

MNLA Curriculum Unit A, Lesson 4

UNIT TITLE: HOOKED ON HORTICULTURE: USING GARDEN CENTERS TO DISCOVER THE WONDERS OF PLANTS

LESSON 4: Greenhouse Plant Technicians and Golf Course Superintendents Propagate Plants; 30-60 minutes

MINNESOTA ACADEMIC STANDARDS IN SCIENCE:

- 3.1.3.2.2 -- Recognize that the practice of science and/or engineering involves many different kinds of work and engages men and women of all ages and backgrounds.
- 3.4.1.1.1 -- Compare how the different structures of plants and animals serve various functions of growth, survival and reproduction.
- 3.4.1.1.2 -- Identify common groups of plants and animals using observable physical characteristics, structures and behaviors.
- 3.4.3.2.2-- Give examples of differences among individuals that can sometimes give an individual an advantage in survival and reproduction.

AUTHORS: Terry Ferriss and Kelly Holt

OVERVIEW: This science activity was designed to teach students how to properly germinate a seed and to introduce them to the variety of specialized plant structures that can be used for propagating plants. Students will gain an understanding of the role and advantages that specialized structures play in the lives of plants. Students will also be introduced to science careers in the horticulture / landscape and/or turfgrass industries.

OBJECTIVE: As a result of this activity students will be able to :

1. Describe and demonstrate how to properly germinate a seed.
2. Name three ways to propagate plants asexually, through the use of bulbs, rhizomes, and/or tuberous stems and explain how these structures provides the plant with an advantage in survival and reproduction.
3. Give examples of science careers in the horticulture / landscape / turf industries.

MODIFICATION OF LESSON: This lesson can also be done with just the seed propagation OR just the vegetative propagation.

MATERIALS:

For Seed Propagation:

1. Bring examples of seeds and seedlings in plug trays or bedding plant packs. Ideally bring a variety of 3-5 different plant species to stimulate interest.
2. Grass seed for seeding an 801 pack. Annual or perennial ryegrass will germinate most rapidly.
3. Marigold or bean seeds; enough for 5-6 seeds per student. Pre-sorting the seed into small 3 oz paper cups, one per student, will facilitate seed distribution.
4. A supply of peat-lite germination media to fill an 801 pack for each student. Bring three or more 5 gallon buckets or bins with media. Having multiple containers of media will be more efficient than having just one bin when students fill their packs and pots. It is important to let the students fill their own pot and packs.
5. Pot labels for students to write their names on and label their own pots.
6. 801 pack for each student.

For Vegetative Propagation:

1. A supply of general soil-less potting media to fill one 4 or 4.5" pot per student.
2. Bring examples of special underground structures used to propagate plants. **Examples** might include any or all of the following: non-planted bulbs (paper white narcissus, onions, tulip, etc); rhizomes (German Bearded Iris); tuberous roots (dahlia, canna, sweet potato); corms (gladiolus, crocus, liatris); and/or stem tubers (white or red potato). (Samples of plants growing from these structures is OPTIONAL)
3. (OPTIONAL) To demonstrate the differences between roots and specialized structures, bring a carrot as an example of a large tap root and wash the media off of any 4" potted plant to show a fibrous root system.

ACTIVITIES AND PROCEDURES:

For Seed Propagation:

1. Explain your role as a professional in the horticulture/landscape/turf industry. Emphasize to the students "if you like plants, you too can have a career with plants".
2. Show seed samples and examples of young or mature plants grown from the seeds. Ask the students about the sizes and shapes of the seeds and to describe the seeds. Tell students that seeds are formed from the flowers on a plant after the flowers are pollinated and fertilized. Ask students to think of seeds that they eat, have the group name a few. Ask students to name animals that eat seeds.
3. Explain that seeds are how plants multiply themselves and how new plants are started.
4. Explain that many vegetables and flowering plants that are sold in garden centers are started from seeds in greenhouses. Professional horticulturists decide which plants to grow and then they grow the plants that will be used for landscaping, gardens, enhancing the environment and even producing food.

5. Demonstrate how to properly plant seeds indoors. Fill an 801 pack with peat-lite media. Sprinkle seeds on top of the media emphasizing NOT to poke the seeds into the media. Cover the seeds with 1/4 inch of vermiculite.
6. Pass out the 801 packs and labels and instruct students to write their names on the labels. With the help of the teacher, have students line up and come up to fill their 801 packs with peat-lite media. Watch and instruct students to fill the pack almost to the top (fill to within 1/2 inch from the top). While waiting for their turn students can write their name on their labels.
7. Distribute one cup of grass seed to each student. Instruct them to sprinkle the seed over the media. Model this for the students and then have the students do it. Repeat with the marigold seeds.
8. Once the seeds are planted, have students cover the seeds with 1/4 inch of vermiculite. To avoid potential spills, bring the vermiculite to the students rather than having them try to carry their packs over to the vermiculite.
9. Have the students put their labels in their packs.
10. Demonstrate how students can set their packs in one inch of water in a cake pan or the sink and let them sub-irrigate for about 10 minutes. This should be done once every 1-3 days depending upon how fast they dry out. Once the plants are an inch tall they can water them from the top. The packs should look like a meadow with flowers in 2-3 weeks.
11. Review "what environmental conditions plants need in order to grow", light, temperature, water, nutrition and gases(air).

NOTE: Try to let the students do each step of the process, keep them doing rather than just watching and listening. Let them write their own labels, fill their own pots, plant their own seeds.

ACTIVITIES AND PROCEDURES (cont...):

For Vegetative Propagation:

1. Explain your role as a professional in the horticulture/landscape/turf industry if you have not done so already. Emphasize to the students "if you like plants, you too can have a career with plants".
2. Ask students to list as many uses for plants as they can think of. Look for environmental benefits, food source, wildlife support, erosion control, purify water, provide shade, aesthetics, interior design, landscape design, etc.
3. Show examples of special underground structures used to propagate plants. **Examples** might include any or all of the following: non-planted bulbs (paper white narcissus, onions, tulip, etc); rhizomes (German Bearded Iris); tuberous roots (dahlia, canna, sweet potato); corms (gladiolus, crocus, liatris); and/or stem tubers (white or red potato). Explain that even though these structures grow underground they are not actually roots but rather "specialized structures" . These are SPECIAL because the plant stores sugar, food and nutrients in the structures during the winter and then the plant uses these stored foods as energy to start growing the

- next spring. Ask students if they can think of reasons why having a specialized structure might be an advantage for a plant. Get 3-5 responses from the group.
4. Ask students which of these plants they may have seen growing somewhere. Let a few students share their experiences with the class.
 5. Explain the concept of propagation. Propagation is using part of a plant (seed, bulb, corm, rhizome, or other plant part) to start additional new plants.
 6. (OPTIONAL) To demonstrate the differences between roots and specialized structures, bring a carrot as an example of a large tap root and wash the media off of any 4" potted plant to show a fibrous root system.
 7. (OPTIONAL) Show examples of the plants growing from the specialized structures you brought in.
 8. Distribute a 4.5" pot, a label and a small potato or a piece of a red or white potato tuber with at least 2-3 eyes to each student. With the help of the teacher, have students line up and come up to fill their pots with media . Fill the pots half full, place the potato piece in the pot and finish filling the pot. Watch and instruct students to fill the pots almost to the top (fill to within 1/2 inch from the top). While waiting for their turn students can write their names on the labels.
 9. Instruct students to water the pots at home not more than TWICE a week. Describe how to use "the finger" test to determine the need to water. Insert pointer finger into the media up to the middle knuckle and if the media feels dry to at the finger tip then water with about 1 cup of water. If the media feels damp or wet DO NOT water and recheck in a few days.

NOTE: Ask the teacher if the students will be growing the plants in the classroom or taking them home to watch them grow. Either is acceptable.