

# Soy, the Super Bean

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

OVERVIEW: This soybean experience will show students how the abundant protein of soybeans is included in our diets and well as the myriad of other ways soybeans are used in our daily lives. It introduces legumes and their ability to enrich soil with nitrogen. And there's also a quick trip through the history of soybeans – including Henry Ford's soybean car!



GRADES: 2-5 *This lesson can be modified for younger grades.*

OBJECTIVES: The student will be able to:

- Name a number of food and non-food products that soybeans are used to make
- Explain how soybeans can replace nitrogen in the soil
- Explain the meaning of “crop rotation”
- Describe the life cycle of the soybean

PROCEDURE:

Teacher shows and discusses with students the Learning Through Gardening power point presentation “Soy, The Super Bean,” which can be downloaded from our Teacher Tool Box at [www.njagsociety.org](http://www.njagsociety.org).

*Optional:* Read the book *Full Of Beans, Henry Ford Grows a Car*, by Peggy Thomas.

EVALUATION:

Students list various products made from soybeans.

Students write a paragraph or explain verbally how soybeans and bacteria work together to replenish nitrogen in the soil and why this important to farming.

EXTENSIONS:

Read a book about soybeans such as [Soybeans In the Story of Agriculture](#) or [Soybean A-Z](#), both by Susan Anderson and JoAnne Buggy.

As homework, ask students to find and make a list of products in their kitchen pantries that contain soybeans.

In small groups, students do further research on the work with soybeans of George Washington Carver and Henry Ford.

Make soybean ink or soybean lip balm. (Directions follow.)



# How to Make Soy Ink

Printing ink was originally made from petroleum oil, which must be pumped from far underground. Then about 45 years ago, newspaper companies began to experiment with using a renewable resource, and it was discovered that soy made a good base for ink. Not only was it renewable, it provided brighter colors and made recycling easier because the ink was easier to remove.

## MATERIALS (for a class of 24)

small paper cups  
2 teaspoons soybean oil  
1 teaspoon soy lecithin  
3 teaspoons (3 packages) unsweetened Kool-aid  
or other powdered drink (adds color to the ink)  
 $\frac{1}{4}$  cup plus 1 tablespoon water  
stir sticks or spoons  
bowl or other container for mixing  
paper  
Q-tips and/or rubber stamps

*Note: The soy oil does not mix well with water until the lecithin is added. Soy lecithin is used for mixing fats and oils with water. Lecithin is commonly found in chocolate candy and salad dressing.*

## PROCEDURE

Mix the water with the unsweetened powdered drink mix in a bowl.

Add 2 teaspoons soy oil and 1 teaspoon soy lecithin and stir vigorously until any lumps are gone. (You can show students how the oil and water don't mix well until the lecithin is added.)

Divide ink into small cups for use by small groups of students. Use Q-tips to write with the ink on paper or use rubber stamps, if available, to stamp images.

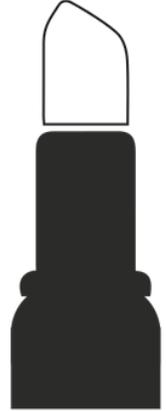


# How to Make Soybean Lip Balm

This simple activity is designed to show students how soy oil can be used in everyday products

## MATERIALS (for a class of 24)

small paper cups  
½ cup beeswax pellets (*Read about beeswax below.*)  
1 cup soybean oil  
small saucepan  
stove top or other heat source



## PROCEDURE

- Place the beeswax pellets in a small saucepan. Heat on low-medium heat. Stir until all beeswax is melted.
- Add soybean oil to the melted beeswax, stir and remove from heat.
- Pour 1 tablespoon into each small cup.
- Let solution sit until it hardens to a soft solid.
- Use fingertip to transfer the lip balm from cup to lips, or remove paper cup and use the wax cylinder to coat lips.

## ***What is beeswax?***

*A beehive is filled with little rooms called cells where the bees raise their young and store pollen and honey for the winter. These small cells each have six sides – they are hexagons. The bees make these cells out of beeswax.*

*A bee has special parts on its underside– called glands – that produce wax. When the worker bees eat honey, these special wax-producing glands change the sugar into wax. Bees must eat eight ounces of honey for every one ounce of wax they produce. The wax appears as small flakes on the bees' underside. The bees must chew the wax in order to soften it, so they can shape it into cells. Beeswax is used in many products, including skin lotions, dental floss, jelly beans, gummy bears, candles, and medicines.*