Grade 4

Connecting Healthy Gardens with Healthy Youth

Lesson One: How does food relate to plants?

"My Lunch Came From Soil" from GROWING IN THE GARDEN, LOCAL FOODS AND HEALHTY LIVING, Iowa State University Extension and Outreach
"Carrot Tops" from SCIENCE PROJECTS OF THE WEEK (S.P.O.W.), Nimitz Middle School, LA

Students make surprising connections between the food we eat and soil. Apple Earth illustrates how little soil is left to grow food for almost 7 billion people. What can we do to assure our access to healthy foods? Students conduct experiments and prepare tasty, healthy recipes with a root crop that grows in the soil, carrots.

Content objectives: Describe how most foods start in the soil and then go through several steps before we eat it; Understand the implications of how little soil is left to grow food for a growing population; Identify ways to have access to healthy foods; Understand characteristics of carrots and conduct an experiment.

Life Skill objectives: Healthy living, Critical thinking, Communication, Citizenship, Leadership, Decision making, Problem solving, Cooperation

Core and STEM concepts and skills:

Science	Science as inquiry, Earth and space, Life science
Math	Numbers and operations, Algebra, Geometry, Measurement, Data
Language Arts	Speaking, Listening, Writing, Viewing
Social Studies	Behavioral sciences, Economics, Geography, History, Civic literacy

Healthy snack: Carrots or Carrot Raisin Salad (EATING FROM THE GARDEN) or Moroccan Carrot Salad (GARDEN MOSAICS)

Additional and supporting resources:
Carrot Family and Carrot activities and recipes from GARDEN MOSAICS; *Singing in Our Garden* (CD), "Dirt Made My Lunch" by the Banana Slug String Band from bananaslugstringband.com

BEFORE THE LESSON

1. **Grade 4, Lesson 1:**
This document contains all the curriculum items and resources you need for this lesson. All lesson downloads are located on the www.peoplesgarden.wsu.edu Educational Toolkit.

2. Secure a copy of *Singing in Our Garden* (CD), "Dirt Made My Lunch" by the Banana Slug String Band from www.bananaslugstringband.com. Check materials list for complete description of items needed.

3. Assemble necessary ingredients and materials for the selected recipe(s).

THE LESSON

1. **My Lunch Came From Soil** and **Carrot Tops** are meant to be taught over two or more days.

AFTER THE LESSON

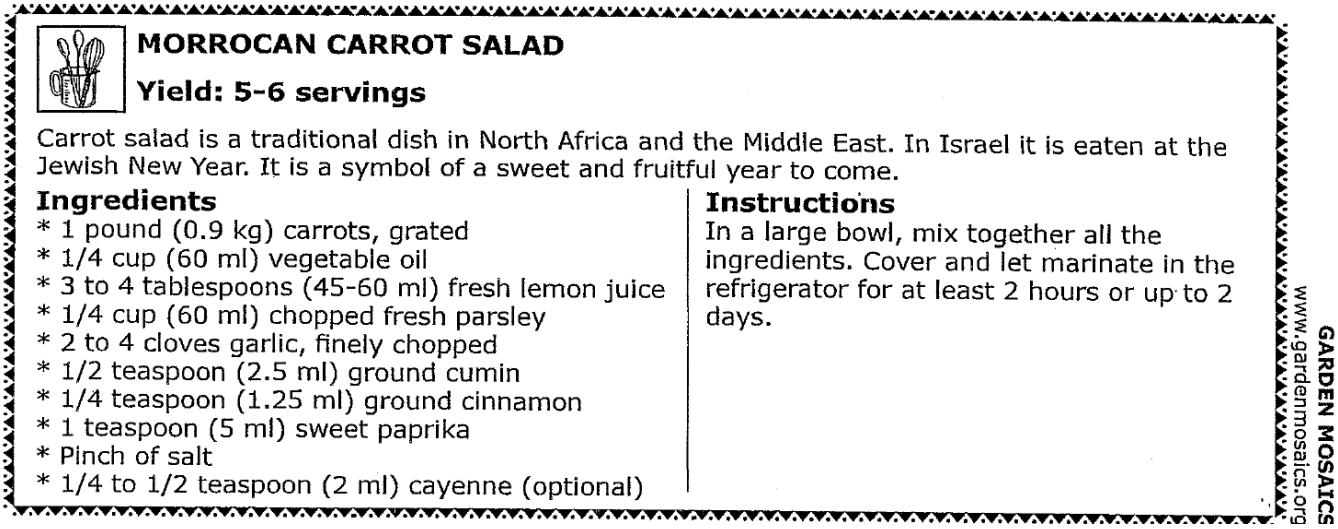
Optional activities are included in the lesson plan for a pizza game to reinforce lesson concepts.
Also included is the Carrots Science Page from Garden Mosaics. Consider using some of the activities described.

Recipes

Cracker Mini Pizza from lesson
For each student:
1 cracker
¼ slice of cheese
Pizza vegetables or 1-piece pepperoni
Pizza Sauce in a squeeze bottle

Have student squeeze a small amount of pizza sauce on top of a cracker, add cheese, veggies and/or pepperoni.

Morrocan Carrot Salad from GARDEN MOSAICS



MORROCAN CARROT SALAD

Yield: 5-6 servings

Carrot salad is a traditional dish in North Africa and the Middle East. In Israel it is eaten at the Jewish New Year. It is a symbol of a sweet and fruitful year to come.

Ingredients
* 1 pound (0.9 kg) carrots, grated
* 1/4 cup (60 ml) vegetable oil
* 3 to 4 tablespoons (45-60 ml) fresh lemon juice
* 1/4 cup (60 ml) chopped fresh parsley
* 2 to 4 cloves garlic, finely chopped
* 1/2 teaspoon (2.5 ml) ground cumin
* 1/4 teaspoon (1.25 ml) ground cinnamon
* 1 teaspoon (5 ml) sweet paprika
* Pinch of salt
* 1/4 to 1/2 teaspoon (2 ml) cayenne (optional)

Instructions
In a large bowl, mix together all the ingredients. Cover and let marinate in the refrigerator for at least 2 hours or up to 2 days.

GARDEN MOSAICS
www.gardenmosaics.org

Carrot Raisin Salad from EATING IN THE GARDEN (next page)

Eating From the Garden Recipes

A nutrition and gardening program

Carrot Raisin Sunshine Salad

Ingredients:

- ❑ 1 pound carrots (5 or 6), peeled and shredded
- ❑ ½ cup raisins
- ❑ 8 ounces low-fat vanilla yogurt

Equipment:

- ❑ Knife
- ❑ Peeler
- ❑ Cutting board
- ❑ Grater
- ❑ Measuring spoons
- ❑ Small bowl
- ❑ Measuring cup
- ❑ Plastic wrap

Directions:

1. Wash hands and surfaces.
2. Wash and peel carrots, and grate or shed into small pieces.
3. In a large bowl, mix all ingredients together.
4. Cover with plastic wrap and refrigerate for 15 minutes.
5. Toss again before serving.
6. Refrigerate leftovers.

Servings: 4

Nutrients per serving:

Calories : 157	Sodium: 83 mg
Fat: 1 g	Carbohydrates: 35 g
Protein: 3 g	Cholesterol: 4 mg
Fiber: 4 g	Protein: 5 g

Wash fresh vegetables before peeling.

Cooking terms

Peel:
To remove the outer covering.

Shred:
To cut into thin pieces with grater or other tool.

My lunch came from soil?

Revised
Unit 2
Lesson 2b

CONTENT OBJECTIVES

Describe the steps of food production from natural resources to the things we eat, Understand the implications of how little soil is left to grow food for a growing population, Identify ways to provide food for themselves and others

LIFE SKILL OBJECTIVES

Communication through listening, sharing ideas, developing visuals, presenting information, and participating in a positive way; Citizenship by recognizing and respecting the natural resources, people and places that provide food; Citizenship and leadership by recognizing needs, sharing ideas, and actively participating; Leadership by working together in a team, listening and talking to others before making a decision, and being a good example; Healthy living; Critical thinking; Decision making; Problem solving; Respect; Responsibility; Cooperation

INDICATORS
E EVALUATIONS

Worked with others to describe and illustrate how people found and prepared food since the 1800s, Responds to the questions regarding how little soil is left to grow food for a growing population, Follows instructions and helps team in the Soil to Food Relay and to prepare snacks, Identify one way to help their family with the food they eat

SUBJECT STANDARDS
CORE CONCEPTS AND SKILLS

21st Century Skills: Health literacy, Civic literacy, Employability skills, Technology literacy
Science: Science as inquiry, Life science, Earth science
Social Studies: Behavioral sciences, Economics, Geography, History, Civic literacy
Literacy: Speaking, Listening, Writing, Viewing
Mathematics: Numbers and operations, Algebra, Geometry and measurement, Data analysis

LEARNER TYPES

Linguistic-words; Logical-mathematical; Spatial-visual; Bodily-kinesthetic; Intrapersonal; Interpersonal, Natural

MATERIALS

Singing in the Garden CD by the Banana Slug String Band *(for "Dirt Made My Lunch" song, go to bananaslugstringband.com, or use the lyrics found at the end of this lesson)*
CD Player
It's Lunch Time! activity sheet *(4 copies, found at the end of the lesson)*
Pencils *(one per person)*
48 White paper plates *(for drawing and coloring)*
Crayons or colored pencils *(enough to distribute to four groups)*
Hole punch *(optional)*
Ball of yarn or string *(optional, to tie plates together, can substitute masking tape)*
Large apple *(one that is easy to cut)*
Knife
Cutting board

Materials continued on the next page.

MATERIALS CONTINUED

Soil to Food Relay supplies *(see the chart in the Apply section)*
Corn, soybean, pumpkin, sunflower, or bean seeds, or colored game chips to be used as game markers *(Try to us three or four different kinds of seeds or colors of chips and divide them evenly between the people that will be playing "The Pizza Game".)*
Dice or spinner
Mini Pizza ingredients:
One napkin, round snack cracker, quarter-slice of cheese, piece of pepperoni per person
One squeeze bottle of pizza sauce
MyPyramid and/or MyPlate posters *(go to the Printable Materials and Ordering page on www.choosemyplate.gov)*
"The Pizza Game", dice or spinner, seeds or game markers *(optional, one copy per person, may choose to enlarge and copy on 11"x 14" paper, see the Optional Activity in the Apply section.)*

Introduction

Engage

Set the Stage

5 minutes

TEACHER'S NOTES: *You will need a CD player and the* Dirt Made My Lunch *or* Singing in Our Garden *CD by the Banana Slug String Band. Find the "Dirt Made My Lunch" song and be ready to play it so that everyone can hear. If these items are not available, please read the lyrics from the song found at the end of this lesson.*

Where does your food come from?
Let the students share their ideas and listen to their responses. This is a good way to understand your students' perspectives and level of knowledge and understanding.

We are going to listen to a song by the Banana Slug String Band to see where these "edutainers", educators and entertainers, say that foods come from.

Play the "Dirt Made My Lunch" song on the Dirt Made My Lunch or Singing in the Garden CD by the Banana Slug String Band. If that is not an option, read the song found in the Introduction section of Lesson 2A. If you listen to the CD, use the next paragraph. If you read the lyrics skip the next paragraph.

Mr. Dirt sounded sort of rough. Dirt, or soil, is kind of rough. After all, soil is made from rocks. Mr. Dirt said something incredible.
What did he say made your lunch?
Dirt

Now that you've heard the song, how would you answer the question, "Where does your food come from?"
Food comes from dirt!

What is another name for "dirt"?
The "dirt" they are referring to is actually "soil". Dirt is what gets on our clothes and skin and what blows onto our window sills and gets on our cars, vans, and trucks. Soil is what we can grow plants out of.

Do people make soil?
No, people don't make soil. Soil is called a natural resource because it is on the Earth naturally. It takes thousands of years to make soil from rocks, weather, and decaying plants and animals.

According to the song, how does dirt or soil make your salad?
The soil in a garden, orchard, or field grows the lettuce, cabbage, carrots, celery, cucumbers, raisins, apples, bananas, peaches, pears, blueberries and other vegetables and fruits that you might like to eat for your salad.

According to the song, how does dirt or soil make your sandwich?
The soil in a field grew the wheat. The wheat was harvested and ground into flour. A baker added more ingredients to the flour to make bread for your sandwich. What you put in it – jelly, peanut butter, meat, cheese, lettuce, pickles – determines how the soil made the rest of your sandwich.

According to the song, how does dirt or soil make your milk?
The answer is kind of tricky.

Where does most of our milk come from?
A cow

What does the cow eat in order to produce food?
A cow eats grasses and grains. Grains such as corn, oats or flax come from grasses.

Where do the grasses grow?
In the soil

Raise your hand if you think that most of your food, whether it is plant or animals-based – comes from the soil.

Do
EXPLORE
INVESTIGATE CONCEPTS
30 to 40 MINUTES

TEACHER'S NOTES: *Make one copy per student of each of the "It's Lunch Time" activity sheets found at the end of this lesson. Or, make only four copies, one per team. Write one of the following Family Descriptions at the top of four sheets. Divide the students into four teams. Have the team members sit together. Give each team member an activity sheet and a paper plate. Have extra plates ready for students to use, if needed. They can use crayons or colored pencils work well for drawing. Precut several strands of yarn to tie plates together. Be ready to punch holes in the plates and add the yarn when the students are almost finished with their plates.*

FAMILY DESCRIPTIONS	*Native Americans before the 1800*
	Pioneers during the 1800s
	Farmers in the 1900s
	Consumers (you) now

Each group of you is a family described on your "It's Lunch Time" activity sheet. *(Have each group read their description out loud to the rest of the class or group.)* The cool autumn days and your many activities make you hungry. Your family is anxious to eat lunch. The menu is turkey sandwiches, berries, and milk or water. Your family needs to work together to answer the questions on your sheet according to the time period which you are living.

After answering the questions, draw and color the steps onto your twelve plates. Suggestions for the plate pictures are listed at the bottom of your activity sheets. Be creative. After finishing the plates, arrange them in sequential order. The last plate should have a picture of your lunch.

You may want them to punch holes in their plates and give them string to connect them together. They can also use masking tape to connect the plates in order.

You will only have fifteen minutes to finish this activity. That means you'll have to work together the best you can to figure out lunch for your family.

Give them five and ten minute notices. With five minutes left, take around the strings and punch holes at the top and bottom of each plate.

E Start with the Native Americans before the 1800's and have each group hold up their plate chains and show and describe how they made lunch in their time period.

REFLECT
EXPLAIN
DEVELOP CONCEPTS
It's Time for Lunch!
Discussion, 10 minutes
Apple Earth, 8 minutes

Hang up the plates in sequential order. Make a paper sign describing each of the four family groups, for example, "Native Americans before the 1800s".

E IT'S TIME FOR LUNCH! DISCUSSION

What differences did you notice between each of the families and the length of time it took to make lunch?

(To make sure you have discussed each of the following differences between the age periods, you might want to make checkmarks in front of each of the following responses as you hear it from the students.)

- ☐ It took less time to prepare lunch for each time period. *(It is fun to ask each group how long it took for lunch to be ready to eat.)*
- ☐ It became easier to find lunch. *(Ask each group where they found lunch. For example: in the woods, at the river, on the farm, or in the grocery store or restaurant.)*
- ☐ Different tools were needed or used in each time period. *(Have each group share what kind of tools they used to prepare lunch. The current consumers may have gotten in a car and gone to a grocery store or a deli. Note that money seems to be the tool to get lunch now compared to physical labor and hand tools in the past.)*
- ☐ It took less people to find and prepare lunch. *(The groups can each share how many family members it would really take to prepare lunch in their time period. Discuss how it can take less time if more people help.)*
- ☐ In the past, the food was grown, found, handled or processed and prepared by the families. Now, most of our food is grown, found, handled or processed and prepared by many people in many places around the world. In fact, research shows that much of the food we eat in the United States has traveled at least 5,000 miles. Some families still grow, process, and prepare their own food or sell it locally.
- ☐ The food tasted different in the past then it does now. That is because of the way the plants and animals are grown or raised, what they ate, etc. It is also because most of the foods we eat in the United States have gone through a lot of processing. Think about how often you have eaten a fresh peach or pear compared to canned peaches or pears.

There is one thing about most of our food that has remained the same since the beginning of time. What is it?

Most of the food we eat starts in the soil.

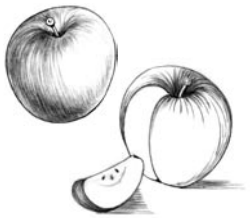
How did the soil make the turkey, bread, berries and milk in the lunch menu?
In all time periods, turkeys ate things that grew or lived on or in the soil. The bread was made from plants such as grains from grasses that grew from the soil. The berries came from plants growing in the soil. The milk was most likely from a cow or goat that ate grasses or grains growing in the soil.

Raise your hand if you agree with the following statement made by millions of children and families across the United States. "We don't need farms anymore because we have grocery stores."

What is wrong with that statement?
Our food still grows out of the soil. In fact it takes a good combination of soil, water, sun, air and people that can use good agricultural practices to grow our food now and into the future.

Let's take another look at the importance of understanding that our food comes from the soil.

APPLE EARTH



Place a washed apple on a cutting board or plate and use a knife to cut the apple into sections as described below. Hold the sections up for the students to see as you discuss what they represent.

(Hold up the apple.) This apple represents planet Earth.
What are some similarities between this apple and the Earth?
They are both round, they each have a core, they each have a crust or skin

We are going to cut the apple into pieces to see how much soil is left on planet Earth to grow food for almost seven billion people and the animals in our care.

1. *(Cut the apple lengthwise in four equal parts and take away three.)*
   These three parts represent the water on Earth.
   Where do we find water on planet Earth?
   In oceans, river, lakes, ponds, streams, etc.

   The piece that is left, one-fourth of the apple, represents the land on Earth.

2. *(Cut the remaining quarter in half lengthwise and take away half.)*
   This half represents the areas on Earth that are too hot, too cold, or too wet for the plants we eat to grow.
   What places are too hot?
   Deserts, equator
   What places are too cold?
   The poles, places where there is frozen ground
   What places other than bodies of water are too wet?
   Swamps

3. *(Cut the remaining portion crosswise into four equal parts and take away three.)*
   These three parts represent areas of Earth where the plants we eat can't grow roots into the ground. We call these surfaces impervious, which means incapable of penetrating or being passed through.

What things cover soil and make the ground impenetrable?
Roads, houses, businesses, shopping malls, schools, parking lots, mountains, rocks, etc.

The fourth portion – only 1/32 of Earth – represents the land that can grow crops for the close to seven billion people and the billions of animals that live on Earth.

Do plants grow into the core of the earth?
No

What do you call the layer of soil where plants grow?
Topsoil

4. *(Peel the skin off the remaining section.)*
   This skin represents topsoil, the part of the soil that plants grow in. This is the amount of soil on planet Earth that grows the food to feed all the people and animals that live around the world.
   Is there very much topsoil on planet Earth to grow our food?
   No

What do you think about the amount of soil left on planet Earth to grow our food?
There's not much soil left that can grow our food.

Will we find any more soil to grow our food?
No, water will continue to cover 75% of planet Earth. The poles will still be too cold to grow food. More buildings, roads, parking lots, shopping malls, golf courses, athletic fields and other things will cover the earth. If we misuse or fail to conserve or protect the good soil we have left, we will lose it, too. It takes thousands of years for the earth to replenish one inch of new topsoil. Scientists and growers are finding other ways to grow foods such as hydroponics, which uses water instead of soil.

Will the population of people and animals on planet Earth increase or decrease?
The population on planet Earth is growing by about 80 million people each year. People are living longer and there are more women at the right age to have babies. According to the United Nations Population Division, there will be seven billion people living on planet Earth by the end of 2011 and close to 10.5 billion in 2045.

How much will our population grow between 2011 and 2045 and how many years is that?
10.5 billion – 7 billion = 3.5 billion or 3, 500, 000, 000 billion people
2045 – 2011 = 34 years
In 34 years, there will be 3.5 billion more people eating food grown from the same amount of soil, or less, than there is on planet Earth now. Think about how old you will be and how you be responsible for feeding your own family. Fortunately, scientists are working hard to find ways to sustain our food supply, or keep it going.

What does Apple Earth tell us?
We need to take good care of the Earth and find ways to grow food for more people and the animals in our care.

Think about the things we learned from the Native Americans and Pioneers in our lunch activity. What is one thing we could do to assure our families that they will have something healthy to eat?
We could grow at least some of our own food.

TEACHER'S NOTES: *Select at least two Fresh/Raw Produce items and their matching Processed Product (tomatoes and pizza sauce) from the first two columns of the Soil to Food Relay chart. Find props as described in the remaining three columns of the chart. You may want to make signs that say Farmer, Processor, Distributor, Grocer, and Consumer. The Mini Pizza's include one napkin, round cracker, squirt of pizza sauce, quarter slice of wrapped cheese, and slice of pepperoni per student. Keep foods in a cooler or refrigerator until they are ready to use.*

APPLY
EXPAND
ELABORATE IN A NEW WAY
20 MINUTES,
POSSIBLY ANOTHER DAY

SOIL TO FOOD RELAY

Place the relay items on the floor, ground, or on chairs in the order of the columns on the Soil to Food Relay chart. Explain to the students that they will soon become farmers or gardeners, processors, distributors, grocers, and consumers in a Soil to Food Relay. The purpose of the relay is to see how fast food can move from the soil in the garden to us, the consumers. Explain each person's actions in the relay as described in the chart.

Divide the class or group into teams of five students. Have two or three teams stand near their props. Ask the farmers what produce they have and what they are to do with it. Repeat the questions with the other team members. Have fun doing the relay. After everyone has had an opportunity to participate, proceed with the questions after the chart.

SOIL TO FOOD RELAY

Fresh/Raw Produce Gardener or Farmer	**Processed Product** Processor	**Distribution Center** Distributor	**Grocery Store** Grocer	**Home** Consumer
Place a sample of the following produce on the ground and stand the gardener or farmer next to the item. When the relay begins, he or she will pick up the fresh/raw product and run it to the processor.	Place the processed product that matches the fresh produce, such as salsa from tomatoes, on the ground and stand the processor next to the item. When the processor receives the fresh/raw produce, he or she will put it on the ground, pick up the processed product, and run it to the distributor.	Place a real or toy phone on the ground or have the students use their hands and fingers to make a phone receiver. Have the distributor stand next to the phone and be ready to receive the processed product from the processor.	Place a real or toy phone on the ground or have the students use their hands and fingers to make a phone receiver. The grocer should be ready to receive a phone call, then the processed product from the distributor.	Put a dollar bill or play money and a grocery bag on the ground and stand the consumer next to them.
Vegetables Choose one or two of the following: tomatoes, peas, beets, green beans, etc.	Choose a juice, canned or dried product made from the fresh produce in the garden produce column.	When the distributor receives the processed product, he or she will pick up the phone to call the grocer. The distributor makes a ringing sound and the grocer picks up his or her phone. The distributor says, " I have a new shipment of salsa (or whatever the processed product is), do you need some in your store?" The grocer will answer, "Yes." Then the distributor runs the product to the grocer.	After receiving the product from the processor, the grocer holds up the product, looks toward the consumer, and yells, "Salsa (or what-ever the product is) for sale. Salsa for sale."	Once the consumer hears "Salsa for sale!" from the grocer, he or she picks up the money and the grocery bag, runs to the store, hands the money to the grocer, the grocer puts the product into the bag, the consumer runs the product back home, takes it out of the bag and pretends to eat it.
Fruits Choose one or two of the following: grapes, oranges, apples, berries, etc.	Choose a juice, canned or dried product made from the garden produce column.			
Grains Choose one or two of the following: corn, oats, wheat, rice.	Choose crackers, pasta, cereal, rice cakes, or bread made from the produce in the garden produce column.			

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What foods reached the consumer the fastest?

How many steps did it take to get the food from the farm or garden to the consumer?
Five

Did it take very long to get from the garden to the consumer?
It didn't take long in the classroom relay.
How long do you think it takes for food to move from the garden or farm to the grocery store?
Food is moved to the grocery store as fast as possible, keeping it as fresh as possible. In some cases, produce could move from the garden to the store in 3 days or less.
What are some reasons it would take longer than 3 days to get food from the garden or farm to the store?
If you look at the labels of the foods you pretended to buy at our grocery store, some foods are grown or processed or distributed in another state or country. It would take some time to transport them from place to place.

The farmer and gardener, processor, and distributor didn't really run the food from one place to another.
How does food move from the farm or garden to the processor, then the distributor and finally to the grocery store?
The raw produce at the farm, garden or ranch was probably packed into the back of a large truck, and a truck driver drove it to a processing plant. The food may also go from the processing plant to the distributor and on to the grocery store in trucks.
What if the food is grown in China or South America?
How do you think it came from there to the grocery store?
The food could be moved from place to place on trucks, trains, ships, or planes.

How would you describe the Soil to Food steps if you bought fresh tomatoes or fresh salsa at a farmer's market?
Local gardeners and farmers that follow proper growing and processing guidelines and rules can sell their own home-grown tomatoes or home-made salsa at community farmer's markets. There would be only four steps to the relay and the same person can do all the steps except be the consumer. The gardener or farmer would harvest the tomato. He or she would clean it or turn it into salsa (process it) at home. The distribution center and grocery store is replaced by the farmer's market. The gardener is called a farmer's market vender and sells his or her own products. The consumer is still you or someone else buying the locally-grown tomato or salsa.

As a consumer, would you rather buy tomatoes and salsa from a grocery store, a farmer's market, or maybe you could grow tomatoes and make salsa yourself?
Explain what you would like to do and why.

Think about all the people, buildings, machinery, trucks, and advertising that it took to get the food from the soil to you. Do you think that the amount you paid is a good price?
In the United States, we are very fortunate that our fantastic grocery stores have the largest supply of some of the safest, freshest, least expensive food in the world.

How was each fruit, vegetable or grain changed from when it came from the garden or field?
Have them describe the changes such as washing, slicing/chopping/smashing, adding ingredients, cooking, freezing/refrigerating, packaging, etc.

We call changing a raw agricultural product, such as the ones we just talked about, into a new product – **value added agriculture**. Value was added by changing the product so that more people would want it. That would mean more farmers would have to grow more produce, more workers would have to turn the produce into processed products, and the distributors and grocers would have more product to sell to you the consumer. That means more money for everyone involved and that means, you the consumers have more food choices that you like.

Raise your hand if you would rather eat a fresh, raw tomato over pizza or spaghetti sauce.
Raise your hand if you would rather eat pizza or spaghetti sauce rather than a raw tomato.

In most cases, the students will raise more hands for the value-added tomato products. Have them repeat why it is good to add value to raw products.

MINI PIZZAS

You are going to become processors working at a processing plant that makes mini pizzas. The ingredients have come from four different processing plants and you are responsible for assembling them. I have kept the ingredients in a cooler to keep them fresh and safe to eat.

Besides keeping our ingredients cool, cleanliness will assure us that our pizzas will be safe to eat. So the first thing you need to do is to go wash your hands with soap and water and dry them with a paper towel *(or air dryer, if available)*.

While they are washing their hands, select four students to wash their hands first and stand in a line facing the room. Give the first student a stack of napkins, the second one the round crackers, the third one the quarter-slices of cheese, and the fourth one the slices of pepperoni. You or another adult helper can take care of the squeeze bottle of pizza sauce in between the crackers and cheese.

We have four factory workers ready to work on the Mini Pizza assembly line, which will be you. First, let's figure out where each of our pizza ingredients came from.

The first person will be putting a napkin on your open hands. We won't trace those ingredients now. The second person will put a cracker on your napkin.

What is the main ingredient in crackers?
Wheat is usually the main ingredient. It is a grain that comes from a wheat plant.

Where did the wheat come from?
A farmer grew the wheat in the soil. He or she harvested it and a trucker took it to a processing plant to be made into wheat flour. Then it went to another processor to be made into crackers, a distributor sold the crackers to a grocer. We bought these crackers from the grocery store.

The next person will squeeze a little pizza sauce on your cracker.

What is the main ingredient in pizza sauce?
Tomatoes are the main ingredient in pizza sauce. Onions, garlic, peppers, basil and other flavorful vegetables and herbs were probably added.

Where did the tomato come from?
Tomato sauce is a good example of a value added agriculture product where the raw tomato from a garden or field was sent to a processor to be changed into something people want more of. The processor turned the tomatoes into pizza sauce and sent it to the distributor. The distributor sold it to the grocery store where we bought it for you to eat.

Next, you will get a quarter slice of cheese with the wrapper still on it. The factory worker will put it next to your cracker with the pizza sauce so you can take it back to your desk and take the wrapper off before you put it on your pizza.

Where does cheese come from?
Most cheese comes from cows. However, you can get cheese from goats and even sheep. Tofu is cheese made from soybeans.

How does cheese start from the soil?
The soil grows the grains that the cows eat. The cows produce milk. The milk is taken to the processor to be made into cheese. The processor sends it to the distributor. The distributor sells it to the grocery store. We buy the cheese from the grocery store.

Is cheese an example of a value added agriculture product? Why?
Yes. Milk is the raw agriculture product that was changed into cheese so that more people will buy it.

We are going to form a line that passes in front of each of our factory workers. If you do not want one of the ingredients in the pizza, please say "No, thank you." Take you mini pizzas back to your seat and assemble it. Once you have done that, you may eat it.

It is really loud in a factory. That means you can't talk to one another during this process unless you are saying "No, thank you" because you wouldn't be able to hear each other. I will play Dirt Made My Lunch and you can pretend it is on your ear phones.

When they are done eating their pizzas, ask them what they thought about their pizzas. Ask them how many people do they think they should thank for making it possible to eat pizza?

Take a minute or two to ask them what food groups from MyPyramid or MyPlate are represented in the pizza. They should identify all but the fruit group. Ask them what they could have with their pizzas to include the fruit group.

Besides eating foods from each of the food groups, what else could you do to make you healthy?
Exercise

Please stand by your desk. If you agree with the following statements, use your arms and legs to march in place, count out loud to ten, one count for each step. If you disagree with the statement, put your hands above your head and touch your toes ten times.

1. Most of my favorite foods start in the soil.
2. We have to take care of the soil because there isn't much left on planet Earth to grow our food.
3. We don't need farmers and gardeners for food because we have grocery stores.
4. Our family could easily grow all the food we eat.
5. I can grow some healthy food for me and my family to eat.

You may want to discuss each of these statements; or, explain to the students that they will learn more about these statements throughout the garden lessons.

If you would like to have the students plant a food crop in the soil, you might like to check out the egghead planters in Lesson 2A. Or, you can purchase tomato, pepper, or basil transplants and take care of them until it is time to transplant outside.

LOCAL CONNECTIONS

Ask the students to find out what food is being grown or processed in or around your community. Also include places where local foods (foods grown near where you live) are sold. Give them a few days or a week to visit with their parents; use their eyes and ears to investigate; visit a farm, garden, orchard, garden store, or processor; or check other local resources. Have them write down what they find out and be able to report back.

When they report back, discuss the quantity of food items they found. Discuss the condition of the soil and the climate to determine how that affects food production where you live. Discuss if they think there could be more local food production or more opportunities to buy local foods. Ask if they can think of ideas that they could do to improve the access to healthy garden foods in their community. You may want to turn their ideas into a service learning project.

OPTIONAL ACTIVITIES

THE PIZZA GAME

Distribute "The Pizza Game" found at the end of this lesson, one per student. Use seeds or game chips as markers.

What time period does this Pizza Game represent?
Now

How can you tell?
There is a processing plant, distribution center, a grocery store, and trucks. It looks like the game players, you, will be buying the pizza from the grocery store instead of growing and preparing all the ingredients yourselves.

How is soil used in the game, or in real life, to bring you your pizza?
Soil grows the plants needed to make the pizza crust and sauce. It also grows the plants that the animals eat in order to produce the cheese and meat on your pizza. The roads and building are built on top of the soil. You will be traveling on the soil to get the pizza from the store to you.

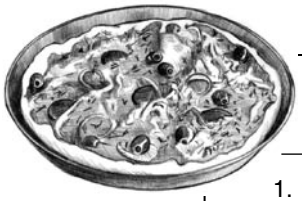
How many buildings did it take to bring you your pizza?
From the game, it looks like it took three – ABC Processing, Tasty Food Distributing, and Choice Food Store. It probably took more. Think of the buildings you find on farms for animals and for farm equipment. Each pizza ingredient went from the farm to different processing plants. Another business might have assembled the ingredients into the final pizza product before it went to the grocery store.

Start at the garden, which will represent different farms and write the number of buildings that you think it took for the animals and the farm equipment to produce the raw agricultural products for the pizza crust, sauce, cheese and meat. *(Give them a minute to write the number by the garden. Then proceed with the number of processing plants and distribution centers. You may want to add a building between the distribution center and the grocery store to assemble the ingredients for the pizza. Have them count up the number of buildings and write "Buildings = number of buildings" in small print at the bottom of the game sheet.)*

How many people did it take to bring you your pizza?
Make tiny stick figures near the garden or farm, trucks, processing, distribution center, grocery store and at least one or two people to bring the pizza home and heat it up. Then count up the figures and write "People = number of people" in small print at the bottom of the game sheet" *(Give them a couple minutes to complete the task and then have them share and discuss their numbers.)*

How many game squares will it take for us to move from the start at the Pizza Garden to the finish at the Pizza?
There are 49 game squares in the Pizza Game. *(You may want to present the following information in the form of a math activity for the students to figure out.)* Because most processed foods in the United States travel approximately 5,000 miles from the farm to you plate, every ten game squares equals about a thousand miles. That means every square could represent about 200 miles. You will be making a long journey in a short time as you play this game. Food travels remarkably fast between the farm and the grocery store.

Play the pizza game by rolling a die for each kind of seed or chip color. For example, everyone with a sunflower seed or a yellow chip will move 1 to 6 spaces. Then everyone with a corn kernel or red chip will move together, and so on.



INSTRUCTIONS FOR THE PIZZA GAME

Follow the path from the pizza garden to the pizza and see how produce moves through the food system.

1. Put the game pieces (garden produce or different seeds) in the garden. When it's your turn, roll one die.
2. Move the number of spaces on the die.
3. If you land on a truck, you're ahead of schedule, move ahead 3 spaces.
   If you land on a hand, stop and check your food, and skip your next turn.
   If you land on a jar, more people want to buy your tomato sauce.
   Move ahead or back to the warehouse dock.
4. The first person to land on the pizza is the ***winner!***

Why would it be a big challenge for families to grow and process all the ingredients for a pizza?
It would be hard to grow the wheat and grind it into flour. It would be a challenge to take care of one cow and change or process the milk into cheese. It would take a lot of time, energy, and equipment to raise one pig, beef cow, chicken, or whatever meat you wanted on your pizza and then process it yourself.

What pizza ingredients would be the easiest to grow on your own?
Tomatoes, peppers, onions, and herbs that go into pizza sauce would be easiest to grow.

What other favorite foods also contain tomatoes, peppers, onions, and herbs?
Salsa, taco sauce, lasagna, chili, and other soups and sauces are some examples of foods that you could make with the same garden produce as pizza sauce.

Look at the pizza on the game and pretend it is salsa. Let's say you grew your own salsa ingredients. How many game squares would there be from your garden to the salsa?
(Discuss how all the processing plant, distribution center, and grocery store would be removed. Then determine the number of steps from the garden to the house. At the top of the game sheet write, "My garden to me = 1 or 2 game squares". The game squares would no longer represent 200 miles each. Discuss how many miles each square might represent.)

How many game squares would you have if you bought salsa ingredients or salsa at a farmer's market where local farmers or growers bring their produce to sell directly to you, the consumer?
(Discuss how the local farmers or growers would take their garden produce directly to the farmer's market and then you would buy them and take them home. If the producers cleaned the produce and made the salsa, you should add another building, such as their house, to process it. Write "Local garden to farmer's market to me = 2 or 3 grams squares." The game squares would no longer represent 200 miles each. Discuss how many miles each square might represent.)

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Dirt Made My Lunch

By the Banana Slug String Band © 2002

CHORUS
Dirt made my lunch,
Dirt made my lunch,
Thank you Dirt, thanks a bunch,
For my salad, my sandwich
My milk and my munch 'cause
Dirt, you made my lunch.

Dirt is a word that we often use,
When we're talkin' about the earth
beneath our shoes.
It's a place where plants
can sink their toes;
In a little while a garden grows.

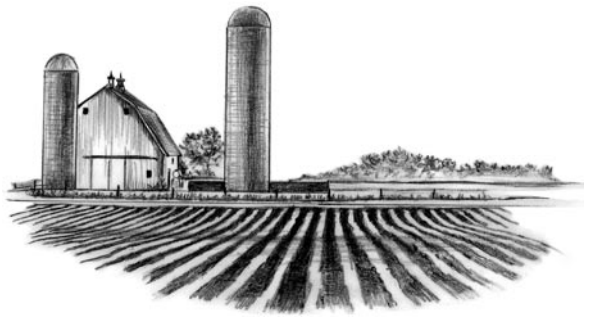
Chorus …

A farmer's plow will
tickle the ground,
You know the earth has laughed
when wheat is found.
The grain is taken and
flour is ground,
For making a sandwich
to munch on down.

Chorus …

A stubby green beard grows
upon the land,
Out of the soil the grass will stand.
But under hoof it must bow,
For making milk by way of a cow.

Chorus …



It's Lunch Time

My lunch came from soil?

Family description Name

Lunch

Turkey Sandwich (Turkey and bread)
Berries
Milk or Water

1. **Where is your family is going to find turkey, bread, berries, milk or water?**

2. **How will you prepare the meal?**

3. **Who will be responsible for each part of the meal? What tools might each person need? How long will it take each person to get their menu item ready to eat?**

4. **Once you've answered questions 1– 3, you are ready to draw and color the paper plates to tell the entire story. You can use a few plates or all twelve plates. After the plates are finished, arrange them in the correct sequence.**

   Suggestions for the plates
   A. Pictures of animals and plants the lunch item came from.
   B. Picture of the places the lunch items probably came from.
   C. Pictures of the tools used to hunt, harvest, process, prepare, or buy the food.
   D. Pictures of the final product – lunch.

Iowa State University
Extension and Outreach
Healthy People. Environments. Economies.

4-H Youth Development
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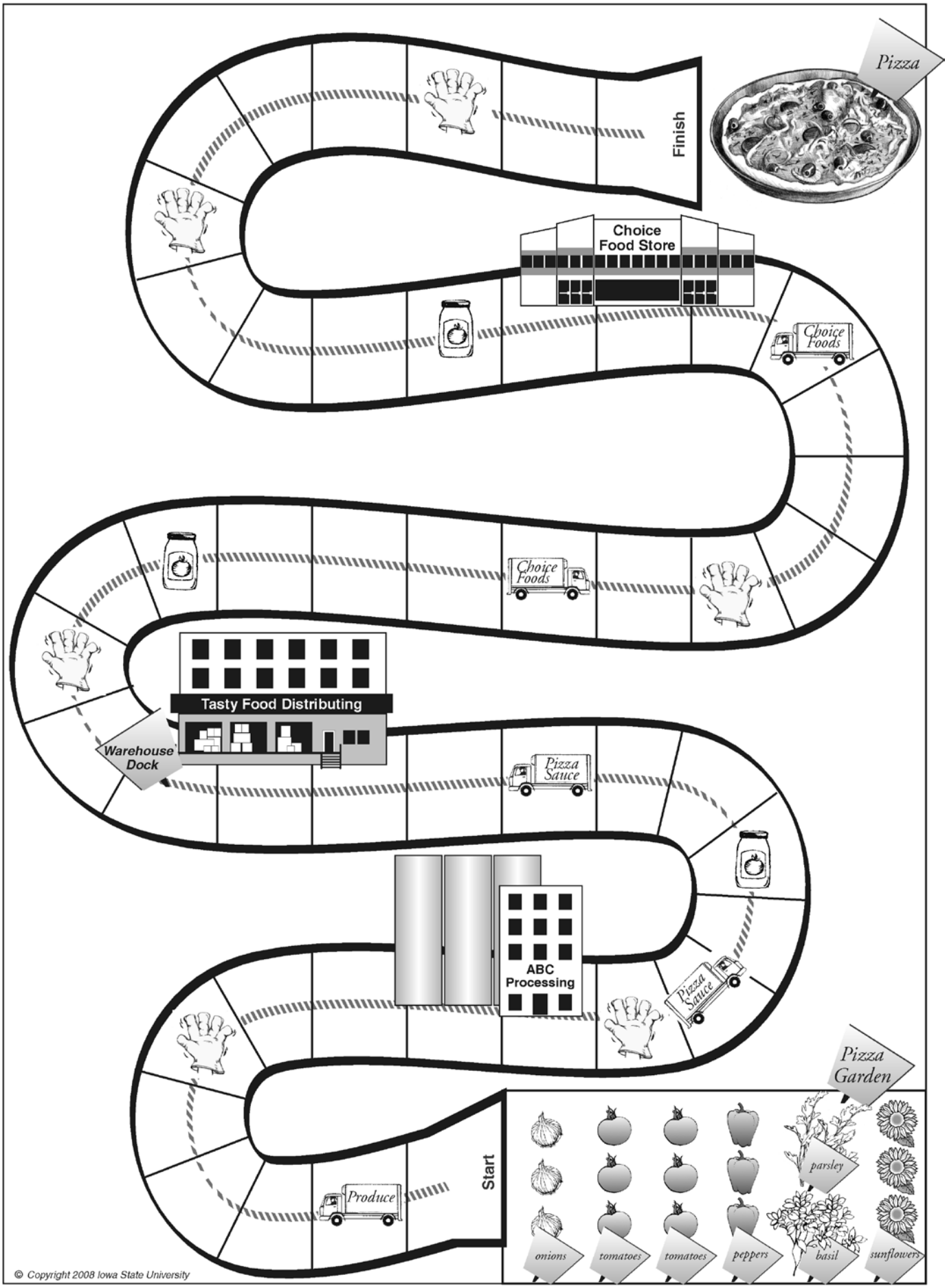


Student Project

SCIENCE PROJECT OF THE WEEK

CARROT TOPS

PROBLEM: Can a plant grow from just the top of a carrot?

NOTE: YOU MUST START THIS PROJECT TONIGHT!

RESEARCH: What kind of root does a carrot have? Why is the root so big? What is needed for a plant to grow?

HYPOTHESIS: Can the carrot top provide what is needed for the plant to grow?

MATERIALS: Shallow container
4 carrots

PROCEDURE:
1. Cut about half an inch off the end of the carrot that has the leaves. Cut the leaves off close to the base of the carrot.
2. Put the carrots into the container with the cut side down.
3. Add enough water to cover about half the carrot top.
4. Place the container in a well-lighted window.
5. Observe the carrot tops each day for any changes. Remember the changes may start out small and change slowly. Look for new leaves and roots.
6. Use a metric ruler to measure any growth you may observe.
7. Continue your observations for six days and write your report on the sixth day.

DATA: Make a chart to record any changes and measurements

CONCLUSION: This is not optional. You must explain what you learned by doing this activity.
Remember that you must answer the question you asked in your original problem statement.

NOTE: BE SURE TO HAVE YOUR PARENT OR GUARDIAN SIGNS YOUR WORK. PARENTS: YOUR SIGNATURE SHOWS YOUR STUDENT HAS DONE THE WORK.

Teacher Notes

POSSIBLE HYPOTHESIS: No growth will occur since the carrot is not living. OR Leaves will grow since even this small part of the plant is still living.

POSSIBLE CONCLUSION: The carrot top should show some new growth each day. The student should discuss the possible reasons for the growth.

Student Project

EL PROYECTO DE CIENCIA DE LA SEMANA

CABEZA DE ZANAHORIAS

PROBLEMA: ¿Puede una planta crecer de la cabeza de una zanahoria?

NOTA: DEBES DE EMPEZAR ESTE PROYECTO ESTA MISMA NOCHE.

INVESTIGACION: *What kind of root does a carrot have? Why is the root so big? What is needed for a plant to grow?*

HIPOTESIS: ¿*Can the carrot top provide what is needed for the plant to grow*?

MATERIALES: Un recipiente no muy hondo
4 zanahorias

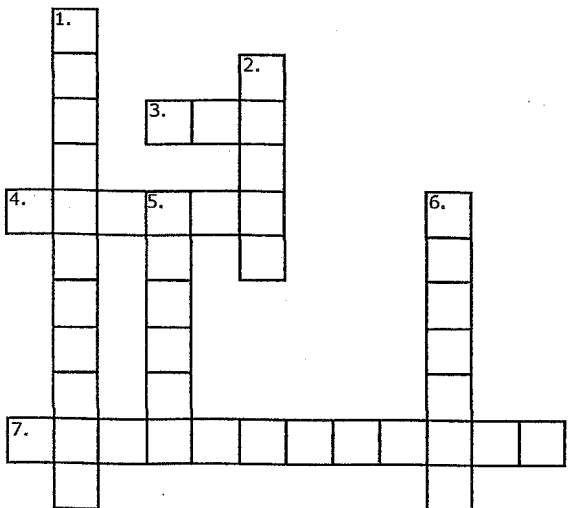
PROCEDIMIENTO:
1. Córtale a la zanahoria media pulgada del lado donde tiene las hojas. Corta las hojas que están cerca de la base de la zanahoria.
2. Pon las zanahorias en el recipiente con la parte cortada para abajo.
3. Anide suficiente agua para cubrir la mitad de la zanahoria.
4. Coloca el recipiente cerca de una ventana con suficiente luz.
5. Observan las zanahorias todos los días si hay cambios. Recuerda que los cambios pueden empezar péquenos y cambiar despaciamente. Busca por hojas y raíces nuevas.
6. Usa una regla métrica para medir <u>cualquier</u> crecimiento que puedas observar.
7. continua sus observaciones por seis días y escribe su reporte en el sexto día.

DATOS: Haz una tabla para apuntar sus observaciones e inferencias.

CONCLUSION: Esto no es una opción. Explique lo qué aprendió al hacer esta actividad.
<u>Recuerda que tiene que contestar la pregunta del problema</u>.

TOME NOTA: ASEGUEREN QUE SU PADRE O TUTOR FIRME SU PROYECTO. PADRES: SU FIRMA DEMUESTRA QUE SU ESTUDIANTE HA HECHO LA TAREA LO MISMO.

CROSSWORD PUZZLE



Across

3. Carrots live for _____ years.
4. Genus name for carrots.
7. Orange carrots have more _____ than any other vegetable.

Down

1. Purple and yellow carrots are from _____.
2. Carrots should be planted in _____ soil.
5. Species name for carrots.
6. Carrots belong to this family.

QUOTE

"What did the carrot say to the wheat?
Lettuce rest, I'm feeling beet."
Shel Silverstein

Answers to Crossword Puzzle
Across: 3. two; 4. Daucus; 7. beta-carotene.
Down: 1. Afghanistan; 2. loose; 5. carota; 6. Apiaceae.

SPOTLIGHT ON RESEARCH

A Rainbow of Carrots

Today, most people around the world eat orange carrots, but that was not always true. A thousand years ago, people in Afghanistan ate yellow and purple carrots, and Europeans ate yellow ones. In India people still prefer red carrots.

People all over the world may soon be eating a rainbow of colorful carrots, thanks in large part to scientists at the University of Wisconsin. For several years, they have been cross breeding carrots from all over the world to develop new carrot varieties that come in many different colors. These new varieties make very colorful dishes, but that is not the main reason they are being developed.

You may have heard that one way to get enough nutrients is to eat vegetables with different colors. In the case of carrots, this is true. Nutritionists have discovered that each different color variety of carrot contains a different nutrient that your body needs. For example, orange carrots are high in beta carotene, which you need for healthy eyes and seeing in the dark. Red carrots are high in lycopene, which protects you against heart disease and some cancers. Purple carrots contain powerful antioxidants that grab and hold harmful chemicals in your body that can cause aging and disease. Yellow carrots are high in lutein, which prevents eye diseases.

If you see these new colorful carrots in your food market, give them a try! They make surprisingly colorful and tasty dishes, and they are good for you, too!

Source: Peabody, Erin. "New Carrots Offer Colorful Surprises - and Health Benefits." U.S. D.A. Agricultural Research Service. November 15, 2004. <http://www.ars.usda.gov/is/pr/2004/041115/htm>

MORROCAN CARROT SALAD

Yield: 5-6 servings

Carrot salad is a traditional dish in North Africa and the Middle East. In Israel it is eaten at the Jewish New Year. It is a symbol of a sweet and fruitful year to come.

Ingredients

* 1 pound (0.9 kg) carrots, grated
* 1/4 cup (60 ml) vegetable oil
* 3 to 4 tablespoons (45-60 ml) fresh lemon juice
* 1/4 cup (60 ml) chopped fresh parsley
* 2 to 4 cloves garlic, finely chopped
* 1/2 teaspoon (2.5 ml) ground cumin
* 1/4 teaspoon (1.25 ml) ground cinnamon
* 1 teaspoon (5 ml) sweet paprika
* Pinch of salt
* 1/4 to 1/2 teaspoon (2 ml) cayenne (optional)

Instructions

In a large bowl, mix together all the ingredients. Cover and let marinate in the refrigerator for at least 2 hours or up to 2 days.

GARDEN MOSAICS
www.gardenmosaics.org

Garden Mosaics is funded by the National Science Foundation Informal Science Education program, and by the College of Agriculture and Life Sciences at Cornell University.

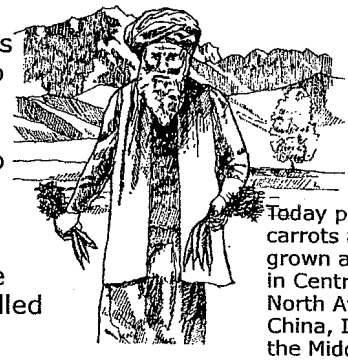
CARROTS Science Page

DID YOU KNOW?

The first carrots were not orange. In the 1500s, the Dutch bred purple carrots with yellow carrots to develop the first orange carrots.

ORIGINS

White carrots are native to Europe and red carrots are native to Asia. Yellow and purple carrots are native to the area now called Afghanistan.



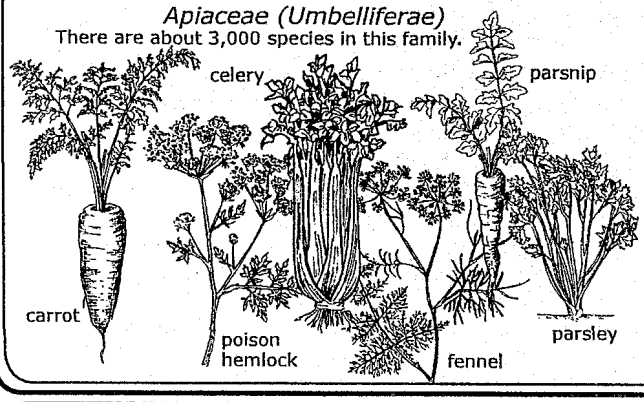
Today purple carrots are still grown and eaten in Central Asia, North Africa, China, India, and the Middle East.

CLASSIFYING CARROTS

FAMILY

Apiaceae (Umbelliferae)

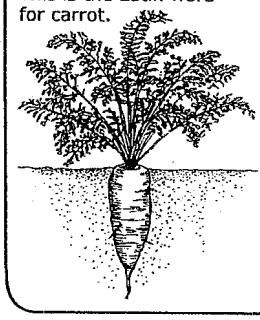
There are about 3,000 species in this family.



GENUS

Daucus

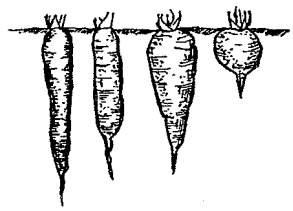
This is the Latin word for carrot.



SPECIES

carota

This comes from the Greek word karotan, meaning carrot.



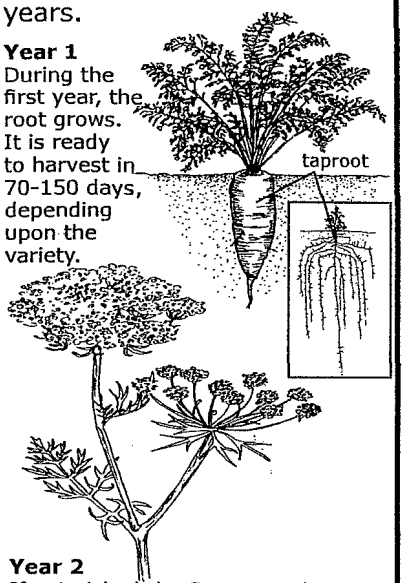
Carrots come in all shapes, sizes, and colors.

THE CARROT PLANT

The carrot plant lives for two years.

Year 1

During the first year, the root grows. It is ready to harvest in 70-150 days, depending upon the variety.



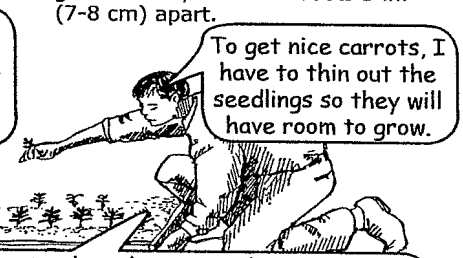
Year 2

If not picked the first year, the root over winters. The next year, the carrot plant uses the stored food in the root to send up a flower stalk. Flowering wild carrot has small white roots and is common along roadsides in much of the U.S.

GROWING AND HARVESTING CARROTS

Plant carrots in spring in cooler climates and in fall in hotter climates. Prepare the soil well! Most varieties like deep, loose, well-drained soil. If planted in heavy soil, carrots may produce forked roots.

Sprinkle the seeds in rows spaced about 12 to 18 in. (30-46 cm) apart. After they come up, thin them to one inch (2.5 cm) apart. When the tops grow thicker, thin to about 2-3 in. (7-8 cm) apart.



Harvest carrots when they are at least finger size. The smaller carrots are juicier and more tender.

NUTRITIONAL VALUE

Carrots have more beta-carotene, from which the body makes vitamin A, than any other vegetable. Plant breeders have developed carrot varieties that have about 75% more beta-carotene than the carrot varieties that existed 25 years ago.

A person who does not have enough vitamin A cannot see well in the dark. If left untreated, the person may become blind. Each year an estimated 350,000 children, mostly living in developing countries, go blind because their bodies lack vitamin A.

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