

Transporting Goods: Packaging Bananas

Wheels & Things: Transporting Goods by the National Industry Education Forum (NEIF).

Revised by Joan Chadde, Michigan Technological University.

Grade: 4-7

Lesson Overview

Students examine four different modes of transportation used to get goods to market and design suitable packaging. They choose one type of material – bubble wrap, felt, paper, saran wrap, craft foam sheet, cardboard, etc. to package a clay banana and then test it by dropping it from two feet above onto rough rocks to see if their package was effective at preventing ‘bruising.’

Learning Objectives

At the end of the lesson, students will be able to:

1. Explain the role of transportation in the exchange of goods and services.
2. List four modes of transportation and advantages and disadvantages of each.
3. Why is packaging of goods important to the producer of the goods and to the consumer of the goods? Give examples of fragile items for transportation.

Duration: 35 min

Materials required:

Per Class

Map of United States showing shipping ports, rail lines, highways, cities

Poster of 4 modes of transportation & packaging materials

Cards with names of fragile items for transport

Dry erase markers (optional - to write on whiteboard)

Newsprint page to post: table of Advantages & Disadvantages of 4 Transportation Modes

Newsprint page to post with “What Information do you need for designing appropriate packaging? (or write on board)

Engineering Design Process poster

Shoebox-sized clear plastic tub with a single layer of angular (rough) gravel

Per Team

Student page with table of Advantages & Disadvantages of 4 Transportation Modes

Student page with question: *What Information do you need for designing appropriate packaging?*

½ sheet paper & pencil

Plastic shoebox tub (to carry choice of supplies)

¼ Modeling Clay stick (buttersticks-yellow) shaped like a banana

Masking Tape

Scissors

Washable markers (optional)

Advance Preparation



Set up table with various types of packaging – bubble wrap, felt, paper, saran wrap, craft foam sheet, cardboard, etc. for students to choose from.

Background

Packaging refers to the container or wrapper that holds a product or group of products. Most commercial packaging serves two basic functions: protecting the product from damage during shipping, and promoting the product to the ultimate consumer. Some common types of packaging include shipping cartons, containers for industrial goods, and bags, boxes, cans, and other holders for consumer products. Packaging is of great importance to both sellers and buyers of products. It can prevent spoiling, breakage, tampering, or theft; enhance convenience in use or storage; and make products easier to identify. A significant improvement in packaging can even create a "new" product by expanding the ways in which it can be used, and thus its potential markets. For example, a soup that is packaged in a microwavable bowl might suddenly increase its sales to working people. Read more: <http://www.referenceforbusiness.com/small/Op-Qu/Packaging.html>

Vocabulary

Logistics is the **management** of the flow of **resources** between the point of origin and the point of consumption. The resources managed in logistics can include physical items, such as food, materials, equipment, liquids, and staff, as well as abstract items, such as time, information, and energy.

A **supply chain** is a system of organizations, people, activities, information, and resources involved in moving a product or service from **supplier** to **customer**. Supply chain activities transform natural resources, **raw materials**, and components into a finished product that is delivered to the consumer/customer.

Package engineering is a field of study that designs packages for products. A package engineer must design a package to sell an item and protect the product. Engineers develop packages from a wide variety of rigid and flexible materials. You can get a degree in designing packages!
(Note: Michigan State University had the first package engineering degree program in 1952)

Transportation engineering is the planning, design, operation and management of any mode of transportation in order to provide for the safe, efficient, rapid, comfortable, convenient, economical, and environmentally compatible movement of people and goods.

PROCEDURE

Introduce yourselves---name, major, university, career possibilities. **(2 min)**

Attention-Getter (optional) – Look at the label on your clothing or on your notebook or some other nearby item. Where was this item made? How did it get to you?

Activity Steps

1. Display a map of United States showing shipping ports, rail lines, highways, cities. Ask students how cargo and people move around the country?

- Ask students to list four modes of transportation---raise your hand and tell one mode: trucking, rail, maritime shipping, and air. What transportation modes will a product coming from China need to use to get to you?
- Handout **student page** and ask teams or families to write at least one advantage and disadvantage for each mode of transportation. When families have finished, ask them to share their ideas as you write their responses on the board.

2. Packaging Engineering (3 min)

Packaging has become an essential part of the transport of goods and helps make sure products arrive safely, unspoiled, and undamaged. Students will imagine that they are **packaging engineers**. Producers come to them for help for packaging their products in preparation for transport.

What are some of the challenges of shipping various items? Handout product cards (1-2 per group) and ask family teams/students to discuss in small groups and record their ideas in the form provided (*Transporting Goods: Packaging Bananas*).

- crystal vase
- bottled soft drinks
- fresh tomatoes
- wind turbine
- fresh-cut flowers
- ice cream
- flat screen TV

When families have finished, ask them to share their ideas as you write their responses on the board.

3. What Information do you need for designing the appropriate packaging for an item?

Have family teams/students discuss in small groups what they would need to know about a product and its destination in order to design the best package. Write their ideas on the student page provided. Ask them to share with the larger group. **(5 min)**

Here is list of possible considerations:

- type of product (fragile, bulky, use, alive)
- contents of the product (will it burn, spill, poisonous)
- speed of delivery (how far, how long)
- conditions enroute (temperature, moisture, air pressure, bumpy v. smooth)
- size & weight
- value of the product
- whether item needs to be dry or wet/moist

What materials can be used for packaging? Brainstorm a list of possible packaging materials

---paper, plastic, airtight, padding, cardboard, etc. Write on the board.

4. Your Challenge: How can you get bananas from a plantation in South America to your home without bruising or damaging them? (12 min)

Show the *Engineering Design Process* poster (Ask; Imagine; Plan; Create; Improve). Students will follow these steps to design a package for the <clay> banana that will protect it from bruising. We will test our packages by dropping them two feet onto rough rocks.

- Each group needs to “imagine and plan” their package. What sort of package will you make? Each group may choose only ONE packaging material to wrap their clay banana. Packages should measure no more than 2 inches x 3 inches.
- Once students have a plan, they should raise their hand and instructor will look at their plan. Next, they can bring their plastic shoebox tub to the supply table and pick up some tape and their chosen material.
- Have students test how well their packages protect their “banana” by bring it up front to a tub of angular gravel on the front table/desk. Using a meter stick to measure, have students drop their banana package from 2 feet onto the rocks. Have all of the students open their packages to see if there are any indentations in the clay banana that would indicate “bruising.”
- If time allows, have students improve their packages. If they were successful, they should try to use less material and make a smaller package—to save money and natural resources? Packaging engineers are always looking for ways to save on costs!
- How could you make your banana package look attractive, so a person wants to buy it?

5. Evaluate the packages. Which ones worked? Did not work? What improvements can you make for next time? Engineers are always making improvements! **(3 min)**

Learning Assessment (3 min)

1. Why is transportation of goods important to us?
2. List four modes of transportation and at least one advantage and disadvantage of each.
Air – fast but expensive.
Rail – take goods inland where there is no water, and carry more than trains.
Maritime shipping – most efficient way to move large amounts of bulk cargo like oil, sand, gravel, limestone, liquids/oil across the ocean and/or along the coasts.
Highways – can transport relatively small amounts of cargo to inland locations
3. Why is packaging of goods important to the producer of the goods and to the consumer of the goods? Give examples of fragile items for transportation.

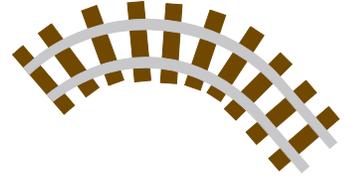
Clean Up

Unpackage “banana.” Ask students to put all leftover supplies into their plastic tub. Put scraps in wastebasket. Save the clay bananas to be reused.

Extension Transporting, Packaging and Storing Jobs - Ask the class what different jobs are involved in packaging, transporting and storage of a product. Students list the jobs in alphabetical order. Ask them to try to use at least 18 letters of the alphabet.

Transporting Goods:

Write at least ONE advantage and disadvantage for each mode of transportation.

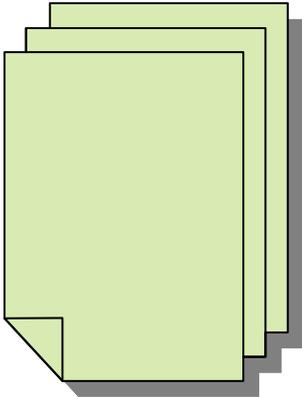


	Truck	Rail	Airplane	Ship
Advantages				
Disadvantages				



What information do you need to design appropriate packaging for these items?

Fresh-cut Flowers	Flat Screen TV	Fresh Tomatoes	Bottled Soft Drinks



Flat Screen TV	Computer
Bottled soft drinks	Wind Turbine
Fresh Tomatoes	Ice Cream
Fresh-cut Flowers	Fresh-cut Flowers