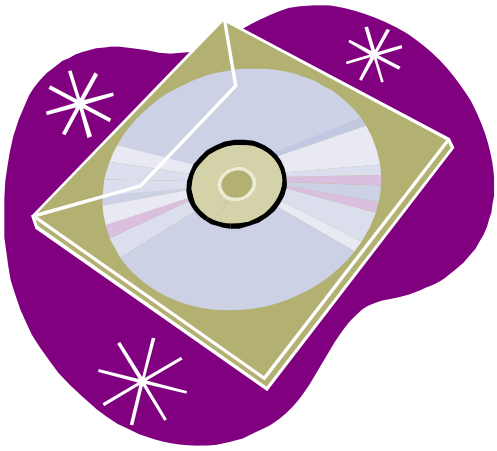
Packaging Your Product!

SF Environment
Our home. Our city. Our planet.
A Department of the City and County of San Francisco

Grades 7-12

Lesson Summary:

Students examine product packaging and identify its various purposes. Students then design alternative packaging that uses fewer natural resources and minimizes waste and litter.



Overview:

In this lesson students will:

- Discuss the functions, benefits and drawbacks of packaging.
- Design alternative packaging for various products.
- Learn and write an analytical essay on how local municipalities are dealing with the issues of packaging and litter.

Time:

15-20 minutes to prepare. 2 – 45 minute lessons.

Preparation:

- Read the background information.
- Ask students to bring in 1 to 3 examples of products with packaging

Background:

We all buy stuff, and most of that stuff comes in packaging. Whether it's a sack of potatoes, sneakers in a shoebox, or styrofoam and plastic enclosing the newest electronic gadget, packaging comes with almost everything.

Packaging has its uses and benefits, as well as its drawbacks.

Manufacturers prefer packaging that not only protects their product, but also appeals to the customer and draws the buyer in. Packaging often identifies the product, as well as provides advertising.

Furthermore, some packaging is required by law. For example, the US Food and Drug Administration requires that packaging for foods and medicines be designed to prevent harmful tampering. Other times, it's beneficial to have packaging that will protect the product from damage and

Vocabulary:

- Post-consumer recycled content
- Polystyrene
- PVC

Materials:

- Examples of products with packaging, i.e.
  - Potato chips
  - Electronics
  - CDs
  - Health & Beauty products
- Photocopies of *Oakland* and *San Francisco* news articles (see attached)
- Photocopies of *The Good and the Bad: Packaging Facts* and *Be A Package Designer!*

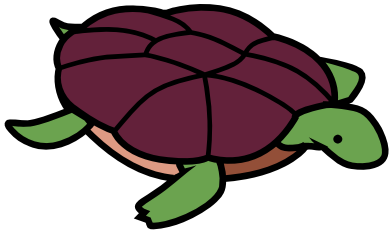
spoiling. Packaging can increase the ease of transportation and storage, and lengthen an item's shelf life.

Since manufacturers aren't the ones responsible for disposal and clean up however, they rarely consider what happens to the package *after* the product has been purchased. Though some packaging is useful, much of it can also be excessive and problematic, for the following reasons:

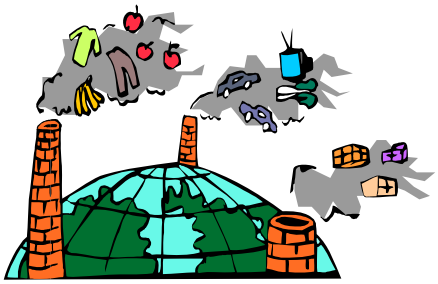
Trash
Packaging is the largest component of household waste. It makes up over one-third of the nation's waste stream. All of this trash is destined for the nation's landfills.

Natural Resources
All packaging, including cereal boxes, cookie tins, or plastic wrappers are made from natural resources, such as trees, minerals and petroleum. Packaging requires large amounts of fossil fuels, water and electricity for manufacturing, as well as energy and space for transportation, disposal pick-up and land filling.

Litter
Packaging accounts for a large portion of litter in our environment. Litter in our streets is ugly to look at, attracts pests and bacteria, clogs storm drains, and costs cities like San Francisco approximately $26 million a year to clean up. Furthermore, much of this litter travels to waterways and oceans, where it then harms marine and wildlife.



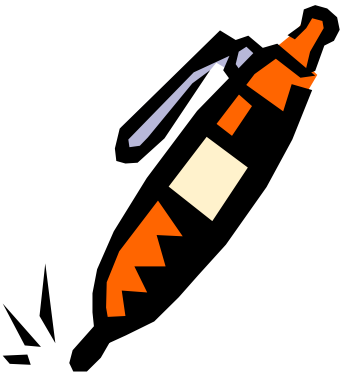
Wildlife
A large amount of the trash and debris in our planet's water is made of synthetic, non-biodegradable materials, the most common being plastic. More than 46,000 pieces of plastic contaminate each square mile of the Earth's oceans. Many animals eat plastic, mistaking it for food. Due to either ingesting plastic, or getting entangled in it, up to a million sea birds and 100,000 sea mammals such as dolphins, whales, and sea otters die each year, as do many sea turtles and countless fish.



Toxicity
Plastic is toxic to produce and toxic when it breaks down. Some types of plastic are cancer causing, especially when with

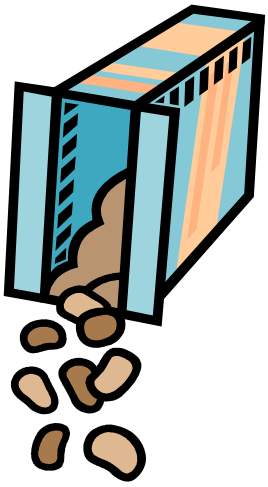
heat, time or harsh detergents, they migrate from packaging into our food and water. Even hard plastics, such as baby bottles, have been shown to leach chemicals that are hormone system disruptors. Some plastic food wraps and flexible plastic containers are made from **poly vinyl chloride** (PVC). PVC can cause cancer, birth defects, genetic changes, vision failure and liver dysfunction, and also creates toxic byproducts in its manufacturing. When PVC is burned in incinerators it creates Dioxin, a strong carcinogen that accumulates in the body.

Given the damaging consequences of packaging, we need to identify which packaging is really needed from that which is excessive. Generally, packaging is considered excessive when it is purely for the convenience of the retailer or consumer, used only for advertisement, or is not related to protecting contents from being spoiled or damaged. For example, when buying a pen, is it really necessary to have it packaged with plastic on the front and cardboard in the back?



One way to reduce packaging is for federal and state governments to create regulations that promote the use of reusable, recyclable, and compostable packaging that is not harmful to the environment. These regulations can take the form of container deposits, financial incentives, and bans on specific packages. Even municipal governments have the power to change packaging. The city of Oakland, California recently passed a ban on **polystyrene** (commonly known as Styrofoam) restaurant take-out containers, decreeing that compostable containers must be used in its place when comparable in cost. Citizens can propel their governments in passing these types of laws through political participation and support.

Another way to improve packaging is to encourage manufacturers to voluntarily reduce packaging and create new packaging that is less harmful or wasteful. Consumers can play an important role in determining the types of materials used in packaging. We can buy products that are packaged properly but minimally or are packaged in materials that are either recyclable or compostable, and made from recycled materials. If consumers stop buying products that are over packaged and wasteful, manufacturers will have to respond by modifying their product's packages to reflect these concerns and demands.



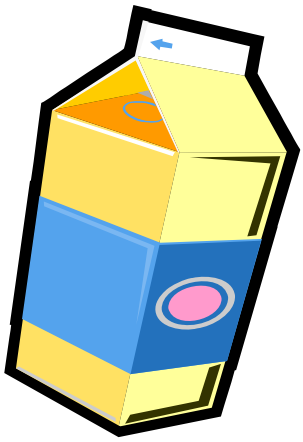
When we buy something, we also buy the packaging. We can all be better consumers and avoid purchasing over-packaged items. We can also make sure that packaging does not become litter, and that packaging is reused, composted or recycled. If it is waste, we need to dispose of it properly. By thinking about what our stuff is packaged in, we can start making better choices that can help protect our planet.

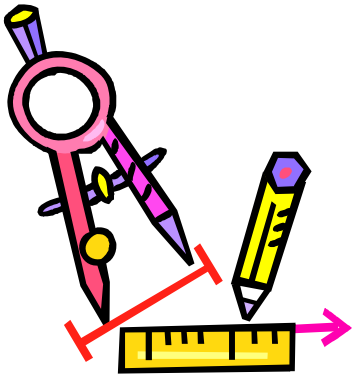
Procedure:

1. Ask students to bring in 1 to 3 examples of products with packaging.
2. Distribute the worksheet, "Packaging Pros & Cons." Show 2 to 3 examples of packaging, using the samples everyone has brought. Using the worksheet as a guide, discuss the functions, benefits and drawbacks of the packaging. Analyze and discuss the following:
   - What are the most important packaging needs for this product (*sanitation, breakage, freshness, etc.*)?
   - Is the package designed for easy transport? Can many of them fit easily into a box or unit container?
   - Is the package safe for workers who are handling the product?
   - For what other reasons does the package seem to be designed? (*i.e. function, consumer safety, advertising*)
   - Is all or part of the package necessary? Why or why not? For instance, a bottle is an example of a package that is necessary for storing liquid. A plastic wrapper on top of the bottle may not be necessary. How could this be designed to use fewer materials?
   - What kind of packaging material was used? Are the packaged materials recyclable themselves or made from recycled material? Are they compostable? How do we know?
   - Is the package reusable? Could it have been designed for reuse?
3. Distribute the worksheet, "Packaging Materials." As a group, examine the products your students brought to class.
   - Could these items have used less packaging? Discuss alternative packaging methods for these items.
   - Could they have made the package from a recyclable or compostable material?
   - Could they have chosen a material made from a renewable resource (*trees or kenaf*) or a recyclable one (*glass*), in place of a non-renewable resource (*petroleum*)?

- Did anyone bring in identical items that were packaged differently? Do they contain the same amount of the product? If not, can students think of examples where the product can be purchased in different packaging?

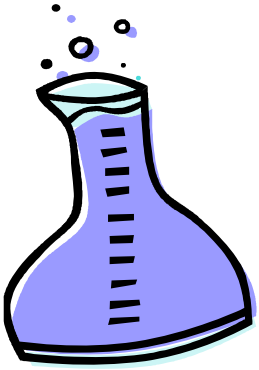
4. Use the worksheets as a guide and compare the different ways that identical products are packaged, such as:
   - Rope tied around firewood, firewood sold in plastic net bags, and compressed logs wrapped in paper.
   - Newspaper vs. polystyrene peanuts stuffed in a shipping box.
   - Glass milk bottles, paper milk cartons, and plastic milk jugs.
   - Meats wrapped in butcher paper vs. on a foam tray with plastic wrap.
   - Individual serving-size packages of potato chips and potato chips sold from a large bag.
5. Have students choose three items from the collection that was brought in and fill out the *Packaging Design Student Worksheet*.
6. For one package, have students develop additional design specifications. Have them describe what material their package will be made of and what natural resource is used. Encourage creativity. Students can produce a 3-dimensional model, a drawing, or a package label to illustrate their idea for improved packaging.
7. Have students present their prototype package to the class. What was the reasoning behind their designs? What material was used? Is it from a renewable or nonrenewable resource? What will be written on the outside of the package? The design should include information explaining how the consumer can reuse and/or recycle the package.

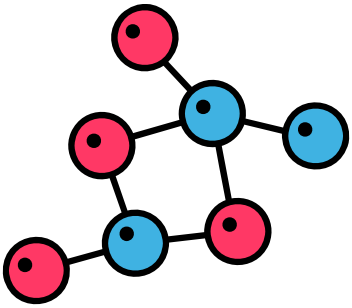


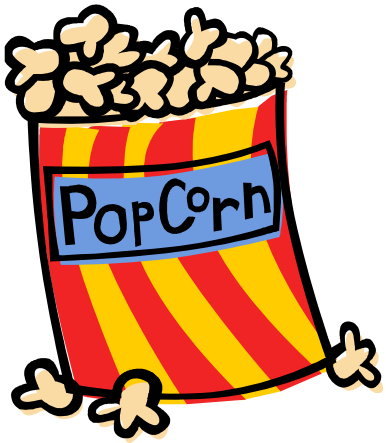


Part III

1. Have students read the following *Oakland* and *San Francisco* news articles. Then, either based solely on the articles or on additional research, have students write an essay on whether or not San Francisco should pass its own ban on polystyrene packaging, while considering the following questions:
   - What reasoning do legislators provide for banning styrofoam? Why would certain groups be against such a law?







- Do you agree or disagree with the arguments on banning polystyrene containers? Why?
- Are there any specific concerns or counterclaims?

Extensions:

- Write a letter to the manufacturer of a poorly packaged product explaining that your class does not support the practice of over-packaging and offer suggestions on how the packaging can be changed. Write a second letter to the manufacturer of one of the products identified as having a better package, congratulating them on their design and explaining why your class preferred their package over the competitors. Encourage your students to share their innovative packages with the manufacturer of their product.

- *Chemistry*: Collect samples of polystyrene and cornstarch packing peanuts. Create experiments where students try dissolving both in water; have students record their observations. Then have students dissolve the styrofoam peanuts in acetone. Students may record the PH balance of the acetone and the water before and after the peanuts are placed in, in order to show how neutral, acidic or basic the liquids are. Here are some discussion questions to consider:
  - What are both materials made from? *(Synthetic polymers, versus corn)*
  - What happens to it after it is used? (*Polystyrene is sometimes reused but mostly goes to landfills, and decomposes at a very slow rate, sometimes taking up to 1,000 years. Corn-based peanuts easily dissolve, and can be composted or flushed down the sink.)*
  - Is purchasing packaged peanuts even necessary at all? (*maybe yes, maybe no*)
  - Does it depend on the item that you're packaging?
  - What other materials could you use instead to pack things? (*old rags, crumpled newspapers, air popped popcorn*)

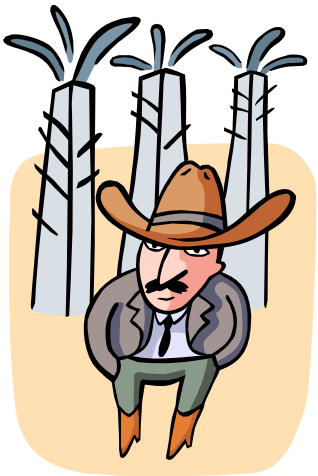
The Good and The Bad...
Packaging Facts

BENEFITS

1. PROTECTS CONTENTS FROM DAMAGE
2. IS SANITARY
3. IDENTIFIES CONTENTS
4. PREVENTS OR REDUCES THEFT
5. PROVIDES INSTRUCTIONS FOR PROPER USE
6. ADVERTISES PRODUCT
7. IS CONVENIENT FOR CONSUMER AND/OR RETAILER
8. MAKES PRODUCT TRANSPORTABLE
9. DECREASES WASTE FROM SPOILAGE AND HANDLING
10. DECREASES WASTE FROM STORAGE

CONSEQUENCES

1. OFTEN ENDS UP AS LITTER AND DEBRIS ON CITY STREETS, BEACHES, WATERWAYS AND OCEANS
2. LITTER AND DEBRIS HARMS AND KILLS HUNDREDS OF THOUSANDS OF BIRDS, FISH AND SEA MAMMALS EVERY YEAR
3. CONSUMES ENERGY FOR PRODUCTION (GAS, OIL, WATER, ELECTRICITY)
4. CAN LEACH CHEMICALS AND PRODUCE TOXIC WASTE
5. CONSUMES AND WASTES NATURAL RESOURCES
6. CAN MISLEAD CONSUMERS REGARDING QUANTITY AND QUALITY OF A PRODUCT
7. INCREASES THE COST OF THE PRODUCT TO THE CONSUMER
8. OFTEN COSTLY FOR CITIES TO CLEANUP
9. DISPOSABLE PACKAGING FILLS UP LANDFILLS



Be A Package Designer!

What makes "good" packaging? When is a package wasteful? Can we ever "close the loop" or re-use some types of packaging endlessly? Read the following standards, and start examining the packaging you see in stores, in your trash, and on the streets.

Less Wasteful

- Uses as little packaging as possible to preserve product
- Packaging contains large amounts of product
- Packaging made from renewable resources (paper packaging made from trees or plants such as kenaf or hemp; bio-plastics made from corn or potato starch)
- Packaging contains recycled content, especially post-consumer recycled content
- Reusable packaging
- Recyclable packaging
- Compostable packaging

More Wasteful

- Excessive packaging
- Small quantity of product per package
- Packaging made from non-renewable resources (plastic or foam packaging made from oil; metal packaging made from minerals)
- Packaging made from virgin materials or containing little **post-consumer recycled** content
- Non-recyclable or difficult to recycle packaging (plastics)
- Non-compostable packaging

List three items brought in by students and fill out the following chart.

Item and packaging description	**Recycle, compost or trash?**	**How could this item be packaged less wastefully?**	**Is there another seller of the same type of product that is packaged less wastefully?**
1. Brand Q calculator packaged with clear plastic on top, and cardboard backing	**R**- paper separated **T**- plastic cover	Sell the calculator by itself. If there needs to be information on instructions for use, have a folding sticker	Yes—Brand X calculator packaged in a box.
2.			
3.			
4.			

OAKLAND

Ordinance outlaws Styrofoam
Food vendors have to be in compliance by 2007

22 June 2006

Expect your mashed potatoes and coleslaw from any KFC in Oakland to come in a different, more environmentally friendly container next year.

The Oakland City Council voted early Wednesday morning to ban restaurants and other food vendors from using polystyrene foam -- more commonly known as Styrofoam -- containers in the city by 2007. The measure, proposed by Councilwoman Jean Quan, also requires all food vendors to use only biodegradable and compostable materials -- as long as such alternatives exist at the same price or less.

Enforcement of the ordinance would be complaint driven, with citations costing food vendors as much as $500.

The plastic foam ban and move toward biodegradables should help Oakland achieve its waste goals of having only 25 percent of trash go to landfills by 2010.

Quan said the ban was necessary in Oakland because, along with the general litter problems, Styrofoam also poses a real threat to the city's waterways. Polystyrene foam accounts for 15 percent of the litter collected in storm drains.

Quan also points out that polystyrene poses a harmful threat to wildlife, because it breaks into smaller pieces, which looks like food to many species, and is then ingested. Approximately 100,000 marine mammals, not including sea birds, die each year from eating or getting entangled in plastic debris.

But Johnnise Foster Downs with the California Restaurant Association, said the new ordinance is just another example of Oakland trying to blame restaurants for the city's ills. Earlier this year, city officials imposed a litter tax, targeting mainly fast food restaurants, to fund litter cleanup crews.

"Restaurants are being made the scapegoat for Oakland's litter problem," Foster Downs said.

Litter is often due to illegal items such as tires being dumped by small business. Other leading causes of litter include residents and pedestrians throwing objects such as cigarette butts, paper, chewing gum, as well as fast food packaging.

She said the ordinance hurts some restaurants because it not only bans Styrofoam, but also makes restaurants have to find biodegradable and compostable alternatives. She said similar bans on polystyrene foam, such as the one in Portland, did not make restaurants find alternatives that would break down. She added the ordinance also might pose a health risk because polystyrene foam is regarded as the best material restaurants can use to keep foods hot or cold.

SAN FRANCISCO
Styrofoam ban for restaurants proposed for '07
Business owners split on forced switch to eco-friendly options
June 27, 2006

Board of Supervisors President Aaron Peskin is submitting the Food Service Waste Reduction Act, an ordinance that would require city restaurants and city departments to stop using Styrofoam and other brands of polystyrene. The manufacturing of the material involves polluting chemicals, and it is blamed for cluttering landfills.

The ban would take effect Jan. 1, 2007.

"Polystyrene foam products rely on nonrenewable sources for production, are nearly indestructible and leave a legacy of pollution on our urban and natural environments," Peskin said Monday. "If McDonald's could see the light and phase out polystyrene foam more than a decade ago, it's about time San Francisco got with the program."

Peskin's legislation would exempt catering companies and nonprofits such as soup kitchens. But it would apply to about 3,400 restaurants, while also requiring the city to provide a list of biodegradable and compostable alternative materials for food vendors to use.

About 7 million pounds of polystyrene are used each year in San Francisco for food service purposes.
City Hall's new rules would seem at odds with the myriad restaurants that have helped secure San Francisco's reputation as the West Coast's premier dining location. But Kevin Westley, head of the Golden Gate Restaurant Association, said most of the city's eateries are a step ahead on plastic foam products.

"I actually think it's a pretty good idea," he said. "(Polystyrene) causes pollutants when it's made. It's a pollutant itself because it's not biodegradable. There are many other alternatives, such as waxed paper, waxed cardboard, heavier paper products. There really shouldn't be a need for Styrofoam."

But some segments of San Francisco's restaurant industry might be less prepared for a ban on the containers.

"A lot of small businesses would be affected, especially those restaurants on Stockton Street, which all do takeout business," said Pius Lee, head of the Chinatown Economic Development Group. "I think it would upset them. It's a surprise to us."

Nathan Nayman, director of the Committee on Jobs, a lobbying group for big business in San Francisco, accused Peskin of drafting his legislation to satisfy environmentalists without any consideration of what it will cost companies.

"There's a mind-set at City Hall that says, 'Let me work behind closed doors in smoke-filled rooms with a special interest -- without speaking to the entity that will suffer the consequences,'" Nayman said. "There used to be a time when policymakers in San Francisco brought everyone around the table."

Asked why the city has waited so long to ban the use of polystyrene, Jared Blumenfeld, director of San Francisco's Department of the Environment, said city officials wanted to make sure whatever replaces the plastic foam is a better material.

"We want to be sure we're not pushing people from Styrofoam to something worse." Blumenfeld said Peskin's legislation should give businesses and suppliers of alternative food container products time to shift away from plastic foam.

"We're certainly excited," he added.