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## Removing Weeds & Studying Native Plants

### Activity: Weedy Socks & Wheels



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Sock activity adapted from: Barbara Chamberlin

<http://horizon.nmsu.edu/ddl/experiments/socks.html>

Prevention methods adapted from: BLM Invasive Weeds - "A Growing Concern"

#### Overview

This classic activity can be used to demonstrate how animals, recreation, and roadway transportation spread weed seeds. Students will conduct a simulated sock or wheel seed collection in a 'weedy' area. These collected seeds will be planted in sterilized 'weed free' soil and the germinating plants will be identified over a 3-week period.

**Grade Level:** K-6

**Focus:** Life Science, Ecology, Investigation, and Experimentation

#### Objectives

1. Students will describe the ways that plant seeds are spread naturally. (Wind, Water, Wildlife)
2. Students will the major ways humans can spread weeds. (Vehicles, Recreation, Animals, Collecting)
3. Students will brainstorm ways of preventing the transport of weeds by people.
4. Students will observe the growth of weeds in their weed sock or wheel plantings and answer the question: "Why are almost all the seeds that germinate from the socks & tread weeds?"

**Site:** Outdoors (Weedy Area)

**Time Format:** 1 class session and follow-ups over a 3-5 week period

#### Materials:

- Old 'fuzzy' socks
- Bicycle with off-road tire tread
- Plastic bags
- Sterile soil that has been specially prepared for this activity (Click here to learn more about making a Solar Soil Sterilizer)
- Containers for the soil (approx. 8-16 oz container. Old water bottles, milk cartons, or plastic pots work great) For a self-watering bottle design see 'Make Your Own Osmotic Planter' at the end of this section.
- Water

## Advanced Preparation

1. Prepare enough sterilized soil for each student to have at least 16 oz. for planting.
2. Have students save and bring in their old socks and a small 16 oz. plastic water bottle.
3. Go to your weedy area and try both the sock and tire method described below. This activity works best when fields and vegetation are dry.

## Activity

1. Review with students: What is a weed? What are the four characteristics of weeds? (Teacher Help: "Weeds are plants that crowd out native plants, harm animal habitats, and increase erosion")

Weeds generally:

- Produce many seeds
- Monopolize nutrients or water
- Germinate quicker and grow faster than natives
- Avoid predation from herbivores

Note: Have students discuss why weeds are a threat to native ecosystems.

2. Explain to students that we will be looking at ways of removing and preventing the spread of weeds. Explain that the first step in removing weeds from our ecosystems is to prevent the spread of weeds.
3. Ask Students: How do plant seeds spread in nature? (With no human influence)  
Answer: Plant seeds have adapted to being spread by: Wind, Water, and Wildlife.

Ask students: What are some ways that humans spread weed seeds?

Teacher Help: Make a list titled 'How humans spread weeds' on the board and organize it with the following categories.

- **Vehicles:** Cars, trucks, trains, motorcycles
- **Recreation:** Hiking, Camping, Bicycling, Clothing/Gear
- **Animals:** Horses, Dogs, Livestock
- **Collecting:** Picking weed flowers or buying and planting weedy plants, like French broom, in our yards.

Have students look at the list for a moment. Ask students: What are some ways that we can help prevent the spread of weeds?

Teacher Help: Make another list titled 'Prevention'.

**Vehicles:** Drive on established roads and trails away from weed-infested areas.

**Recreation:** Clean camping and hiking gear of weeds before continuing to a new area or another campsite. Clean your bicycle tread and hiking boots of seeds.

**Animals:** Feed pack animals weed free feed. Brush animals and check their feet before leaving weed infested areas.

**Collecting:** Learn to identify invasive weed invaders and pull them. Remember to leave them where they are or bag them in plastic and carry them out to a garbage area.

Note: It may also be possible to let a landowner or neighbor know that they have a invasive weed on their property.

Ask students: What are some things that we should not do because they might help spread weeds. Make a list titled 'Don't'.

- Don't pick flowers or seeds of invasive weeds and take them home.
- Don't pick and transport wild flowers that you can't identify.
- Don't camp, drive or ride in weed infested areas.

4. Explain to students that we are going to do an experiment to see how many native and non-native plants will grow from seeds trapped in an animals fur or the tread of a tire.

5. Take students to the weedy area. Explain to students that what they call 'stickers' are generally the seed of a 'weedy' plant. Remind them that animals and vehicles are responsible for transporting numerous weed seeds across vast areas.

Have students put the old socks over their shoes. (Some cutting maybe necessary to get a good fit)

Explain to students that now your feet are hairy like the feet of an animal. To make things more interesting students can pick the animals they want to be.



Have students walk around in the grass, sand dirt, and/or leaves in the 'weedy' area outside your classroom.



Have students carefully remove the socks and put them into plastic bags. This is to prevent the spread of possible weed seeds on the way back to the classroom.

### Return to the classroom

If you are also using the bicycle tire tread push the bike through the same area and have students collect the seeds from the tires into a plastic bag. Explain to students that recreation and transportation off of trails and roadways can spread weeds that get trapped in the tread of tires.

Back in the classroom: Prior to planting have students draw pictures of some of the seeds that they collected.

Have students focus on:

- What do the seeds look like?
- How big are they?
- What color are they?
- How are the seeds attached to the socks or tires?
- How do the seeds feel?
- How many seeds are in groups or bunches?
- How many different types of seeds are there?

Note: Students might count the number of seeds they see in their sock and predict how many will germinate.

Have students cut out a seedy section of their sock (approximately the diameter of their water bottle or container.)



Place the seedy material on top of a few inches of specially prepared soil.



Place the seedy material on top of a few inches of specially prepared soil.



Cover the sock material with an inch of soil . Water from the top until the base is filled with water. Make sure that the moisture travels up the sock wick until it reaches the level where the seeds are.

If you are planting the seeds collected from the tire tread simply fill the container with soil and plant the seeds an inch down in the soil.

Place the planting in a window sill. Water the soil every day.  
Note: If you are using the water bottle construction simply make sure there is water in the base of the bottle.



### Wrap-up/Evaluation

Have students make posters that describe:

- The ways that plant seeds are spread naturally. (Wind, Water, Wildlife)
- The major ways humans can spread weeds. (Vehicles, Recreation, Animals, Collecting)
- Informs others about ways of preventing the transport of weeds by people.

1. To answer the objective question: "Why are almost all the seeds that germinate from the socks & tread weeds?" Reinforce the four 'weedy' characteristics.

- **Produce many seeds** - More seeds on the ground more on the sock.
- **Monopolize nutrients or water** - Those that reach the light and sprout the roots get the nutrients and water
- **Germinate quicker and grow faster than native seedlings.** - Grow faster dominate space.
- **Avoid predation from herbivore.-** Seeds don't get eaten so they can grow.

2. Keep a record or chart of the soil and seeds. Some suggested observation questions are listed below.

- Are any of the seeds split open or beginning to sprout?
- Which seed broke through the top of the soil first?
- How much do the seedlings grow every day?

### **Going further**

Collect seeds from known native plants and invasive weeds. Plant them both together and plant natives separate from weeds. Observe which one dominates. This can coincide with the sock/tread plantings. Take pictures of the plants as they grow and keep records of them, even ones that didn't sprout. Print your findings, make a copy for your records, and make a poster showing your results.

# Making a Cardboard Box Solar Soil Sterilizer

This solar oven design is adapted from a design created in 1976 by Barbara Kerr. The construction of this oven will allow the user to create 'weed free' soil for plantings. This design is a smaller scale construction plan to demonstrate the basic plan. If you will be sterilizing large amounts of soil for a large group then it will be necessary to use a larger box. The construction and use of this oven could also serve as an optional 'weedy' prevention activity. This oven can be used in conjunction with the "Weedy Sock/ Weedy Tread" activity.

This solar oven can reach temperatures of 275 degrees, hot enough to cook food and kill germs in water. We will be using it to eliminate bacteria and weed seeds from collected soil. This oven can be used virtually year round in our temperate environment. Weed free soil is dependent strictly on temperature. The oven must reach a temperature of at least 180 degrees (F) for seed sterilization to occur.

## Materials

### **Cardboard**

One large box

One smaller box that will fit inside the big box and have a 2-3 inch space between the two.

Cardboard scrap sheets

### **Paper**

Old newspapers

Black construction paper

### **Other Materials**

Aluminum foil

Heavy-weight clear plastic laminate Cut to the dimensions of the large box.

Duct Tape

Thermometer

### **Tools**

Box Cutter

## How To Make Your Cardboard Box Solar Soil Sterilizer

1. Take your large box and line the bottom with insulating materials like crumpled newspapers.
2. Set your smaller box inside the big one (this will serve as your oven).
3. Fill the space between the sides of the two boxes with crumpled newspaper.
4. Use cardboard pieces to fold over the insulated space between boxes. Make sure to pack it tightly.
5. Line the cardboard pieces bordering the packed space between the boxes with black construction paper.
6. Line the sides of the inner box with aluminum foil adhered with non-toxic glue
7. Tightly secure or lay your plastic on top of the large outside box. Make sure to secure the plastic around the sides with duct-tape so no air can escape

# Making Your Own Osmotic Plant Container

The following contains step-by-step instructions for the construction of a self watering osmotic plant container. To construct this planter the following materials will be needed:



**Plastic bottle:** 16oz water bottles work great. You can even use the larger 2 liter soda bottles.  
**Sock:** You can use the same sock that was used in the 'Weedy Socks & Tread Activity'.  
**Tools:** Scissors or cutting tool.

Assembly:

1. Cut the bottle into two pieces. Make sure that the bottom is taller than the length of the portion of bottle that is narrow.



2. Check the fit of your bottle. It should look like the photo below. The spout of the bottle should be an inch or two above the bottom of the bottle.



Cut a strip of material from your sock long enough to travel down the side of the top half of the bottle, through the spout, and into the bottom where the water will be stored.



3. Fill the container with soil. Keep the sock wick against the side of the container for a visual check to make sure the water is travelling up the wick from the water basin.



For further instructions on planting seeds in this container return to the 'Weedy Socks & Tread Activity'.