

Biodegradable Plastic From Corn

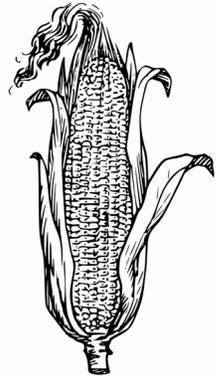
*A lesson from the New Jersey Agricultural Society
Learning Through Gardening program*

OVERVIEW: So many things are made from corn, even plastic! Prove this to your students by showing them how to make plastic from corn starch and corn oil. Discuss how this type of renewable resource benefits everyone.

GRADES: K-5

OBJECTIVES: The student will be able to:

- Describe an environmental reason for using corn as a source for the production of plastics
- Explain the difference between a nonrenewable resource (plastic from oil) and a renewable resource (plastic from corn)
- Make a sample of plastic from corn



INTRODUCTION:

Explain that plastics made from nonrenewable oil products last for thousands of years in our environment because they do not break down or decompose. Because they do not decompose, these plastics take up valuable space in our landfills. Our landfills are filling up fast.

To help alleviate this problem, researchers have invented a biodegradable plastic made with cornstarch. Plastics made with cornstarch will break down and not take up space in landfills. Plus, the added benefit is that biodegradable plastic is made with a renewable resource – corn. Corn is produced every year, unlike oil. Oil is a nonrenewable resource because we only have a certain amount of it. Once we have used our oil reserves they will be gone. Corn can be grown every year and used to make more biodegradable plastic products.

There are more than 3,500 different uses for corn products and more uses are being found every day. Many of the new products, like paint or fuel, are more environmentally friendly than petroleum (oil)-based products.

Explain that today the students will make a simple biodegradable plastic using nothing but corn products and water.

MATERIALS: (for 30 students)

Microwave
2 cups of cornstarch
 $\frac{1}{4}$ cup corn oil
2 cups water
30 resealable baggies
1 box of food coloring
Medicine droppers
Measuring tablespoons



Procedure for Making Biodegradable Plastic:

Mix 2 tablespoons of cornstarch, 2 tablespoons of water, and 2 drops of corn oil in a resealable baggie.

Add 2 drops of food coloring to the mixture.

Seal the bag tightly and knead the contents until they are well mixed and no cornstarch lumps are seen.

Heat the baggies in a microwave for 20-30 seconds at a high setting.

NOTE: Do not microwave all the baggies at the same time; they will not become hot enough. Only microwave three or four baggies at a time.

Allow baggies to cool.

Students can create shapes with the biodegradable plastic.

Class Discussion:

Compare this biodegradable substance to other plastics.

What could you make out of this plastic if you let it harden? Remember that it will dissolve eventually. (For example, golf tees, plastic plates and cups, and packing peanuts are already being made from corn.)

EVALUATION:

Student explains why it is important to find other forms of material and fuel instead of depending on oil.

Student will be able to explain the difference between a renewable and nonrenewable resource.

EXTENSIONS:

Pass out the *Things Made From Corn* sheet and discuss the products listed. What products are familiar to the students? What products are they surprised to see on the list?

Send home the *Corn Products Found in the Home* sheet for homework and have students search their own cupboards for corn products.

Do the Pick a Peanut experiment. Drop a packing peanut made of Styrofoam and one made of biodegradable plastic into water and see what happens. Which packing peanut is better for the environment?

New Jersey Learning Standards

Science: K:ESS3.C 1:LS1.A 2:LS2.A 3:ESS2.D, LS1B 4:LS1.A
5:ESS1.C, ESS2.D

Social Studies: K-2: 6.1.2.EconEM.1, 2, 6.1.2.EconNE.1
3-5: 6.1.5.EconEM.1, 2



Things Made From Corn

Products that use corn include:

Adhesives	Insecticides
Aluminum	Instant coffee & tea
Antibiotics	Insulation
Aspirin	Jams, jellies, & preserves
Baby food	Ketchup
Biodegradable plastic	Latex paint
Breakfast cereals	Licorice
Candy	Lipstick
Canned vegetables	Livestock feed
Carbonated beverages & soda	Maple syrup
Chalk	Margarine
Cheese spreads	Marshmallows
Chewing gum	Paper plates & cups
Chocolate products	Peanut butter
Coatings on wood, paper, & metal	Potato chips
Corn chips	Rubber
Corn meal	Rugs & carpets
Cosmetics	Salad dressings
Crayons	Shaving cream & lotions
Dessert powders	Shoe polish
Disposable diapers	Soaps & cleaners
Dry cell batteries	Spark plugs
Dyes	Tacos & tortillas
Edible oil	Textiles
Ethanol	Wallpaper
Finished leather	Wheat bread
Flour & grits	Windshield wiper fluid
Frozen food	Yogurts
Fructose	

Name _____

Corn Products Found in My Home

Search around your house for different corn products. List corn products that you find. Some key words to look for on labels are: cornstarch, corn syrup, dextrose, high fructose corn syrup, and corn oil.

Pick A Peanut Experiment

Packing Peanuts can be made from styrofoam, a non-biodegradable material made from petroleum. (Gasoline is made from petroleum). Packing peanuts can also be made from corn, which will decompose naturally. Which packing peanut is better for the environment?

Procedure:

1. Examine both packing peanuts. How are they the same? How are they different?

2. What tests can we do to determine which is the one made from corn?

3. Predict what will happen when each packing peanut is stirred into water. Stir each packing peanut into water and record your observations below.

4. Which packing peanut is better for the environment? Why?
