7. From the results of this experiment, what can you conclude about the idea of hydropulping? How do you think this basic experiment could be improved? (What could you do to get better results?) What types of things do you think engineers would need to consider in order to make this a useful recycling process?
8. Assume the role of a packaging engineer and design a sample of a "perfect" environmental package for an item that currently has non-environmentally friendly packaging (perhaps

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use one of the items you have from your kitchen). Explain the product and how it is currently packaged. Provide an example (if possible) of the new packaging that you suggest and explain why the new package is more environmentally appropriate. Explain the pros and cons of the "new" packaging compared to the original packaging. Pitch your project and record in a video. Post on your social media account.

Fostering Discussions

What type of packaging materials may be used as alternative to those which you think are not eco-friendly? How can you contribute to reducing the wastes coming from these food packaging materials?

Possible Extensions

Students may also pitch for other ways to repurpose packaging materials to produce items that they can use or sell for added income (e.g., plastic bottles and tin cans as pot/planters, seedling bags from plastic or foil wraps of chips and egg trays, gift bags, pencil holders, decorative items, fashion jewelry, art deco, etc.)

Authors/Source
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Most Essential Learning Competencies (Science), Department of Education. 2020. .
https://www.teachengineering.org/activities/view/cub_environ_lesson05_activity1

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