APPENDIX

HANDS-ON GARDENING EDUCATION MANUAL

A manual comprised of lesson plans to help support implementation of school gardens in elementary schools

by

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Planting Our Garden in Woolly Pockets Lesson Plan

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

- Understand the importance of seeds.
- Know how to plant seeds and seedlings.
- Understand the origin of food.
- Differentiate between healthy and unhealthy foods.

Grade Level:
- Kindergarten through second grade

Duration:
- 20 minutes

Materials:
- Seedlings
- Seeds for planting
- Different seeds in containers
- Water (watering hose)
- Watering cans or plastic cups
- Woolly pockets
- Labels to identify plants
- Popsicle sticks
- Tape

Procedure:
Before Planting Our Garden:
- Buy seeds.
- Plant seeds beforehand; sow them so they grow into seedlings, or find some resources that have seedlings available for you to pick up or purchase them.
- Create a lay-out for the pockets.
- Design and print labels ready for planting day.
- Make sure there is access to water.
Before Lesson On Planting Day at the School:

- Organize your seedlings and seeds.
- Install water hose.
- Have watering cans or cups so the students can water their newly planted seeds or plants.
- Place plant labels in the Woolly pockets so students know where to plant their seeds or seedlings.

Lesson Plan:

Opening: (5 minutes)

Ask the students the following questions:

- What do they like to eat?
- Where does the food they buy come from?
- What are healthy and unhealthy foods?
- Explain to the students about the special pockets – Woolly Pockets – in which they will plant their seeds or seedlings

Garden Activity: (10-15 minutes)

Demonstrate to the students how to plant the seeds/seedlings by showing them how to make a hole in the soil with their hands, placing the seed/seedling in the hole, gently pushing the soil back into place, and pressing on the soil so the plant/seed will be firmly planted. Let the students plant the seeds and seedlings in the pockets. Make sure each child will get a turn at one part of the activity since not every child will get a plant or a seed. After planting, each student should get a turn watering the plants. When showing them how to water the plants tell them that only gently flowing water is needed because otherwise the seeds/seedlings will be washed out and they cannot grow. A simple way to check if the plant needs water is to put your finger into the soil up to your first knuckle; if it feels moist, it has enough water. If it is dry they will need to water the plants more.

Encourage the students, but do not force them to take part in the activities because some may not want to touch the soil.

It is easier to instruct the students in smaller numbers, therefore it is recommended to divide the class into smaller groups before the activity (depending on
the amount of pockets or volunteers that are available).

**Conclusion: (2 minutes)**

Briefly review the presented material with the students and instruct them on the importance of only looking at the plants that are growing or will sprout and not to touch them so the plants will be able to grow. In addition, remind the students of the importance of washing their hands after gardening.

**Woolly Pockets Map (Example)**

|---|-----------|-----------------|--------|------------|--------|--------|------------|--------|----------------|------------|

**Woolly Pockets**
<table>
<thead>
<tr>
<th>Tomatoes</th>
<th>Lavender</th>
<th>Pansies</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image1" alt="Tomatoes" /></td>
<td><img src="image2" alt="Lavender" /></td>
<td><img src="image3" alt="Pansies" /></td>
</tr>
<tr>
<td>Peas</td>
<td>Cabbage</td>
<td>Mint</td>
</tr>
<tr>
<td><img src="image4" alt="Peas" /></td>
<td><img src="image5" alt="Cabbage" /></td>
<td><img src="image6" alt="Mint" /></td>
</tr>
</tbody>
</table>

Sample of plant labels

Organization of seedlings

After planting
References


November 22, 2011, from http://www.woollyschoolgarden.org/what-is-a-woolly-
school-garden
Composting and Insect Control Lesson Plan

Objectives:

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

- Understand what plants need.
- Understand about recycling plant material.
- Understand the importance of garden insects.
- Understand that the compost they make will provide important nutrients for the plants.

Grade Level:

- Kindergarten through second grade

Duration:

- 20 minutes

Materials:

- Fruits or vegetables (orange peels, apples, and cabbage leaves or any other fruits or vegetables)
- Clear plastic containers which have lids with holes
- Soil
- Plastic box to hold soil and organic matter
- Water
- Water buckets
- Cart to move all material to the gardens
- Ladybugs
- Picture cards of air, water, sun, soil/food, and insects
- Butterfly mask handout

Procedure:

Preparations:
• Call a nursery (Green Thumb Nursery) at least 2-3 weeks ahead to find out if they have ladybugs. The nursery is able to order them for you.
• Collect plastic containers with lids.
• Drill holes in lids.
• Collect vegetable and fruit scraps for composting (lettuce, apples slices, cabbage leaves, banana peels).
• Buy soil (potting mulch) from nursery.
• Buy one or two containers of ladybugs from nursery and keep in refrigerator or cool place at home the day before the lesson.
• Print picture cards of air, water, sun, soil/food and insects.

**Gardening Day:**
• Divide ladybugs into additional containers so each group will have one.
• Organize material.
• Pour out soil in plastic containers.
• You will need to have access to water.

**Lesson Plan:**

**Opening: (5 minutes)**

Ask the students the following questions:

1. What do you need to live? – Water, sun, food, air, food.
   a. Soil is food for the plants, made from compost.
3. Ask them what they remember about the importance of water from the last gardening day.
4. Instruct students in the benefits of making compost and of using ladybugs and other insects in a garden to destroy insects that are harmful to plants.

**Discussion:**

**Compost** – decaying plants and other organic matter used to enrich soil

Composting is nature’s way of recycling leaves, plants, fruits and vegetables. Over time they decompose (spoil, decay, rot) into nutrients that can be fed to fruits and
vegetables grown in the garden. For this process air, water, microorganisms (bacteria or very tiny bugs which can only be seen with a microscope) and time is needed. The microorganism will break down the ingredients into humus.

**Good Bugs** – beneficial insects such as ladybugs that feed on destructive insects

Insects have six legs, one pair of antennae, and some insects have up to two pairs of wings. Their skeleton is on the outside of the body. They have four different life stages: eggs, larva, pupa and adult. Butterflies, moths, beetles, ladybugs, bees go through those stages. Ladybugs and praying mantis are good insects and they eat other undesirable insects. Bees, butterflies are pollinators. They fly from flower to flower and help plants grow fruits and vegetables

**Garden Activity: (10–15 minutes)**

Divide students into 3 groups and provide each group with a plastic container. Have the students place different organic matter in each of the plastic containers and fill with soil on top of the organic matter in a way so the plant material can be observed decomposing. Add about 1/2 cup water to the plastic container to help in the decomposition of the material. Close the container with a lid in which holes have been drilled. Keep the plastic container in the classroom until next class when it will be distributed in the garden as fertilizer. Instruct the students to observe the container so they can witness the decaying process. For the next activity, give each of the students a few lady bugs and instruct them to distribute them on the plants.

Encourage, but do not force, the students to participate in the activities. Some of the students might not want to touch the soil or the ladybugs. The ladybug distribution needs to be controlled because the children get very enthusiastic about them.

**Conclusion**

Briefly review with the students what was discussed. Give each student a butterfly mask hand-out to take home. Instruct the children that they may color the hand-out and find additional information about butterflies.
Picture card images of water, soil, sun, air and helpful insects and earthworms

Set-up for composting

Ladybugs in garden  Student with compost container
Organic material after two weeks of decomposing:
From left to right: banana peels, apple slices, cabbage

Ladybug container
Butterflies don't bite or sting. They don't pester you or make noise. They are amazingly beautiful and are hard workers. Butterflies pollinate many of the plants we need to survive.

‘Good Guy’ BUTTERFLY MASK

Cut out the Butterfly to make a mask. Cut out the dotted circles to make holes for your eyes. Make 2 small slits on the sides to tie a piece of string or ribbon to each side so that you can tie it around your head. Use scotch tape to make the holes stronger so they don't tear. If you want antennae, use two pieces of pipe cleaner.

For more info visit: www.KidsGrowingStrong.org
References


Container Gardening Lesson Plan

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

- Understand how to grow vegetables and fruits from a seed.
- Understand how to plant seeds in containers.
- Understand that seeds from different plants look different.
- Understand the importance of consuming fruits and vegetables.

Grade Level:
- Kindergarten through second grade

Duration:
- 20 minutes

Materials:
- Seeds for planting
- Seeds for gluing on cardboard and for containers so children can look and touch the seeds (a 99 Cent Only Store is a great resource for this activity)
- Card stock
- Clear plastic containers to hold seeds
- Soil
- Containers (styrofoam cups, old milk cartons, or plastic pots)
- Water
- Water buckets

Procedure:

Preparation
- Glue seeds and plant pictures on half sheet card stock.
- Mix the seeds from the packets and put into 2 or 3 three plastic containers with lids.
- Purchase soil and cups or asked students to bring containers from home.

Gardening day
- Set up and organize material.
- Have access to water.
Lesson Plan:

**Opening: (5 minutes)**
Ask the students questions such as:

1. What vegetable they would like to grow at home?
2. Do all seeds look alike?

**Garden Activity: (10–15 minutes)**

Show students a container with different types of seeds. Let them compare the seeds with the seed picture card. Ask them to describe the shapes, colors and sizes of seeds and show them the seed picture card. Explain to them that they are going to be vegetables like on the pictures.

Demonstrate how to scoop soil from the bucket into a cup. Discuss that soil is the food for the plant and that it is meant to help the plant grow. Have the children stand in 3 groups and with the help of a volunteer have the children fill their containers with soil. While the children are filling their cups, discuss the importance of soil to the plant. Mention that soil is good for the vegetables like vegetables are good for our bodies. With the entire class watching, show them how to plant their seeds by making a hole in the soil and dropping a couple of seeds into it. Discuss that the seeds grow in the soil and eventually become the actual fruit or vegetable. Have an adult pour a couple of seeds into the child’s hand and help them plant the seeds as instructed.

Next, demonstrate how to water the seeds. Use a small cup to pour water into the cup with the seeds. Show the children that the plant is not “drowning” but is enjoying a light “shower.” Discuss that water is used to help the plant grow into something tasty. Discuss with the students where would be the best place to keep the container. Encourage the students to talk to their parents about planting additional plants at their homes and that they could place them on a windowsill in a sunny place.

For the next activity ask the children if they can act out growing like a plant from the seed to becoming a plant. Then ask them if they can show where their root, stem, petals are.

**Closing: (1–2 minutes)**

Review briefly the topic of the lesson and remind them that for a container garden only a small space is needed.
Seed picture cards
Set-up soil and cup for students to plant seeds

References
Taking Care of Our Garden Lesson Plan

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

- Understand the life-cycle of earthworms.
- Understand the importance of earthworms in the garden.
- Understand how to use compost to feed the plants.
- Understand the importance of water.

Grade Level:
- Kindergarten through second grade

Duration:
- 20 minutes

Materials:
- Plastic container with compost from previous lesson
- Container to empty compost
- Earthworms
- Water
- Water buckets
- Watering cans
- “Lifecycle of an Earthworm” handout

Procedure:

Preparation Before the Lesson
- Call nurseries two weeks before lesson for availability of earthworms.
- Purchase worms a day before lesson.

Lesson Plan:

Opening: (5 minutes)

Have the students bring the compost container from their classroom and ask them “What happened to the foods in the plastic container?” Inform students about the lifecycle of earthworms and about the distribution of compost (fertilizer of hummus, mulch) and the importance of water.
**How Earthworms Help Soil and Plants**

Earthworms dig holes which let water and air into the soil. This helps stop erosion and lets the water and air get down to the roots of plants. The burrows also help plant roots move more easily through the soil and into new spaces. Worms drag leaves and plant bits down into the earth. As they tunnel, the worms swallow soil and eat the plant matter that is in it. The soil they swallow passes through the worm’s body and is left in little piles on top of the ground. This is called “castings” and is excellent fertilizer (food for plants). People who farm worms do it to collect the castings to sell to gardeners.

Earthworm life cycle: Earthworms lay eggs. The eggs hatch after 2 weeks but can take longer in cold weather. They grow as they get older.

**How Water Affects the Growth of Plants**

The soil can be checked by placing a finger into the soil up to the knuckle. If the soil is moist, it has enough water; if it is dry the plant needs to be watered. For a plant to get food the water transports the nutrients from the soil to the roots. The water travels up the stems into the leaves, flowers or fruits. If the plant does not get enough water it will droop, so water helps the plant to stand.

**Garden Activity**

Students will use organic matter, the compost, from the plastic container they prepared during the previous class. Show students how to carefully place it around the plants.

Explain to the students while they are placing the compost around the plant that compost is used as fertilizer for plants and it is also used as mulch which protects the soil from drying out too quickly. Compost also helps prevent weeds from growing. The compost contains many nutrients the plants need. Have the students then water the plants with the watering cans.

Instruct the students about the importance of earthworms in their garden and give them a worm to see and to touch, but do not force any student to touch a worm if they do not want to.

**Conclusion**

Briefly review with the students the covered material. Give the students the handout to take home, which will reinforce the lesson.
Pouring compost into container

Preparing compost for distribution

Distributing compost

Watering plants

Students holding red earthworms

Red earthworms
Containers in which worms were purchased
Life Cycle of an Earthworm

Cut out the worm pictures and stick on the circle in the right order to complete the life cycle of an earthworm.
References


Tasting Nutritious and Delicious Fruits and Vegetables Lesson Plan

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

- Identify at least three different fruits and vegetables.
- Understand the benefits of eating a variety of fruits and vegetables.
- Identify which part of a plant is edible.

Grade Level:
- Kindergarten through second grade

Duration:
- 20 minutes

Materials:
- Variety of cut fruits and vegetables (preferably vegetables grown in the classroom garden)
- Napkins, gloves
- Cut-outs of vegetables (pictures of vegetables printed on legal size paper)
- Card board (pictures glued on cardboard. A brown piece of card board is used to signify the soil)
- Water and paper cups

Procedure:
Preparations:
- Prepare picture cut-outs of the plants of the fruits and vegetables that the students will be tasting and glue on card board. Include the plant roots for each cutout.
- Purchase fruits and vegetables (purchase produce at farmer’s market if possible – farmers might donate some fruits and vegetables to you).
- Wash and cut fruits and vegetables in small pieces.
- Put the fruits or vegetables in individual containers.

Tasting Day:
- Bring cut fruits and vegetables in a cooler to class.
Lesson Plan:

Opening: (5 minutes)

Questions to ask the students:

1. Why it is important to eat fruits and vegetables?
2. What are their favorite fruits and vegetables?
3. Why are fruits and vegetables good for them?

Garden Activity: (10–15 minutes)

Place the root part of the cut-out picture of each fruit or vegetable plant through a slot in a brown piece of cardboard so that the root is showing below the cardboard (i.e. below the “ground” as represented by the cardboard). Ask the students what vegetable it is and what part (root, flower, stem) they are eating. How is it grown? How can you eat it? Discuss why the vegetable is good for them.

For example: Cauliflower – is a flower and it is good for the heart, brain, muscle, and stomach, and it has fiber and vitamin C. This procedure is done with each food item they are shown and taste.

The students are each handed a cut piece of a vegetable or fruit to taste. Encourage the students to taste all fruits and vegetables. Ask them to describe the item. What is the color? What does it taste like? Does it make a sound when you eat it? Is it soft, hard, crunchy?

Closing: (1–2 minutes)

Close the lesson with a short review of the presentation and the importance of eating fruits and vegetables every day.
Vegetable cut-outs used in lesson

Vegetable cut-outs placed in “ground”
Students tasting and exploring vegetables
Kohlrabi
Kale
Cauliflower
Zucchini
Radish
Tomatoes
Peas
References