

Where Is The Food?

Foods That Grow Underground



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Overview

Foods That Grow Underground is an interdisciplinary program based on science that effectively integrates math, language arts, and technology. It was designed to enable students with disabilities to experiment with science as a hands-on exploratory process in a cooperative environment. Second graders learn the ways underground foods are produced, how temperature affects their growth, and the changes that take place when these foods are cooked. They learn about vegetative production by planting and observing the growth of underground foods as plants from bulbs, stems from roots, and eyes from potatoes and seeds. Information about these foods is obtained from the Internet and library books.

We began by planting white potatoes in the classroom. The children observed white potatoes before they grew eyes, and compare with those with eyes. The children are also engaged in research on the Internet and learning the rudiments of typing. The reports are divided among the students. Each has a specific food to research. They then paraphrase that information and type it in the form of report. In addition, lessons on onions, garlic, and carrots are taught. The children make one field trip to the local supermarket to investigate the prices of these foods. They also make a trip to the children's garden at the Brooklyn Botanic Garden to observe plants. Additionally, they make several trips to the P4 garden, where they transplant the young plants. Here, these

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plants are developed for harvesting. In addition, personnel from the Brooklyn Botanic Garden make several visits to the P4 garden to give advice and information on planting onions and garlic. Through this program, students learn that they can create a garden anywhere, and they have the opportunity to experiment with and make predictions about different things.

This program is designed for early childhood students, specifically for SIE V11 A second graders.

Goals

1. To experience some diversity of forms in the plant kingdom.
2. To observe and describe the changes that occur as plants grow and develop.
3. To discover the ways that new underground foods grow.
4. To encourage cooperation and high self-esteem.
5. To discover the various ways that new plants can develop from mature plants.
6. To learn how to type and how to access the Internet.



Timeline

- Week 1 Learning to type - locating keys on the keyboard
- Week 2 Practicing typing
- Week 3 What plants need to grow?
- Week 4 Identifying foods that are in the students' everyday meals
- Week 5 What are the ways plants grow?
- Week 6 What are the parts of a plant?
- Week 7 Effects of heat on foods
- Week 8 Soil investigation
- Week 9 Bulbs and their family
- Week 10 Planting onions and garlic
- Week 11 Solving story problems
- Week 12 Bulb dissection
- Week 13 Tubers and their family
- Week 14 Grafting of food prices
- Week 15 Visit to the local supermarket
- Week 16 How to access the Internet; Letter writing
- Week 17 Research on various underground foods
- Week 18 Writing activity: story writing



- Week 19 Learning about probability
- Week 20 Life cycle of a potato
- Week 21 Planting potatoes
- Week 22 Learning to measure - lengths of leaves
- Week 23 Visit to Brooklyn Botanic Garden
- Week 24 What are the parts of a seed?
- Week 25 Writing invitations
- Week 26 Paraphrasing and writing the research
- Week 27 Paraphrasing and writing the research
- Week 27 Effects of heat on foods
- Week 28 Transplanting young potato plants to P 4 garden
- Week 29 Planting carrots
- Week 30 Learning to multiply
- Week 31 Complete typing research
- Week 32 Learning about circumference

How to measure using standard measurement

Subject: Math

Objective: Students will have experience in working with the concepts of length.

Materials: A variety of leaves

Tape measure

Paper

Pencils

Book: *The Knee-High Man*

Procedure: Read *The Knee-High Man*

Tell the students they will learn to measure using standard measurements.

Have them work in groups of twos or threes.

Distribute the materials to groups.

Demonstrate how to measure.

Have the students measure each leaf, and record their answers on their paper.

Have the children share and compare their answers with the class.

Homework: Worksheet # 1

Evaluation: Students must be able to demonstrate competence in measuring.

What is the circumference?

Subject: Math

Objective: Students will find the circumference of onions, potatoes, sweet potatoes, and carrots.

Materials: Book: *Sir Cumference and the First Round Table*

Several pieces of string

Rulers

Activity worksheet

Procedure: Read the book *Sir Cumference and the First Round Table*.

Tell the students they will find the circumference of the foods.

Draw a circle on the chalkboard.

Discuss what tools of measurement they will use.

Use the string to measure the outer edge of the circle.

Measure the string with the ruler to determine the number of inches.

Have the children work in groups.

Hand out worksheet # 2 and the materials.

Use your string to measure three different parts of your foods.

Measure each string with your ruler.

Record your answers under each part of your food in the boxes.

Have students compare their answers.

Where Is The Food? 

Discovery questions:

Are all the answers the same?

Which part of the potato, onion, sweet potato, and carrot is the biggest?

Homework: Worksheet # 2

What is the price per pound of each food?

Subject: Math

Object: Students will estimate the price per pound of each food.

Materials: Book

Procedure: Write the following question on the chalkboard: What is the price per pound for the following foods: yams, white potatoes, sweet potatoes, carrots, onions, and garlic?

Ask the students to pretend that they are going to buy the items mentioned in the problem.

Have the children guess the price per pound of every item.

Record their answers on the board.

Ask the students to use the answers to make up addition problems, and solve them.

Activity: Take the children to the local supermarket to get the actual prices of the items.

Homework: Using the prices from the supermarket, make a graph. Then answer the following questions:

Which item cost the most?

Which item is the cheapest?

What are the effects of heat on foods?

Subject: Science

Objective: Students will learn what happens to some foods when heat is applied.

Materials: carrots, potatoes, onions, and garlic

Water

Salt

Cooking oil

A pot

Knives

A large bow

Procedure: Display the foods.

Direct the students' attention to the food displayed. Give youngsters the opportunity to share what they know about the foods. Tell the students that this lesson will teach them what happens to food when heat is applied.

Invite the children to touch and smell foods. Discuss their findings.

Have the students prepare the food for cooking by peeling, washing and cutting into small pieces.

Have the students observe the texture, taste and feel of the raw food.

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Write responses on the chalkboard.

Give the students the opportunity to place the pieces into a pot of water.

Have the students observe the changes that take place as they are cooked.

Have the students taste the food after it is cooked.

Ask the children to tell how the food changed in texture, taste, and feel.

Assessment: Have the children list the changes that take place in the food and write a conclusion.

What are the parts of a plant?

Subject: Science

Objective: Students' will identify the parts of a plant.

Materials: Hand lens

One plant

Worksheet # 4

Procedure: Ask students to tell what they know about plants.

1. Display a plant.
2. Tell the students that just as their bodies have parts and functions, so do plants.
3. "Today you will learn about the parts of a plant and their functions."
4. Take the plant from the pot, expose the roots and show them to the children.
5. Explain that there are tiny hairs on the roots and state the functions of the roots and hairs.
6. Next, point out the stem and explain its function.
7. Touch the leaves and give functions.
8. Identify the flower and discuss its function.

Evaluation: Have children summarize the parts and functions.

Homework: Have students complete worksheet #5.

What are the parts of a seed?

Subject: Science

Objective: Students will identify the parts of a seed.

Teacher Preparation: Soak beans in water for 30 minutes.

Materials: Seeds

Kidney beans

Dish with water

Paper towel

Hand lens

- Procedure:
1. Read background information.
 2. Draw a seed on the chalkboard.
 3. Label the parts of the seed.
 4. Discuss and explain seed parts.
 5. Distribute materials to groups.
 6. Direct groups to complete worksheet # 6

Homework: Complete activity on worksheet # 7

Background Information:

A seed is a baby plant with its coat and food. The function of a seed begins when pollen unites with an egg. As it matures, it develops several basic parts. The seed coat is usually a paper-thin covering. Inside the seed is the embryo or young plant. This consists of the plumule –which is the tiny bud of a plant embryo. Attached to the leaves

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is the young stem. The lower part of the stem develops into the primary roots. Food for the new plant is stored in one or two cotyledons, which are called seed leaves, because they furnish food until the embryo is big enough to make its own.

Extension: Use worksheet # 8.

What are the needs of plants?

Subject: Science

Objective: Students will discover why plants need certain items for them to grow.

Materials: Young seedlings (example – tomato, pepper)

Soil

Plant containers

Worksheet # 9

Procedure: Ask students to think about what plants need to grow. Give the youngsters an opportunity to share their ideas; then explain to students that plants need to eat, drink, breathe, and burn up energy in order to grow.

1. Direct students' attention to the seedlings. Use relevant part of the background information to explain why each item is needed.
2. Have the students orally summarize the needs of plants.

Homework: Worksheet #9.

Extension: Have children do experiment on the following activities:

Materials: 8 plastic bowls

Piece of glass to cover bowl

Ice water

Place a piece of kitchen paper in the bottom of the plastic bowls.

Put several seeds on top of this.

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Use two dishes for the four factors. One dish is for the experiment and the other is used as a control.

1. Water seeds #1.
2. Do not water seeds #2.
3. Keep seeds # 3 in ice water.
4. Put seeds # 4 in a dark cupboard.
5. Keep seeds # 5 in a warm place.
6. Put seeds # 6 in a sunny window.
7. Leave seeds #7 open to the air.
8. Place a sheet of glass over seeds #8.

Discovery questions:

What happened to each pair?

Do seeds grow better in warm or cold places, in light or dark, with or without moisture and air?

Background Information: A green plant must eat, drink, breathe and burn up energy in order to grow. It requires light, minerals, air, water, and suitable temperature in order to thrive. Plants need water to dissolve some of the minerals in the soil. The minerals go through the walls of the root hairs and into the roots. They also need water from the soil and carbon dioxide

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gas from the air to form sugar. Chlorophyll, the green coloring material in leaves must be present for this reaction to take place. Sunlight provides the energy needed to sustain this process.



What are the ways plants grow?

Subject: Science

Objective: Students will discover the different ways that plants propagate.

Materials: Grass seeds

Cereal containers

Dirt soil

Old socks

Book: *What Shall I Grow?*

Stems

Bulbs

Potato eyes

- Procedure:
1. Tell the students that this lesson will teach them how new plants develop from mature ones.
 2. “How do you think plants grow?” Elicit answers from students. Record these answers on the chalkboard.
 3. Display the parts of the plants.
 4. Read the book *What Shall I Grow?*

Activity: Worksheet # 9

Homework: Make a list of the different ways that plants grow.

What are the life cycle stages of a potato?

Subject: Science

Introduction: Write the word “potato” on the chalkboard and draw a potato beside it.

Invite students to describe a fully-grown potato. Record their responses to the word “potato.” Ask where potatoes come from. Verify that potatoes come from eyes. Write and illustrate the word “eye” on the chalkboard. Here the students tell what a potato eye looks like when you write their descriptions below the word “eye.” Invite students to predict some of the changes that will occur as the potato eye develops into a large brown potato. Accept all responses and write them between the words “eye” and “potato.” Tell the students they will learn about a potato life cycle in this lesson.

Procedure: 1. Use the background information to describe to students the life cycle of a potato.

 2. Have the students orally compare and contrast this information with their ideas recorded on the chalkboard.

Evaluation: Give each student a copy of worksheet # 13.

 Read the sentences on the worksheet.

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List the following words on the chalkboard:

Stem

Eye and Root

Green

Brown

Have each student use the listed words to complete the sentences on the worksheet.



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Background Information: It has stems above and below the soil. The underground stem is a vegetable. The potato plant has spreading stalks and dark green leaves. The flowers are small and white, lavender, blue, or yellow, depending upon the variety. The petals form a tube-shaped bloom. The small fruit is a berry that looks like a tiny green or purple tomato. Each contains a few to several hundred seeds. The potato has a fibrous root system. The underground stem slowly turns to swollen tubers, then to mature potatoes. Eventually, the older tuber shrivels and rots away. Students will sequence the life-cycle stages of a potato. This process, from eyes to mature potato, takes about 70 – 90 days. If the eyes of a mature potato are planted, the cycle will begin again.

Extension: Give each student a sheet of construction paper, crayons, scissors, and glue. Tell students that each of them will use these materials to create a book of a potato's life cycle. Instruct each student to fold and cut paper in half, length ways (hot day fold), then in half across (hamburger fold). Have them cut the paper on fold. Sequence and glue the boxes onto the pieces of construction paper. Have the students put together and hold in place with two fasteners.

Evaluation: Have students orally summarize a potato's life-cycle stages.

Display books in classroom.



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Date _____

Worksheet # 1

Measuring Leaves

Use your ruler to measure each leaf.

Record your answer under each leaf.





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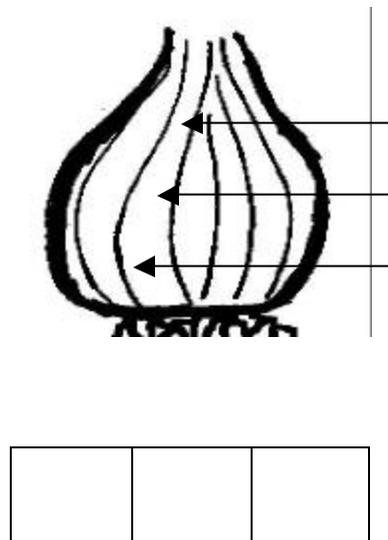
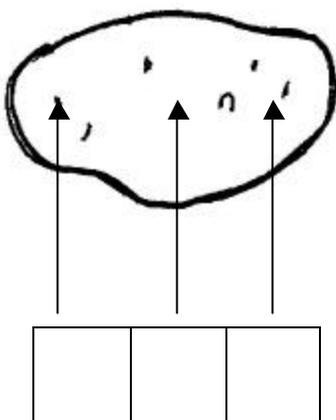
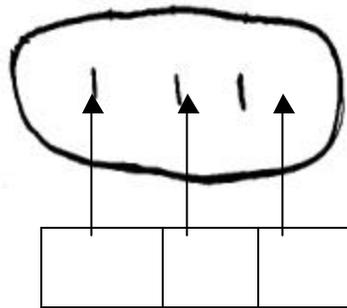
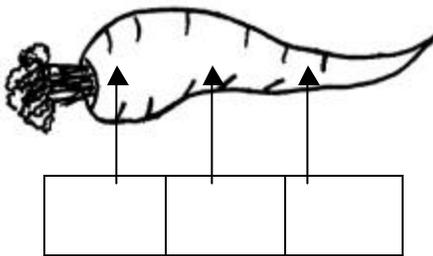
Name _____

Date _____

Worksheet # 2

Circumference

1. Use your string to measure around the top, middle and bottom of the vegetables.
2. Cut the string to the measurement.
3. Measure each string with your ruler.
4. Record the results in each box next to the parts measured.





Name _____

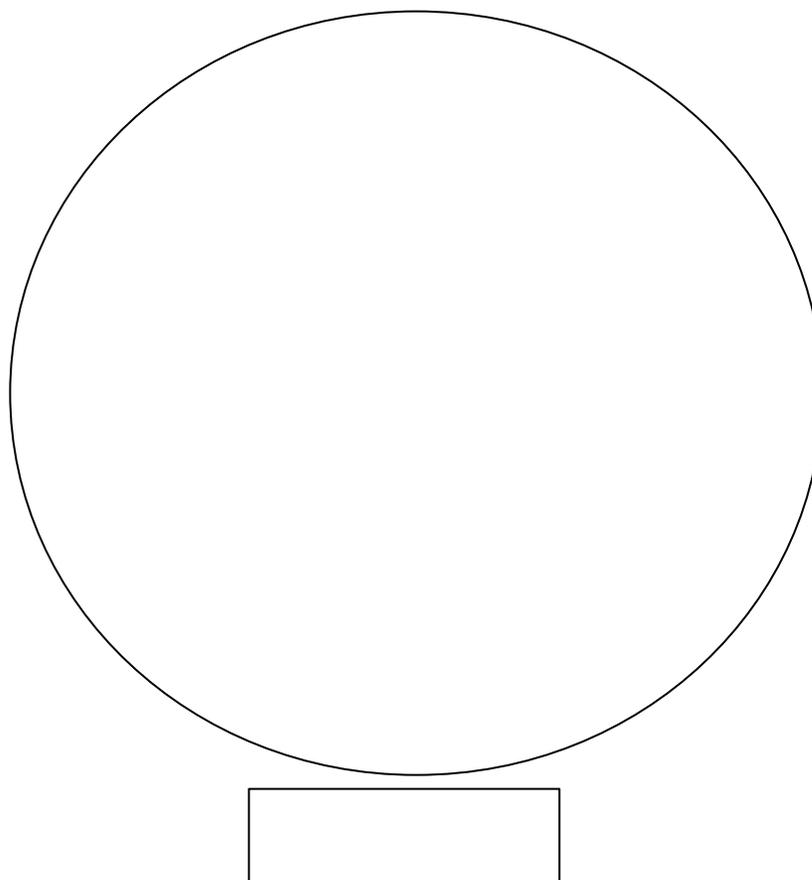
Date _____

Worksheet # 3

Circumference Homework

Materials: 1 piece of string

Ruler



1. Use your string to measure the circumference of the circle.
2. Cut the string to measurement.
3. Use your ruler to measure the string. Record your answer in the box



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Name _____

Date _____

Worksheet # 4

What are the parts of a plant?

Complete each sentence.

Use the word bank.

1. The _____ of a plant carries water and minerals from _____ to the leaves.
2. The _____ of a plant makes the food for the plant.
3. One of the main jobs of the _____ is to take in water and minerals from the soil.
4. _____ also store food.
5. The stem supports the leaves and _____ of a plant.

Word Bank			
Root	Stem	Leaves	Flowers



Where Is The Food?

Name _____

Date _____

Worksheet # 5

Parts of a Plant



Read each sentence.

Follow the directions.

1. Trace the stem with a brown crayon.
2. Make an “x” mark on each leaf.
3. Circle the roots.
4. Color the flower red.
5. Point an arrow to the root hair.



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Worksheet # 6

Name _____

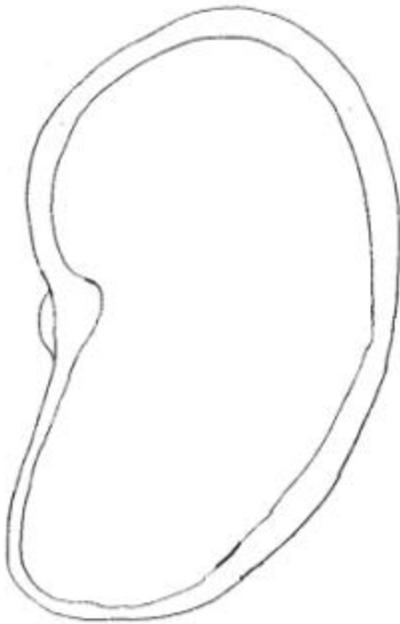
Date _____

Parts of a Seed

Follow the directions.

Draw the parts of a seed.

Label each part using the words in the word bank.



Word Bank			
Baby Stem	Baby Root	Baby Leaves	Seed Food



Where Is The Food?

Name _____

Date _____

Worksheet # 7

Parts of a Seed

Complete each sentence.

1. The seed has a thin _____.
2. Two tiny _____ can be seen inside.
3. Attached to the leaves is a young _____.
4. The lower parts develop into the primary _____.



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Worksheet # 8

Grouping seed by color

Look at all your leaves.

Sort your seeds into piles of the same color.

Put an x in a box that names its color.

RED								
YELLOW								
GREEN								
BROWN								

1. Which color has the most seed?

How many seeds does it have?

2. Which color has the fewest seeds?

How many seeds does it have?



Name _____

Date _____

Worksheet # 9

Needs of a Plant

Complete each sentence.

Use words from word bank.

1. Plants need _____ and _____(carbon dioxide) to form sugar.
2. They need suitable _____ in order to thrive.
3. _____ provides the energy needed to make the green coloring material in leaves.
4. They also need _____ to dissolve substances.

Word Bank			
Water	Air	Temperature	Sunlight



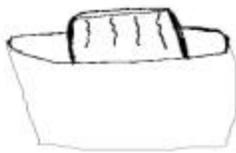
Where Is The Food?

Name _____

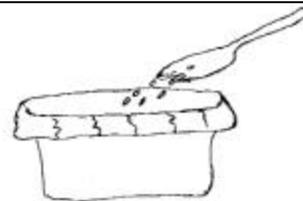
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Worksheet # 10

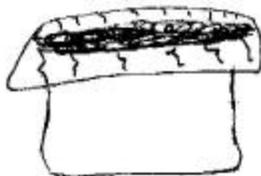
The Way that Plants Grow



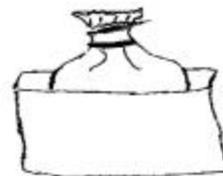
1. Wet an old sock and put it into a cereal bowl. Turn the top over the rim.



2. Use a spoon to spread lots of grass seeds all over the bottom.



3. Use an old spoon to fill the cereal bowl with potting soil.



4. Wrap a rubber band tightly around the sock. Chop off the top.



5. Pour water onto the top of the sock. Lift it up and let it drip.



6. Turn it upside down. Put it on a saucer and pour water around it.



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Worksheet # 11

The Ways that Plants Grow

In each box write the different ways that plants grow.



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Worksheet # 12

Potato Life Cycle

	 <p>Next spreading _____ and dark green _____ grow.</p>
 <p>A potato eye is planted. It grows stems _____ and stems _____ the soil.</p>	<p>A small _____ develops _____ the ground.</p> 
 <p>The tuber slowly turns _____ and is ready to be dug up.</p>	<p>As the young tuber develops the older tuber shrivels and rots away.</p> 



Resources

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Neuschwander, Cindy (1997). Sir Cumference: Charlesbridge Publishing, MA.

Weekly Reader (1982). Young Students Encyclopedia Vol. 15. Middletown, Connecticut.

Weekly Reader (1982). Young Students Encyclopedia. Vol. 4. Middletown, Connecticut.

Internet:

<http://www.gardenersnet.com> a good source of information about all kinds of vegetables.

<http://www.learn.co.uk> a wonderful site with diagrams and information about growing plants, plenty of scientific information.

Trips: Brooklyn Botanic Children's Garden
Local Supermarket

Additional Resources:

Julie Warsowe
Program Manager
Brooklyn Green Bridge.

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