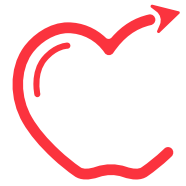


PROJECT: DISCOVERY

**CAREER EXPLORATION
CURRICULUM**

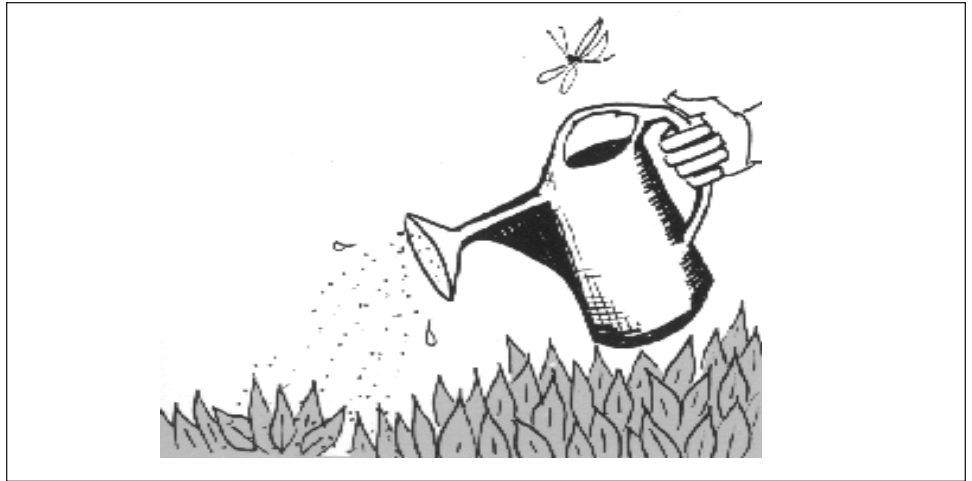
SAMPLES



education: associates
Job Ready. Life Ready.

EXCERPTS PROVIDED:

1. Instructor Notes with Scope and Sequence and Skills..... (2 pages front and back)
2. Pre-Post Test (1 page)
3. Work Performance Benchmarks (1 page front and back)
4. First Look at Greenhouse Work(2 pages front and back)
5. Student Instructions(2 pages front and back)
6. Parent Involvement Brochure(1 page front and back)
7. Certificate of Accomplishment(1 page)



MODULE OVERVIEW

This package deals with occupations in the greenhouse area. These jobs bring beauty and enjoyment into people's lives. There are opportunities in this kind of business for everyone. There are part-time jobs available for students after school and for those who want to work only a few months out of the year.

The activities in the package deal mainly with plant propagation. The activities also explore testing seeds for germination, mixing potting soil and building a greenhouse.

Students might also explore packages related to running a business such as Management, Accounting and Bookkeeping, Banking and Credit, Filing, Sales Representative and Retailing.

ACTIVITIES IN PROGRAM

- Activity 1 - Testing Seed for Germination
- Activity 2 - Mixing Potting Soil
- Activity 3 - Growing Plants from Seed
- Activity 4 - Transplanting
- Activity 5 - Stem Cuttings
- Activity 6 - Other Plant Propagation Methods
- Activity 7- Graftage
- Activity 8- Building a Small Greenhouse (Optional)

MATERIALS IN PROGRAM

- | | |
|-----------------------------|---------------------------|
| Instructor's Notes | mixing pan |
| Student Instructions | drain trays |
| Work Performance Benchmarks | package of marigold seeds |



SCOPE AND SEQUENCE

This 10 - day curriculum is designed as a skeleton lesson plan. Instructors must adapt time constraints to level and ability of students.

- | | |
|-------------------|-----------------------------------------------------------------------------------------------|
| DAY ONE: | Complete Pre-test
Introduce unit materials |
| DAY TWO: | Complete Activity 1:
“Testing Seeds for Germination” |
| DAY THREE: | Complete Activity 2: “Mixing Potting Soil”
Complete Activity 3: “Growing Plants from Seed” |
| DAY FOUR: | Complete Activity 4: “Transplanting” |
| DAY FIVE: | Complete Activity 5: “Stem Cuttings” |
| DAY SIX: | Complete Activity 6: “Other Plant Propagation
Methods” |
| DAY SEVEN: | Complete Activity 7: “Graftage” |
| DAY EIGHT: | Complete Activity 8: “Building a Small Greenhouse” |
| DAY NINE: | Visit local nursery or guest speaker. |
| DAY TEN: | View DVD
Complete Post-test. |

REQUIRED KNOWLEDGE

- Activity 1 - some experience with percentages would be helpful
- Activity 2 - none intended
- Activity 3 - none intended
- Activity 4 - knowledge from Activity 2 on mixing soil
- Activity 5 - none intended
- Activity 6 - experiences from Activity 5 helpful
- Activity 7- experiences from Activities 5 & 6 helpful
- Activity 8 - knowledge from all other activities on plants' needs

MANIPULATIVE SKILLS

- Activity 1 - gross motor dexterity; physical arrangement of petri dish
- Activity 2 - gross motor skills; mixing soil using a trowel
- Activity 3 - gross motor dexterity and eye-hand coordination; filling pot with prepared soil, putting seeds on soil and covering
- Activity 4 - gross motor dexterity and some fine dexterity with tools; filling small pots, transplanting seedlings, using wooden pot labels
- Activity 5 - gross motor dexterity; placing root cuttings into various mediums
- Activity 6 - gross and fine motor dexterity; manipulating leaf cuttings and various mediums, separating roots of a plant
- Activity 7 - gross motor dexterity; cutting plants with knife, using a rubber band to hold plant parts together
- Activity 8 - gross motor dexterity with hand tools; manipulating floral wire, a box and plastic to make a greenhouse

CONCEPTUAL SKILLS

- Activity 1 - defining germination; understanding purpose of determining percent of germination in a group of seeds; realization that seeds need warmth, sun and water in order to germinate
- Activity 2 - understanding that plants need soil that allows air and water to get to roots; realization that greenhouse operators often have their own special soil mixture
- Activity 3 - understanding that the depth at which seeds are planted depends on the size of the seed; understanding that while seeds need moisture in order to grow, too much water and sun is no good; understanding the differences between seed leaves and true leaves
- Activity 4 - understanding reasons for transplanting; following the process for transplanting
- Activity 5 - understanding that there are several ways to reproduce or increase plants and that one way is by cuttings; there are several types of cuttings and different ways of rooting these cuttings.

- Activity 6 - understanding there are various methods of propagation involving leaf cuttings; understanding that there are methods of reproducing plants other than cuttings and seeds; understanding that not all plants are capable of these methods
- Activity 7 - understanding that causing part of a plant to grow on another is graftage and that it is often done with fruit trees and roses; realizing that they will only be attempting graftage indoors on cactus plants
- Activity 8 - understanding that the greenhouse is a controlled environment for plants providing all their basic needs along with protection from weather extremes, etc.

ACQUIRED KNOWLEDGE

- Activity 1 - definition of germination; how seeds germinate and the length of time required; how to figure the percentage of germination; understanding that if the germination percentage is low, more seeds would have to be planted to get the necessary number of adult plants
- Activity 2 - how to mix soil for growing plants indoors; measurements of components of potting soil.
- Activity 3 - how to plant seeds; understanding that new plants are called seedlings; understanding the importance of the correct amount of sun and water; understanding that there are two kinds of leaves on a seedling plant - seed leaves and true leaves
- Activity 4 - why plants must be transplanted; how to transplant seedlings
- Activity 5 - three methods of reproducing new plants from stem cuttings; some knowledge of particular plants being worked with
- Activity 6 - how to reproduce plants by leaf cuttings and division
- Activity 7 - some knowledge about graftage in general
- Activity 8 - how one might build a small greenhouse; something about the growing of plants in such an environment

GREENHOUSE WORK – PRE/POST TEST

ITEM # 1704

Directions: Read each item and decide which choice best completes the statement or answers the question.

1. Germination tests are performed to determine the:
 - A. amount of sun required.
 - B. number plants needed.
 - C. sprouting ability of seeds planted.
 - D. depth for planting seeds.
2. What item is needed to perform a germination test?
 - A. Soil.
 - B. Filter paper.
 - C. Bacteria.
 - D. Fertilizer.
3. Which of the following measures of soil, peat moss, and vermiculite (perlite) would result in a good soil mixture?
 - A. More soil.
 - B. Equal parts of each.
 - C. More peat moss.
 - D. Less peat moss.
4. Which tool should be used to combine the soil mixture?
 - A. Dibble.
 - B. Trowel.
 - C. Wire strainer.
 - D. Spade.
5. The depth and amount of soil required to plant a seed depends on:
 - A. pot size.
 - B. number of seeds.
 - C. seed size.
 - D. soil mixture
6. Why are seedlings transplanted?
 - A. To transport the plant.
 - B. To provide fresh nutrients and encourage root growth.
 - C. To increase the growth rate.
 - D. To provide fresh nutrients for grafting.
7. What is necessary to transplant a seedling?
 - A. Grafting.
 - B. Loosely covering roots.
 - C. Larger pot.
 - D. New soil mixture.
8. "Propagate" means to _____ new plants.
 - A. support
 - B. separate
 - C. transplant
 - D. grow
9. "Graftage" means placing part of one plant:
 - A. in a soil mixture.
 - B. on another plant.
 - C. in a greenhouse.
 - D. on another vein.
10. What is used to hold together plant parts that are being grafted?
 - A. Wire.
 - B. Sap.
 - C. A rubber band.
 - D. toothpicks.
11. How much do you know about working with plants in a Greenhouse?
 - A. Nothing.
 - B. Very little.
 - C. Some.
 - D. A lot.
12. How prepared are you to make a decision about a career in working with plants in a Greenhouse?
 - A. Not prepared.
 - B. Prepared very little.
 - C. Somewhat prepared.
 - D. Very prepared.

GREENHOUSE WORK - WORK PERFORMANCE BENCHMARKS

Client's Name: _____ Date: _____

ITEM # 1710

Trial Number 1 2 3 4 5 6 7 8 9 10

Overall Rating: 1 2 3 4

Performance Scale

Activity 1 - Testing Seed for Germination

- (a) Placed filter paper in bottom of petri dish.
- (b) Dampened filter paper with a small amount of water.
- (c) Placed 10 seeds on filter, and put lid on dish.
- (d) Placed dish in sun and kept damp.
- (e) Calculated germination percentage after five days.

1.	1	2	3	4
	Yes		No	
(a)				
(b)				
(c)				
(d)				
(e)				

Activity 2 - Mixing Potting Soil

- (a) Measured one cup of soil, one cup of peat moss, and one cup of vermiculite into mixing pan.
- (b) Mixed ingredients well with trowel
- (c) Covered pan with plastic film wrap.

2.	1	2	3	4
	Yes		No	
(a)				
(b)				
(c)				

Activity 3 - Growing Plants from Seed

- (a) Placed 4 1/2" pot in mixing pan, filled pot using the trowel, tapped pot lightly on a table, and used the bottom of the 2 1/2 pot to press the soil down.
- (b) Sprinkled some seeds on the soil, spacing them; shook soil, using a strainer, to provide a cover twice as deep as the size of the seed.
- (c) Watered soil until moisture showed on the surface, covered pot with plastic, and placed in light.

1.	1	2	3	4
	Yes		No	
(a)				
(b)				
(c)				

Activity 4 Transplanting

- (a) Mixed equal parts of peat moss, soil, and vermiculite in the mixing pan.
- (b) Filled five 2 1/2" pots and placed them in the draining pan.
- (c) Manipulated the wooden pot label to lift the seedling from the pot.
- (d) Held seedling in one hand, made a hole in the soil of 2 1/2" pot.
- (e) Placed the seedling in the hole up to the leaves, pressed soil firmly around the seedling with thumb and forefingers.
- (f) Transplanted four more seedlings following procedures.
- (g) Watered plants.

4.	1	2	3	4
	Yes		No	
(a)				
(b)				
(c)				
(d)				
(e)				
(f)				
(g)				

Activity 5 - Stem Cutting

- (a) Placed one stem cutting in a jar or glass filled with water.
- (b) Filled 2 1/2" pot with sand and poured water in.
- (c) Manipulated wooden pot label to make a hole in the center of the sand, put cutting into the hole and pressed sand firmly around it, and placed the pot in a plastic bag.
- (d) Filled 2 1/2" pot with perlite or vermiculite to the top and wet the material
- (e) Manipulated the wooden pot label to make a hole, placed the cutting into the hole and pressed the vermiculite firmly around the stem.
- (f) Compared roots after several weeks.

5.	1	2	3	4
	Yes		No	
(a)				
(b)				
(c)				
(d)				
(e)				
(f)				

Activity 6 - Other Plant Propagation Methods

Rex Begonia

- (a) Placed peat moss or sand in 4 1/2" pot, wet the medium.
- (b) Manipulated a knife to cut a large, healthy leaf from the parent begonia plant leaving about 3/4" of the leaf stalk.
- (c) Manipulated a knife to cut the largest vein completely through.
- (d) Placed leaf top side up on the wet medium in the pot, stuck the leaf stalk into the medium; used hair pin to hold leaf in place.
- (e) Covered the pot with plastic wrap and placed the pot out of bright light.

1.	1	2	3	4
	Yes		No	
(a)				
(b)				
(c)				
(d)				
(e)				

African Violet

- (f) Put peat moss, sand or vermiculite in the 4 1/2" pot and wet the medium.
- (g) Removed a leaf with at least 2" of leaf stalk from the parent plant.
- (h) Pushed the leaf stalk into the medium to one-half its length.

Sedum, Jade Plant or Echeveria

- (i) Mixed soil and sand together, put in a small pot and dampened.
- (j) Removed a leaf from the parent plant, stuck leaf stalk into the medium and kept medium relatively dry.

Division

- (k) Removed plant to be divided from pot.
- (l) Manipulated hands to separate the roots carefully, placed each division in a pot of its own, filled with soil mixture to the top of the pot, and watered each plant.

(f)		
(g)		
(h)		
(i)		
(j)		
(k)		
(l)		

Activity 7- Graftage

Myrtillocactus & Zygocactus or Trichocereus & Zygocactus

- (a) Manipulated the knife to make a slit in the top of the myrtillocactus or the trichocereus.
- (b) Manipulated the knife to cut off the top of the zygocactus, to cut a sliver off the base of its stem, and placed the zygocactus in the slit.
- (c) Manipulated the rubber band around cactus to hold the grafting in place.

Notocactus & Trichocereus or Pilocereus and Cereus

- (d) Manipulated the knife to slice off the top of both cactus plants.
- (e) Placed the top of the notocactus or pilocereus on the cut place of the trichocereus or cereus.
- (f) Manipulated string and also used cactus thorns to tie the two pieces together.

7.	1	2	3	4
	Yes		No	
(a)				
(b)				
(c)				
(d)				
(e)				
(f)				

Activity 8 - Building a Small Greenhouse

- (a) Bent floral wire into a curve.
- (b) Placed wire in box, one piece at each end.
- (c) Filled box with soil and planted seeds/plants.
- (d) Watered plants.
- (e) Covered with plastic wrap, leaving one end loose.

8.	1	2	3	4
	Yes		No	
(a)				
(b)				
(c)				
(d)				
(e)				

FIRST LOOK AT GREENHOUSE WORK



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1

A **greenhouse worker** grows plants. A **greenhouse worker** can also be called a gardener.

A **greenhouse worker** works in a **greenhouse**.



2

A **greenhouse** is a building in which plants are grown. A **greenhouse** looks like this.



The roof is usually made of glass or plastic. The sun can shine through the glass.

The sun helps plants grow. Many plants are grown in a **greenhouse**.

3

ACTIVITY ONE:

Testing Seed For Germination



4

A greenhouse worker **germinates** seeds. **Germinate** means to start to grow.

The seeds are tested to see how many will grow.



5

The greenhouse worker puts some seeds in a dish with a little water. Then the greenhouse worker waits for 3 or 4 days.

Then, he or she counts how many seeds **germinated**. You will see little parts of the plant sprout up when seeds **germinate**!



6 seeds are put in a dish...

3 or 4 days later...

3 seeds **germinated**!

6

50% of the seeds **germinated**.

This is called a **germination test**.

$$\frac{3 \text{ Seeds germinated}}{6 \text{ Seeds planted}} = \frac{1}{2} \text{ or } .50$$

7

Greenhouse workers need 3 things for the germination test. They need: **seeds**, **filter paper**, and a **petri dish**.



seeds

A **filter paper** is a round, white piece of paper.



Filter paper

A **petri dish** is a round, small dish with a lid. It's usually made of plastic.



Petri dish

8

GREENHOUSE WORKER STUDENT INSTRUCTIONS

Greenhouse workers spend all day working with plants!

Greenhouse workers:

- Plant, grow, harvest and transplant trees, shrubs or plants
- Spray, weed, fertilize and water plants and shrubs, using hand and gardening tools
- Dig, cut, and transplant seedlings, cuttings, trees and shrubs
- Haul and spread topsoil, fertilizer, peat moss, and other materials to condition the soil

Greenhouse workers work in greenhouse facilities, sometimes called nurseries. They can also work at a customer's home or building location.

In this kit, you will learn to:

- Test seeds for germination
- Mix potting soil
- Grow plants from seed
- Transplant plants
- Root stem cuttings
- Grow plants using propagation methods
- Graft one plant to another
- Build a small greenhouse



ACTIVITY 1: TESTING SEEDS FOR GERMINATION

Germination is the sprouting ability of seed. Most seeds sold today have been tested and their germination is known. However, if the sprouting ability is not known, germination is a good way to see if seeds can still be used to grow new plants.

In this activity, you will learn to:

- Define germination
- Test seeds for germination
- Figure germination percentage



Materials needed from the kit:



Seed packages



1 piece of filter paper



1 petri dish

Materials you need to get:

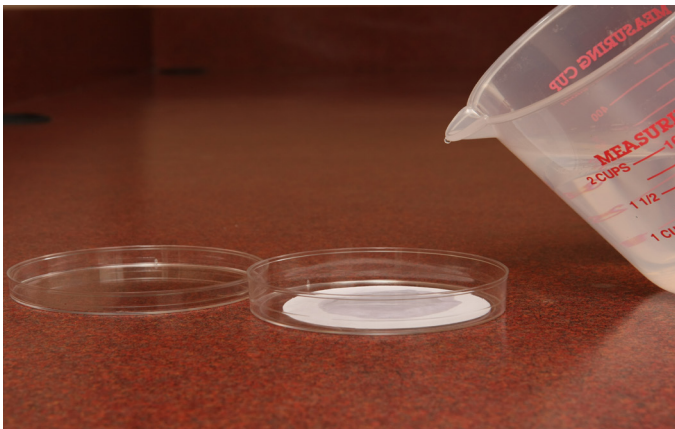
- Additional seeds (optional - from a vegetable such as a bean)
- Water
- Sunlight

Procedure:

1. Place the filter paper in the bottom of the petri dish.



2. Dampen the filter paper with a small amount of water.



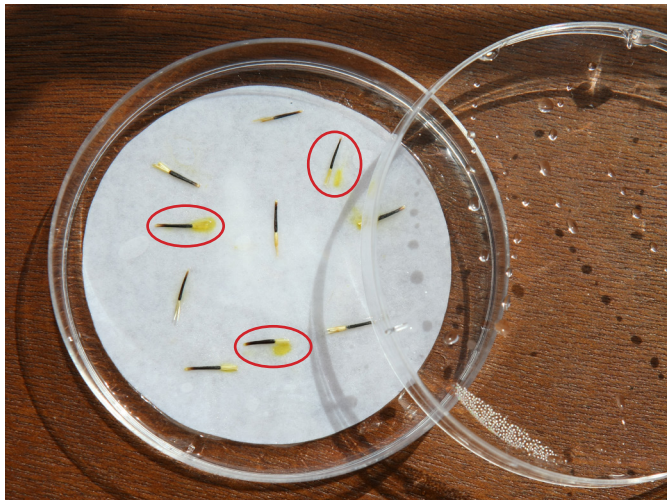
3. Place 10 seeds on the damp filter in the petri dish. Put the lid on the dish.



4. Put the dish in a sunny, warm place. Keep it damp.



5. After 3 or 4 days, look at your dish to see if any seeds have started to sprout. Remember, different seeds take different lengths of time to germinate.



← In this example, note the three seeds that look like they are germinating.

6. After about 1 week, most of the seeds that are going to, will have sprouted. Count the sprouted seeds. Can you figure the percentage of the sprouted seeds? Divide 10 seeds into the number of seeds that have sprouted. This will tell you the germination percentage.

For example:

10 seeds are placed onto a filter paper	=	10	$\overline{)5.00}$	=	50%	germination
5 seeds sprout			$\begin{array}{r} .50 \\ 5.00 \\ \hline .00 \end{array}$			

A MESSAGE TO PARENTS

To help establish a clear channel for communications from home-to-school and school-to-home, we have created the

Parent Involvement Brochure.

Education Associates knows that maintaining a positive relationship with your child's school improves your child's experience in the classroom. Throughout the year, when your child's class begins a new module, you will have the opportunity to review the skills and knowledge they will gain by performing the activities in each kit. As your child performs each activity, they will explore their own strengths, preferences and interests.



ACTIVITIES

Activity 1 - Testing Seed for Germination

Activity 2 - Mixing Potting Soil

Activity 3 - Growing Plants from Seed

Activity 4 - Transplanting

Activity 5 - Stem Cuttings

Activity 6 - Other Plant Propagation Methods

Activity 7 - Graftage

Activity 8 - Building a Small Greenhouse (Optional)

PROJECT DISCOVERY

PARENT INVOLVEMENT BROCHURE

“Greenhouse Work”



EDUCATION ASSOCIATES

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 **EDUCATION ASSOCIATES**
Passionate About Education

I have read this brochure and have reviewed the concepts. My child and I have talked them over together.

My Comments:

SIGNED _____

DATE: _____

Dear Parent(s) or Guardian(s),

Our goal is to help your child improve his/her transition outcomes. To accomplish this goal, our school is participating in the Project Discovery Transition System, which has been approved and validated by the U.S. Department of Education. We will be utilizing hands-on activities, CD roms, and DVD's to teach specific job skills, academic lessons and life skills in a meaningful approach that will be relevant to your child's future!

This is a "Student Centered" approach that accommodates different levels of learners and will enable us to meet your child at his/her ability level. We'll also be able to capture important data, such as what your child learned and how he/she performed in the activities.

We are your partner in educating and preparing your child for a successful future, and you are a vital link in the educational process. By talking with your child about the material (activities) in this brochure, you can reinforce the concepts we are teaching at school.

Please take time to fill out the form on this brochure, detach and return it to school with your son/daughter.

Together we CAN and WILL maximize your child's potential!

Sincerely,

Teacher



Certificate Of Accomplishment

This certifies that

*has successfully completed the necessary requirements for the
Project Discovery kit entitled "Greenhouse Work"
And in recognition thereof is presented this certificate,*

this _____ day of _____, 20____.

Instructor _____

Director _____



