

The Outdoor Garden Classroom

Hands-On STEM Teaching Curriculum, Pre-K-5

K

Kindergarten Grade Lessons

*Caring for the Garden
(2nd Edition)*



THE OUTDOOR GARDEN CLASSROOM

Hands-On STEM Teaching Curriculum, K-5

Lessons are to Nevada State and Next Generation Standards

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The **American Honda Foundation** helps meet the needs of American society in the areas of youth and scientific education by awarding grants to nonprofits, while strategically assisting communities in deriving long-term benefits. Since 1984, the American Honda Foundation has awarded more than \$32 million to organizations serving over 115 million people in every state in the U.S.



Green Our Planet is a nonprofit, 501(c)(3) organization established in 2013. Its mission is to raise money for green projects worldwide via its crowdfunding platform and to educate the public about the most pressing environmental issues facing the planet today. Green Our Planet's overall goal is to help conserve, protect, and

improve the environment through funding green projects and through education, which includes STEM, nutrition and conservation education in K-12 schools. In 2013, Green Our Planet launched its "Outdoor Garden Classroom Program" in Las Vegas, Nevada, which is designed to help schools fund and use outdoor vegetable gardens as "hands-on" classrooms. For more information on Green Our Planet and its programs, please visit www.greenourplanet.org.



together, we can feed everyone

Three Square's mission is to provide wholesome food to hungry people, while passionately pursuing a hunger-free community. Three Square combines food banking (warehousing canned and boxed goods), food rescue (obtaining surplus or unused meats, bread, dairy and produce from hospitality and grocery outlets), and ready-to-eat meals as the most complete food solution for Southern Nevada. Three Square works with more than 1,300 partner sites in the Southern Nevada

community. Three Square distributed more than 30 million pounds of food, the equivalent of more than 25 million meals.



Achieving Excellence Through Education. The vision of Clark County, in conjunction with the Clark County School District, is to provide a safe, supportive environment which enables each student to acquire knowledge, skills and values necessary to a lifelong learner and to become a responsible, contributing member of our changing society.

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A kindergartener will explore the garden using their senses and through observations determine the basic needs in order for plants to survive. A kindergartener will understand that many life cycles in the garden compete or cooperate to meet these basic needs. A kindergartener will acknowledge the role of the gardener as caretaker and learn what all the basic needs in the garden are so that a fruitful harvest is possible.

SEPTEMBER

Objectives

Learn about what a plant needs in order to grow.

NV Standards: (K)1.1, (K)1.2

Next Gen Standards: K-L S1-1, K-ESS3-1

Overview

Students will observe the growth of plants with and without the essential needs for sustenance (soil, water, and sun).

- Lesson 1 – The Importance of Sunshine
- Lesson 2 – The Importance of Soil
- Lesson 3 – The Importance of tWater

OCTOBER

Objectives

Explore other ways to help a garden grow.

NV Standards: (K)1.1, (K)1.2, (K)1.4

Next Gen Standards: K-L S1-1, K-ESS2-2, K-ESS3-1

Overview

Students will learn about companion planting and pest management.

- Lesson 4 – Plant Buddies: Carrot and Chive
- Lesson 5 – Garden Neighbors and Helpful Bugs
- Lesson 6 – Garden Pests

NOVEMBER

Objectives

Ways that people can help a garden grow and how to harvest.

NV Standards: (K)1.1, (K)1.2

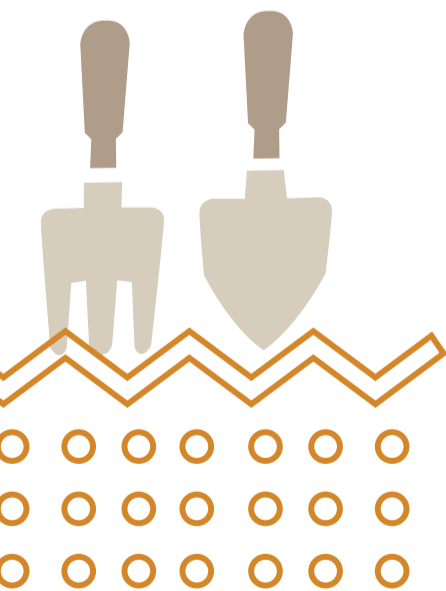
Next Gen Standards: K-LS1-1, K-ESS3-3

Common Core: K.MD1

Overview

Students will make a list of jobs to help take care of the garden and help harvest. Lessons 8-10 can be revisited for the spring season (see additional dates below).

- Lesson 7 – Garden Caretakers
- Lesson 8 – Growing Through the Seasons (*mid-February through March*)
- Lesson 9 – Measuring the Harvest (*April through May*)
- Lesson 10 – Weighing the Harvest (*April through May*)



A NOTE ON THE SECOND (REVISED) EDITION

Since its release in October, 2014, the Outdoor Garden Classroom Hands-On STEM Teaching Curriculum has been used at an increasingly greater number of schools. During the 2014-2015 school year, 63 teachers at 15 CCSD schools provided feedback on their use of the curriculum with their students. The feedback and improvements they suggested were used by five of the original teachers who created the curriculum so that the 2nd edition could be revised and improved. In addition, the curriculum was extended into Pre-K. Further improvements occurred in the summer of 2015 when nutritional facts were added to the lessons for grades 1 through 5. The nutritional facts are aligned to Nevada State Standards and are tied to the information in each science lesson. Also added to this edition are “Brain Breaks” that occur every 15 minutes. These consist of vigorous exercise breaks that are connected to gardening. For example, students might jump up and down while picking imaginary apples from a tree or students might pretend to dig holes in the ground in order to transplant vegetables. Grades 3, 4, and 5 also now have worksheets and a “lesson map” added to them, so that teachers can more easily plan out the teaching of each lesson.

In subsequent years, the OGC curriculum will continue to be revised based on further teacher feedback. In this way, the lessons can continually be improved so that they become a “living curriculum.” A special thanks to all of the teachers who contributed to this revised 2nd edition!

TEACHER FEEDBACK—LET US HEAR FROM YOU!

Teacher feedback is welcome—we want to hear from you about your experiences using this curriculum so that the lessons can be continually improved! All feedback can be left at: lessons.greenourplanet.org

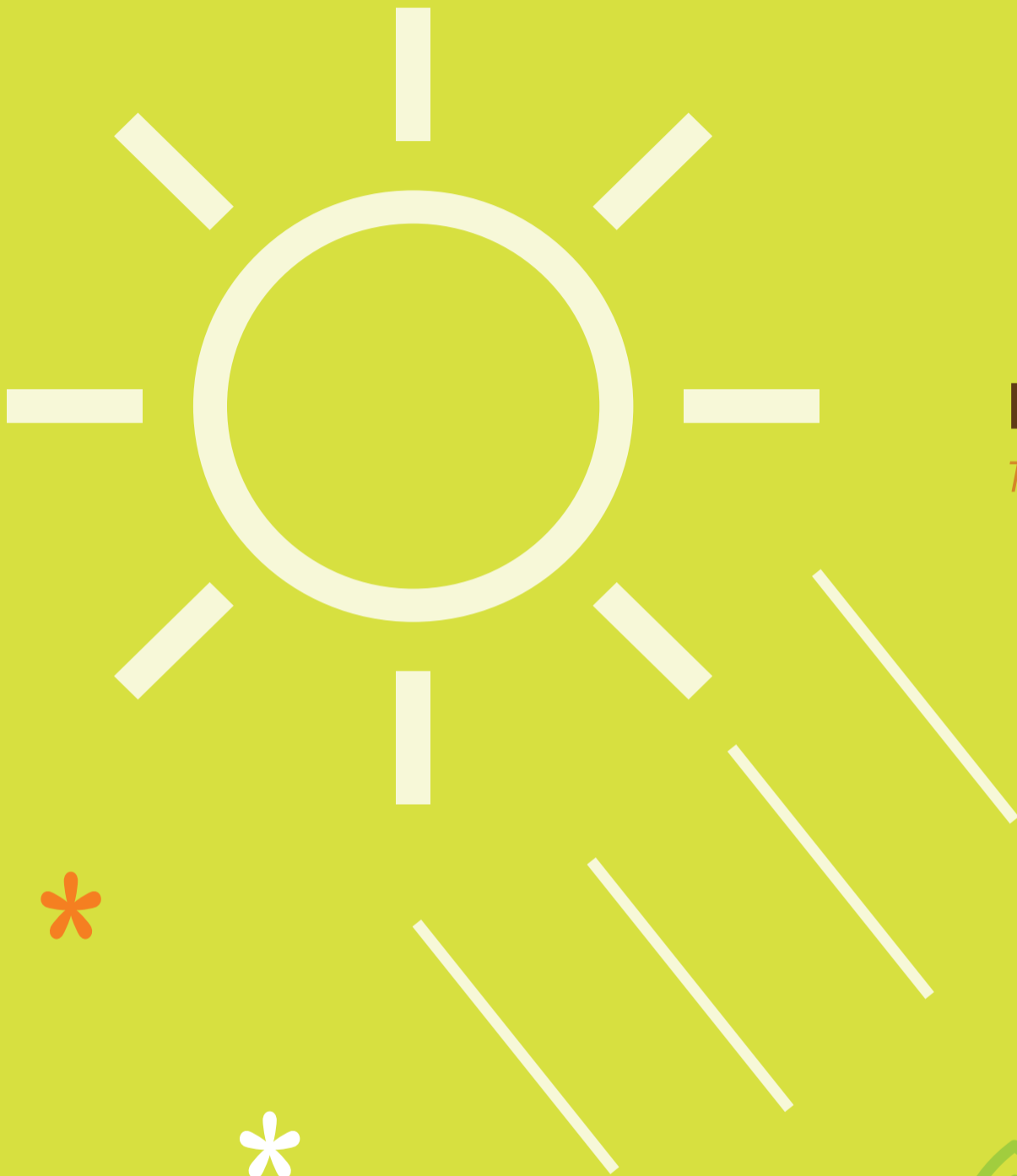
Click on the tab at top that says “Teacher Feedback.”

Teachers and administrators can also contact us directly at: info@greenourplanet.org

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Lesson One

The Importance of Sunshine





OVERVIEW

This lesson will engage students with a hands-on experience leading the curious kindergarteners to identify sunlight as a basic need for plant survival.



OBJECTIVE

- ▶ Students will conduct an experiment to observe the growth of plants with and without sunlight.



STANDARD



Nevada Standards

(K) 1.1 Record observations and explanations using pictures, words or numbers.

(K) 1.2 Use equipment to gather information.



Next Generation Science Standards

K-L S1-1 Use observations to describe patterns of what plants and animals need to survive.

K-ESS3-1 Use a model to represent the relationship between the needs of different plants and animals and the places they live.



TEACHER INFORMATION

Living in southern Nevada, we have more than 300 days of sunshine a year, making sun our most abundant source of energy. Plant life on planet Earth has tapped into this sustainable source, the Sun, for sustenance. In this lesson, your students will explore the effects of sunlight on plant growth.

Photosynthesis is the process of converting light energy to chemical energy and storing it in the bonds of sugar. This process occurs in plants and some algae. Plants need only light energy, CO₂, and H₂O to make sugar. The process of photosynthesis takes place in the chloroplasts located in cells of plant leaves, specifically using chlorophyll, the green pigment involved in photosynthesis. Chlorophyll looks green because it absorbs red and blue light, making these colors unavailable to be seen by our eyes. It is the green light which is NOT absorbed that finally reaches our eyes, making chlorophyll appear green. However, it is the energy from the absorbed red and blue light that is, thereby, able to be used to do photosynthesis. The green light we can see is not/cannot be absorbed by the plant, and thus cannot be used to do photosynthesis.

Adapted from "Photosynthesis"
<http://biology.clc.uc.edu/Courses/Bio104/photosyn.htm>



TIME

30 minutes a day for 1 week/5 days



QUESTIONS

- ▶ What do you think will happen to the plants without sun?
- ▶ Do you think there will be a difference in the growth of the plants that are placed in the sun and the plants without sunlight?



MATERIALS

- ▶ Chart paper
- ▶ Enough seed starting containers for each student plus one for the control (you can use plastic cups, make newspaper pots, or even cut up egg cartons)
- ▶ Radish seeds (Radish seeds are tiny! You can put the seeds in a salt shaker and have students shake out the seeds gently or make seed tape using tissue paper and glue <http://www.gardenbetty.com/2012/03/make-your-own-seed-tape/>)
- ▶ 1 small bag of seed starting mix
- ▶ Spray bottle with water
- ▶ 2 trays, one labeled Group 1 – Sunny and the other labeled Group 2 - Shady
- ▶ Pencils
- ▶ Science journals
- ▶ Camera (optional)



PROCEDURE

1. Begin a conversation about what the students know about the sun. Record their responses on chart paper.
2. Read *From Seed to Plant* by Gail Gibbons. Ask students what they learned about the sun and plants from the book. Record student responses on chart paper in a different color.
3. Review student responses and model thinking out loud to form a testable hypothesis: "I know that the sun helps plants grow. I wonder what would happen if a plant didn't get enough sunlight. I wonder what would happen if a plant got too much sunlight. I wonder what would happen if a plant didn't get any sunlight."

5. Model how to plant a seed following the steps below. As you work through each step, be sure to engage students in the conversation of what a seed needs based on what they heard/read in From Seed to Plant:
 - Each student will get a seed starting container labeled with their name.
 - They will scoop enough soil into the container so that the top of soil is a little bit below the top of the container.
 - Then, each student will sprinkle 1-3 radish seeds (Seeds are typically planted at a depth as wide as the size of the seed. Since radish seeds are so tiny, it is best to have the students sprinkle the seeds right on top of the soil and then sprinkle a fine layer of soil on top of that. Radish are also vigorous and hardy growers, so if they are planted a little too deep, they should still sprout!)
 - Lastly, have each student take a turn with a spray bottle of water to water their seedling. Spray the seedling until the soil is moist throughout.
6. Place the seedlings in trays, one labeled Group 1 – sunny in a place that gets the most sunshine in your garden and the other labeled Group 2 – shady in a place that gets the least amount of sunshine in your garden.
7. Direct students to draw a picture of their first observation of their plant and date to keep track of it. Remind them to draw a sun if their plant is in a sunny place and no sun if it is in a shady place.
8. Return to the classroom with the control plant you used as the model. Remind students that you wondered what would happen if a plant didn't have any sunlight. Tell them that you have labeled this plant with your name and will put in the darkest place in the classroom. They can help you locate this or you can designate a cabinet or closet that they are able to get access to every day for observation.
9. For the rest of the week, designate time for students to write the date and draw a picture of what is happening with the plant in their science journal. Start this by modeling how to record the date and write your observations of the seedling kept in the classroom. At this time, have the students spray their seedlings to keep the soil moist.
10. On the last day of observations, gather the students altogether to have the two groups explain what happened to their seed. The seedlings can then be transplanted into your school garden, or as an extension, into a terrarium in your classroom with a grow light to show how different kinds of light can keep plants growing.



ASSESSMENT

Informal observations, teacher observation. The teacher will check the science journal entry to see if students included a picture of their plant and also to see if they drew a picture of the sun or no sun to make sure they understand their part in the experiment.



ADAPTATION

A large pan with sprouts and soil can be placed in the garden area and a large pan with soil can be placed in the classroom instead of small group projects it can be whole class project.

Students who are unable to complete the sentence stem will be asked to draw a picture on their journal page.

If a student is unable to draw a picture the student can verbally tell and show the teacher their sprout and the teacher can take a picture of them to include in their journal later.

Dates can be recorded with a stamp.



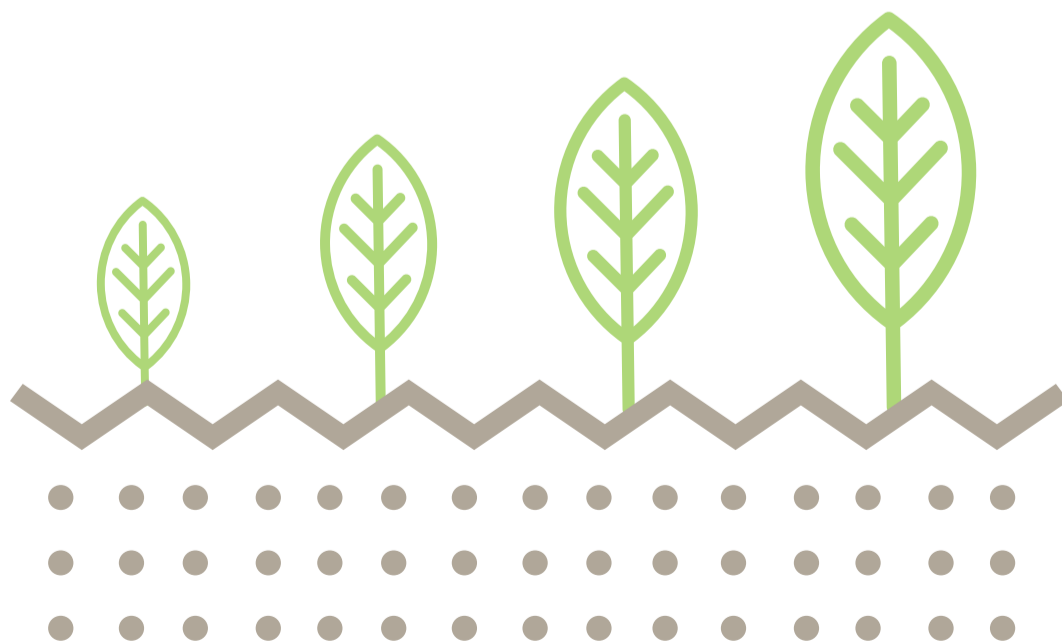
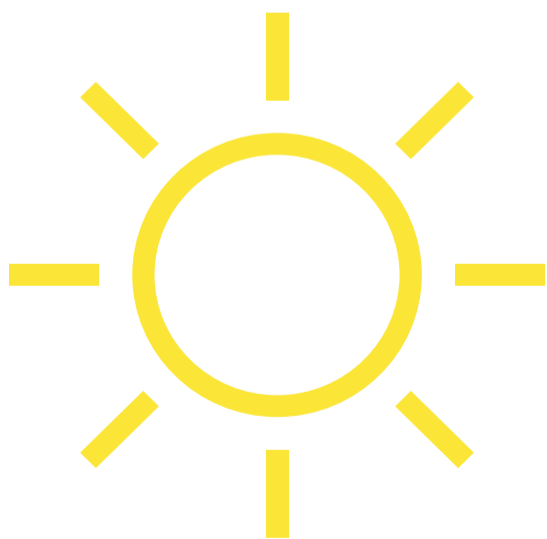
DIGGING DEEPER

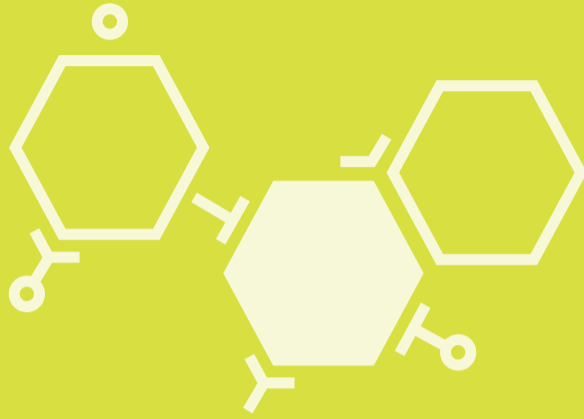
- ▶ Have students place leaves or leaf shaped construction paper on top of a piece of dark colored construction paper.
- ▶ Have them choose a sunny place outside to place their paper.
- ▶ After some time, the sun will change the color of the paper, but leave the leaf print behind.
- ▶ Have students test various areas (more or less sun) to see different results.



DID YOU KNOW?

- ▶ Different levels of shade, anything from little to nothing but shade, can impact the well being of plants and the suitability of growing conditions for plants. The Tarantula Hawk has the most painful bite for humans.
- ▶ In our summer, the North Pole is pointing towards the Sun so the Sun rises and sets roughly from due east to due west. In winter, the Earth is on the other side of the Sun so the North Pole is pointing away from the Sun. This means the Sun rises and sets more towards the southeast and southwest.





Lesson Two

The Importance of Soil





OVERVIEW

This lesson will engage students with a hands-on experience leading the curious kindergarteners to identify water as a basic need for plant survival.



OBJECTIVE

- ▶ Students will conduct an experiment to observe the growth of plants with and without water.



STANDARD



Nevada Standards

(K) 1.1 Record observations and explanations using pictures, words or numbers.

(K) 1.2 Use equipment to gather information.



Next Generation Science Standards

K-L S1-1 Use observations to describe patterns of what plants and animals need to survive.

K-ESS3-1 Use a model to represent the relationship between the needs of different plants and animals and the places they live.



TEACHER INFORMATION

Healthy soil makes a healthy garden. In southern Nevada, our native soil is very dry and missing key nutrients. This is why most of our gardens use imported soil. Soil is a complex structure of many things including mineral particles, pebbles, rocks, air, water, dissolved nutrients, bits of un-decomposed organic matter (bits of leaves or other plants), well-decomposed organic matter (also called humus), and many organisms of various sizes. A good soil provides a balance of air and water so that roots can easily grow and establish while drawing upon nutritional characteristics of the soil structure. Basically, a good garden soil is made up of 50% organic material & particles, 25% air pockets, and 25% water.

The particles that make up a soil vary in their characteristics but are characterized as either sand, silt or clay. Clay is the smallest particle and is too small to see. The particle structure of silt is larger than clay, but still too small to see. And finally, the particle size of sand is large enough to see but still no more than 1/10th of an inch in size. Another key ingredient in healthy soil are microbes. Without microbes and bugs, the important processes of decomposition and aeration in soil are weakened.

Adapted from "Teaching Kids about Water and Soil Conditions"
<http://www.kidsgardening.org/node/61046>



TIME

30 minutes a day for 1 week/5 days



QUESTIONS

- ▶ What do you think will happen to the plants without soil?
- ▶ Do you think there will be a difference in the growth of the plants that were placed in dark soil and the plants in light soil?



MATERIALS

- ▶ Chart paper
- ▶ Enough seed starting containers for each student plus one for the control (you can use plastic cups, make newspaper pots, or even cut up egg cartons)
- ▶ Radish seeds
- ▶ 1 gallon bag of healthy soil (moist and fluffy, dark brown almost black)
- ▶ 1 gallon bag of native soil (dry, light brown dirt)
- ▶ Spray bottle with water
- ▶ 2 trays, one labeled Group 1 – Dark Soil and the other labeled Group 2 – Light Soil
- ▶ Pencils
- ▶ Science journals
- ▶ Light brown crayons
- ▶ Dark brown crayons
- ▶ Camera (optional)



PROCEDURE

1. Gather on the rug and begin a conversation about what the students know about soil or dirt. Record the student's responses on chart paper.
2. Review student responses and model thinking out loud to form a testable hypothesis: "I know that the soil helps plants grow. I have noticed there are different kinds of soil around school, like the dark brown soil in the garden beds and the light brown soil around the grassy field. I wonder what would happen if I planted a seed in different kinds of soil. I wonder what would happen if a seed didn't have any soil."

3. Explain to the students that they will take a nature walk around the school. Try to lead them to a place or places that show at least two different types of soil, moist dark brown healthy soil and dry light brown native soil. Tell the students that they are to look for dirt in as many places as they can find it and to notice the color, smell, and feel of the dirt. It is important for them to get their hands in it! This can be followed with a hand-washing review.
4. Return to the school garden and divided the class into two groups. One group will plant seeds in Dark Brown Soil and the other group will plant seeds in Light Brown Soil.
5. Model how to plant a seed following the steps below. As you work through each step, be sure to engage students in the conversation of what a seed needs based on what they heard/read in *From Seed to Plant*:
 - Each student will get a seed starting container labeled with their name.
 - They will scoop enough soil of their group (Dark Brown Soil and Light Brown Soil) into the container so that the top of soil is a little bit below the top of the container.
 - Then, each student will sprinkle 1-3 radish seeds (Seeds are typically planted at a depth as wide as the size of the seed. Since radish seeds are so tiny, it is best to have the students sprinkle the seeds right on top of the soil and then sprinkle a fine layer of soil on top of that. Radish are also vigorous and hardy growers, so if they are planted a little too deep, they should still sprout!)
 - Lastly, have each student take a turn with a spray bottle of water to water their seedling. Spray the seedling until the soil is moist throughout.
6. Place the seedlings in trays, one labeled Group 1 – Dark Brown Soil and the other labeled Group 2 – Light Brown Soil in a protected place that gets at least 4 hours of direct sunshine in the morning and shade in the afternoon.
7. Direct students to draw a picture of their first observation of their plant and date to keep track of it. Remind them to color the picture according the kind of soil they have planted in.
8. Remind students that you wondered what would happen if a plant didn't have any soil. Tell them that you have labeled this plant with your name and will keep it in the same place as their seedlings and water every day. Remind students to check on the seedling everyday to see if it has sprouted.
9. For the rest of the week, designate time for students to write the date and draw a picture of what is happening with the plant in their science journal. Start this by modeling how to record the date and write your observations of the seedling kept in the classroom. At this time, have the students spray their seedlings to keep the soil moist.

10. On the last day of observations, gather the students altogether to have the two groups explain what happened to their seed. The seedlings can then be transplanted to the school garden, or eaten as a snack. Radish sprouts are quite tasty, even a little peppery like a radish!



ASSESSMENT

Informal observations, teacher observation. The teacher will check the science journal entry to see if students included a picture of their plant and also to see if they drew a picture of soil or no soil to make sure they understand their part in the experiment.



ADAPTATION

Students who are unable to complete the sentence stem will be asked to draw a picture on their journal page.

If a student is unable to draw a picture the student can verbally tell and show the teacher their sprout and the teacher can take a picture of them to include in their journal later.

Dates can be recorded with a stamp.



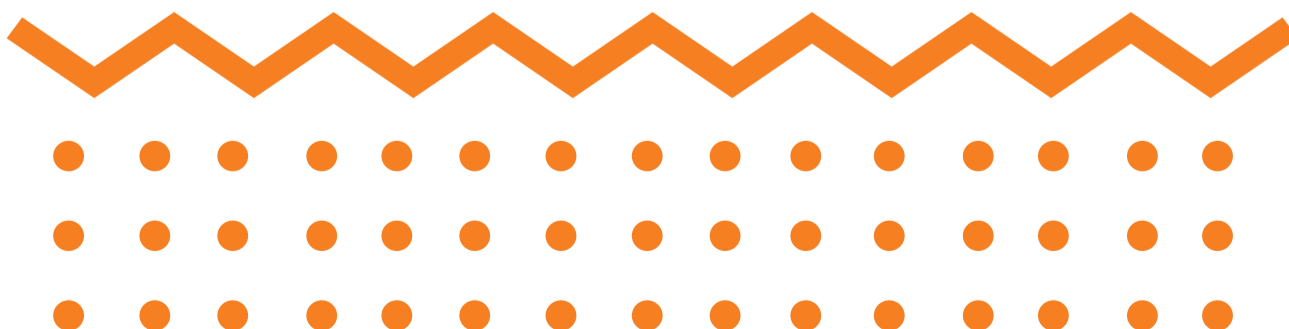
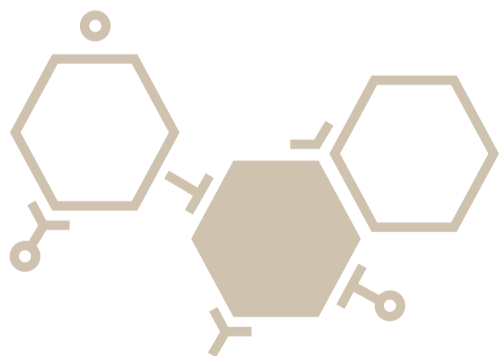
DIGGING DEEPER

- ▶ Aeroponic gardening is a method of growing plants without soil. Instead, plant roots are misted with a nutrient solution during a regular watering cycle. The Chicago O'Hare airport was the first airport to have an aeroponic garden.
- ▶ There are about 50 billion microbes in 1 tablespoon of soil.



GARDENER TIPS

- ▶ Have students add sand to the soil in a part of the garden where drainage is too slow. Have them add clay to soil that is drying out too quickly.





Lesson Three

The Importance of Water





OVERVIEW

This lesson will engage students with a hands-on experience leading the curious kindergarteners to identify sunlight as a basic need for plant survival.



OBJECTIVE

- ▶ Students will conduct an experiment to observe the growth of plants with and without sunlight.



STANDARD



Nevada Standards

(K) 1.1 Record observations and explanations using pictures, words or numbers.

(K) 1.2 Use equipment to gather information.



Next Generation Science Standards

K-L S1-1 Use observations to describe patterns of what plants and animals need to survive.

K ESS3-1 Use a model to represent the relationship between the needs of different plants and animals and the places they live.



TEACHER INFORMATION

Living and growing in southern Nevada, we know that water is a key ingredient in survival for all living things. The native plants and animals have adapted to thrive even with the low level of annual rainfall, approximately 4 inches a year! It is valuable to convey to children at an early age that appreciation and preservation should go hand in hand when working with resources required to grow a garden, most especially water. Here are a few helpful tips that will explain what water does for plants; the cycle of water within the soil; how watering too much or too little affects plant growth; and finally how to determine if plants are in need of water.

Water does many things for plants. Most importantly, water helps draw and transport nutrients from the soil up into the plant. These nutrients are used to help the plant grow. In addition, water is stored within the plant cell tissues to help support the structure of the plant. Without enough water the plant's tissue weakens, causing it to wilt.

When it rains, water penetrates the soil surface and begins to fill in any spaces between soil particles. Depending upon the amount of rain, eventually these spaces between the particles will be filled up. When the spaces within the soil are filled, any remaining water that continues to fall from the sky will flow across the surface of the ground as runoff. Runoff can also be a result of rain coming down too quickly for the water to penetrate the soil surface for absorption (consider the effects of a thunderstorm).

Depending on the characteristics of soils, water may easily penetrate and filter through the soil surface, such is the case with a sandy soil condition. Harder or more dense soils may have less water penetration and more runoff and many clay-type soils will appear sponge-like, as they may absorb and hold onto too much water. Clay-type soils are known for maintaining saturated soil conditions for lengthy periods of time. It often takes a plant that can thrive in these saturated soils for successful growing in these locations.

How do you identify a saturated soil condition? Saturated soils are very spongy and are obviously holding a lot of water. Press on the soil surface to determine if water oozes out from the soil. Inspect for saturated soils by simply standing or slowly walking on the surface and inspecting to see if water pools around the base of your shoes. Heavily saturated soils lose structure, they can cause roots to lose their grip and force trees and shrubs to tip over to one side. In northern climates, late season saturated soils may also freeze-up during the winter months and freeze-thaw cycles can heave up plantings.

Do not overwater and water the lawn only when necessary. In general, lawns only need about one inch of water per week, overwatering is wasteful. Children can easily help determine if the yard or grass is in need of watering by asking them to step on the lawn. If the grass blades quickly spring back up then avoid watering. If they remain flat, then it is time to water the lawn.

A proper balance of water and air in the soil is key to a plant's survival. Too much water can cause your plant roots to rot due to lack of oxygen. Family gardeners can avoid some of these challenges by using raised garden beds which improve drainage and provide plants with a great balance of soil nutrients, water and oxygen to the root systems. If the soil conditions at home indicate a very heavy, dense and compacted soil, definitely consider developing a raised-garden bed.

There is a simple step to inspect whether or not garden plants need water. Check the soil moisture level by placing a finger to a depth of three inches, or at least past your knuckle. If you find that the top layer of your soil is completely dry, then it is time to water. If it is damp or saturated, don't add any more water. If the soil is already saturated there's not much you can do besides not adding more water and waiting for the soil to drain.

Adapted from "Teaching Kids about Water and Soil Conditions"
<http://www.kidsgardening.org/node/61046>



TIME

30 minutes a day for 1 week/5 days



QUESTIONS

- ▶ Can a plant survive without water?
- ▶ What do you think will happen to the plants without water?
- ▶ Do you think there will be a difference in the growth of the plants that have water and the plants without water?



MATERIALS

- ▶ Chart paper
- ▶ Enough seed starting containers for each student plus one for the control (you can use plastic cups, make newspaper pots, or even cut up egg cartons)
- ▶ Radish seeds
- ▶ Seed starting mix (you should have enough left over from Lesson 1)
- ▶ Spray bottle with water
- ▶ 2 trays, one labeled Group 1 – Wet and the other labeled Group 2 – Dry
- ▶ Pencils
- ▶ Science journals
- ▶ Camera (optional)



PROCEDURE

1. Gather on the rug and begin a conversation about what the students know about water. Record the student's responses on chart paper.
2. Read *From Seed to Plant* by Gail Gibbons. Ask students what they learned about water and plants from the book. Record student responses on chart paper in a different color. You may be able to gather some observations or reflections from the students based on the sun and soil experiments.
3. Review student responses and model thinking out loud to form a testable hypothesis: "I know that water helps plants grow. I wonder what would happen if a plant didn't get enough water. I wonder what would happen if a plant got too much water. I wonder what would happen if a plant didn't get any water."

4. Take the class out to the garden and divide into two groups. Tell the students they will each plant a seed. One group will water their seedlings with a 1/3 cup measuring cup or larger amount. One group will water their seedlings with a tablespoon or smaller amount.
5. Model how to plant a seed following the steps below. As you work through each step, be sure to engage students in the conversation of what a seed needs based on what they heard/read in From Seed to Plant:
 - Each student will get a seed starting container labeled with their name.
 - They will scoop enough seed starting mix into the container so that the top of soil is a little bit below the top of the container.
 - Then, each student will sprinkle 1-3 radish seeds (Seeds are typically planted at a depth as wide as the size of the seed. Since radish seeds are so tiny, it is best to have the students sprinkle the seeds right on top of the soil and then sprinkle a fine layer of soil on top of that. Radish are also vigorous and hardy growers, so if they are planted a little too deep, they should still sprout!)
 - Lastly, have each student take a turn with the water amount designated for their group (1/3 cup for Wet Group, tablespoon for Dry Group).
6. Place the seedlings in trays, one labeled Group 1 – Wet and the other labeled Group 2 – Dry in a protected place that gets at least 4 hours of direct sunshine in the morning and shade in the afternoon.
7. Direct students to draw a picture of their first observation of their plant and date to keep track it. Ask them to note how the soil feels and looks after they water.
8. Remind students that you wondered what would happen if a plant didn't have any water. Tell them that you have labeled this plant with your name and will keep it near their seedlings, though not in the same trays so it doesn't get any water. Remind students to check on the seedling everyday to see if it has sprouted.
9. For the rest of the week, designate time for students to write the date and draw a picture of what is happening with the plant in their science journal. Start this by modeling how to record the date and write your observations of the seedling kept in the classroom. At this time, have the students water their seedlings according to their group.
10. On the last day of observations, gather the students together to have the two groups explain what happened to their seed. The seedlings can be transplanted to the school garden, or mixed into the compost bin. The soil, water, and plant material will break down to add to the health of the soil, making a dark brown soil that plants love to grow in!



ASSESSMENT

Informal observations, over heard conversations. The teacher will check the science journal entry to see if students included a picture of their plant and also to make sure they understood their part in the experiment.



ADAPTATION

A large pan with sprouts and soil can be placed in the garden area with water added, and a large pan with soil and without water can be placed in the garden - instead of small group projects it can be whole class project.

Students who are unable to complete the sentence stem will be asked to draw a picture on their journal page.

If a student is unable to draw a picture the student can verbally tell and show the teacher their sprout and the teacher can take a picture of them to include in their journal later.



DIGGING DEEPER

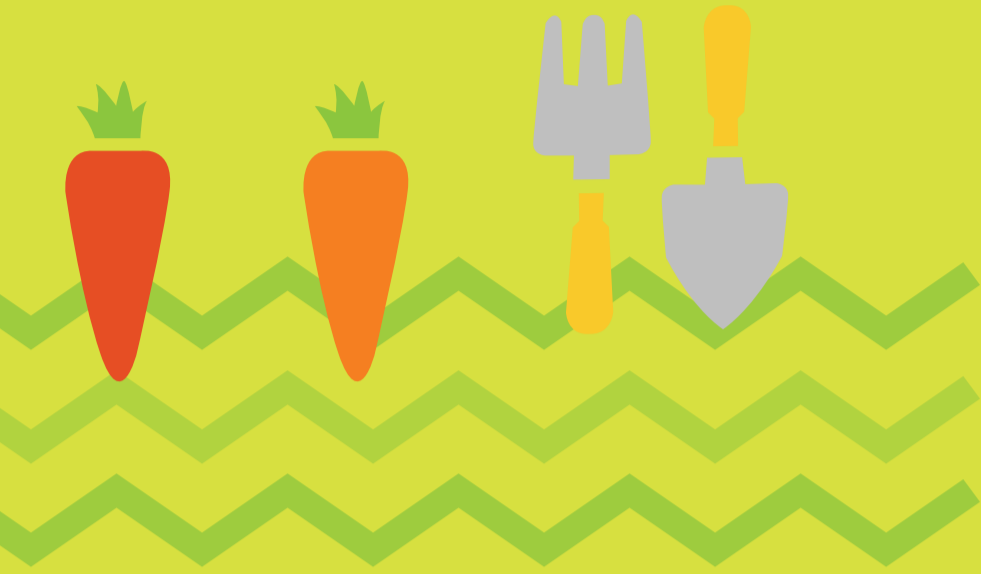
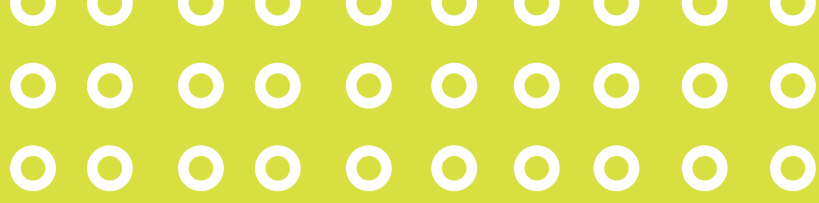
- ▶ Ask librarian for books on opposite words. You can use the garden to practice opposite words. For example: up/down, wet/dry, dark/light, etc.



DID YOU KNOW?

- ▶ Hydroponics is a method of growing plants by replacing the soil with a foam like material that can easily hold and retain a nutrient rich solution.
- ▶ Plants don't like wet feet: Wet feet is when there is a lack of oxygen in the soil around the root zone of plants and the soil is saturated with water for more than one day.





Lesson Four

Plant Buddies: Carrot and Chive





OVERVIEW

After reading *The Carrot Seed*, the kindergartners will learn about plant buddies and then plant seeds in the school garden.



OBJECTIVE

- ▶ Students will learn that a plant is a living thing that has basic needs in order to survive. Students will learn that plants can help each other grow.



STANDARD



Nevada Standards

(K)1.1 Record observations and explanations using pictures, words, or numbers.



Next Generation Science Standards

K-L S1-1 Use observations to describe patterns of what plants and animals need to survive.



TEACHER INFORMATION

To introduce the idea of plant buddies, or companion planting, it is suggested you start with carrot seeds and leeks or chives. Companion planting is the act of planting two different kinds of plants close together to benefit one another. For example, carrots benefit from chives and leeks by increased growth and flavor. In addition, chives and leeks deter harmful insects like carrot flies. For more information about companion planting, read the article “Companion Planting” at Kids Gardening: <http://www.kidsgardening.org/node/89253>

This lesson can be tied directly into planting the school garden or for another event like a seedling sale or holiday gift. If you want the students to plant in the school garden, plan on teaching this lesson the second week of September or the third week of February. If you have a gardener, be sure to coordinate with them.



TIME

30 minute periods for 2 days, then 2 weeks of observations



QUESTIONS

- ▶ What does a seed need to grow and thrive?
- ▶ How can plants help each other?



MATERIALS

- ▶ The Carrot Seed book
- ▶ Carrot seeds (Like radish seeds, carrots seeds are tiny! You can put the seeds in a salt shaker and have students shake out the seeds gently or make seed tape using tissue paper and glue <http://www.gardenbetty.com/2012/03/make-your-own-seed-tape/>)
- ▶ Chive seeds
- ▶ Enough seed starting containers for each student plus one for the control (you can use plastic cups, make newspaper pots, or even cut up egg cartons)
- ▶ Science journals
- ▶ Matching cards
- ▶ Plant markers made out popsicle sticks and pictures of the carrots and chives (1 each)
- ▶ Scissors
- ▶ Glue sticks



PROCEDURE

- ▶ DAY 1
- 1. Begin the lesson by asking students to turn to their elbow partner to discuss what they know about seeds. Ask one student from each team to share what they know about a seed. Review that a seed is the beginning of a plant, or a baby plant.
- 2. Read The Carrot Seed. Ask students to turn to their elbow partner to discuss what a seed needs to grow. Ask one student from each team to share. Review the three basic needs of a seed to grow - sun, water, and soil.
- 3. Explain that people, animals, and plants need good neighbors or friends. Introduce chive as a plant buddy of carrot. Explain that chive helps carrot grow faster and stronger and keeps away bugs that like to eat carrot leaves. They also taste delicious together in a dish!
- 4. Tell the students to stand up with their elbow partner and link arms. They will work together as plant buddies. Then, designate one buddy as "Purple" and the other buddy as "Orange". (There should be one "Purple" and one "Orange" per team).
- 5. Have students return to their tables. Pass out the matching cards according to what each child is. Introduce the words "top" and "bottom" as words to describe where the plant grows. Have the "Purple" buddy stand up and the "Orange" buddy sit on the floor to show where their plant grows.

6. Have students cut out the cards and glue them into their science journals making sure to match the appropriate word and color to plant (i.e. "Purple" should glue the picture of the chive plant, the color purple, and the word top). Have students write the word of their plant down using imaginative spelling. Make sure to also have the words "carrot" and "chive" written clearly on the white board.

▶ DAY 1

1. Start the lesson in the garden. Make sure the students have their science journals. Have students open up to the matching cards. Allow time to discuss with their plant buddy what their plant is, it's color, and where it grows.
2. Take the students out to the garden and explain that they will plant seeds in the garden today.
 - Using your finger, draw a straight line in the soil along either side of the emitters. Explain to students that the line you drew with your finger is where they will plant the seeds. Mark one side of the emitter with a popsicle stick with the picture of the chives and the other side of the emitter with a popsicle stick with the picture of the carrots.
 - Then, each student will sprinkle 1-3 seeds (Seeds are typically planted at a depth as wide as the size of the seed. Since these seeds are so tiny, it is best to have the students sprinkle the seeds right on top of the soil and then sprinkle a fine layer of soil on top of that).
 - Lastly, have each student take a turn with a spray bottle of water to water their seedling.
3. Allow time for students to write or draw a picture of what they planted and write the date in their journals.
4. For the next two weeks, designate time for students to write the date and draw a picture of what is happening with the seeds they planted in their science journal.



ASSESSMENT

Teacher observation, matching cards in science journal, science journal entries, partner group work.




ADAPTATION

Increase the complexity of the matching game by randomly handing out cards to groups of 6 and ask them to find what they have in common.

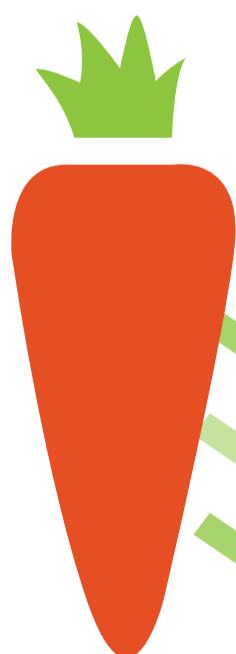
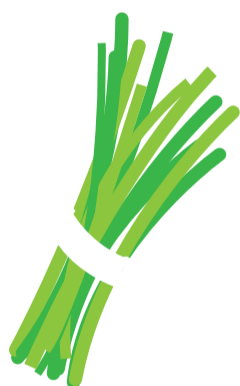
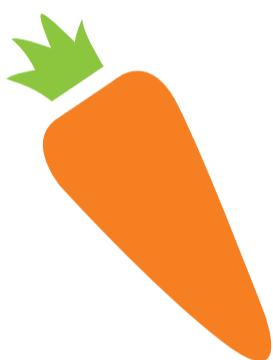


 **DIGGING DEEPER**

▶ Different seeds need different weather conditions to germinate. Consult a seed starting schedule to make sure that you are planting the right plants during the right time of the year.

 **DID YOU KNOW?**

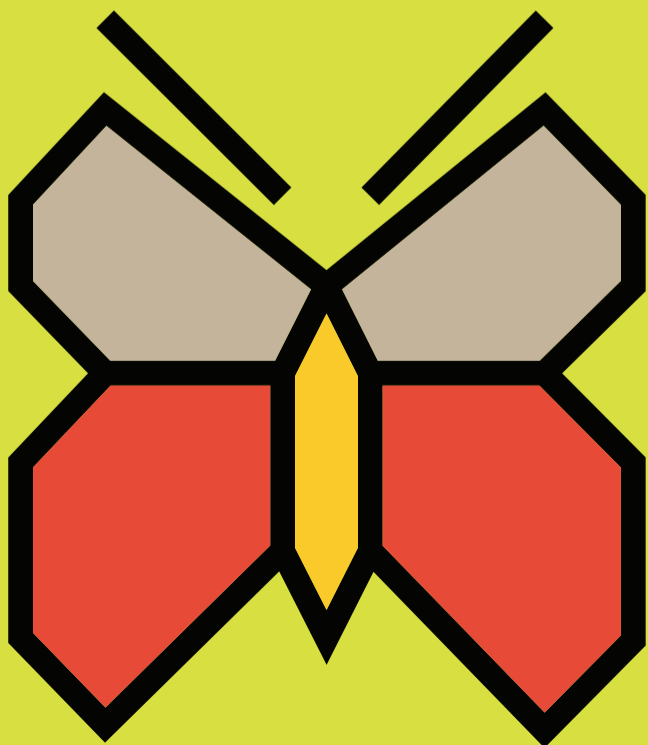
- ▶ With seed sizes varying from the size of dust to huge flower bulbs, determining a plant's success is seed depth. A general rule to follow is to plant a seed as deep as the size of the seed.
- ▶ Sometimes it can be difficult to space tiny seeds. Try using some toilet paper as seed tape. Place the seeds along the center of a lightly misted strip of TP. Fold the sides over and re-mist, then place in your garden.





Lesson Five

Garden Neighbors: Butterflies, Bees, and Ladybugs





OVERVIEW

After reading *The Carrot Seed*, the kindergartners will learn about plant buddies and then plant seeds in the school garden.



OBJECTIVE

▶ Students will learn that a plant is a living thing that has basic needs in order to survive. Students will understand that insects help plants grow.



STANDARD



Nevada Standards

(K)1.1 Record observations and explanations using pictures, words, or numbers.

(K)1.4 Ask questions about the world.



Next Generation Science Standards

K-L S1-1 Use observations to describe patterns of what plants and animals need to survive.



TEACHER INFORMATION

For information about beneficial insects, read more at “Beneficial Insects – We Get By With a Little Help From Our Friends” <http://www.kidsgardening.org/node/99563>

Kindergarten is the first school year a child can experience the magic and wonder of the life cycle of a butterfly. Use this lesson as a companion to a butterfly unit and explore the other kinds of helpful insects that your students may find in the garden.

While bees may be a source of concern for the caring adults at a school, keep in mind that without bees your garden will not produce food so it is essential that you create a safe place for bees and children! As a general rule, bees will not sting unless they are aggravated. Encourage your students to be calm and quiet if they encounter a bee.



TIME

30 minutes, anytime of year though this lesson would be best in the spring around the same time as the butterfly unit.



QUESTIONS

▶ What insects help plants grow?



MATERIALS

- ▶ Ladybugs (you can purchase a small plastic container from nurseries in the spring)
- ▶ Plastic cups (one for each student)
- ▶ Science journals



PROCEDURE

1. Start the lesson by asking the students to find their plant buddy to discuss what plants can do to help each other.
2. The teacher will state that plants do not only need plants as their neighbors, but they also need other living things.
3. The teacher will show the students a picture of a bee and a ladybug. The teacher will explain that insects are good neighbors to plants too. Bees help plants pollinate other plants so that seeds (babies) can be formed. Ladybugs help to keep the bad insects away. Show the students a picture of an aphid and explain aphids make plants sick but ladybugs eat aphids. In fact one ladybug can eat up to 1,000 aphids in a day!
4. The teacher will then ask the students to return to their seats.
5. Each student will be given a plastic cup with a ladybug inside.
6. The students will draw a picture of a ladybug in their science journals. The teacher will write the word ladybug on the board, and the student will copy that into their journals underneath the picture of the ladybug.
7. The teacher will then have the students take their cups out to their garden area and release the ladybugs into the garden.



ASSESSMENT

Teacher observation, science journal entries.

ADAPTATION

Encourage students to write a complete sentence about the ladybug "The ladybug is -----."

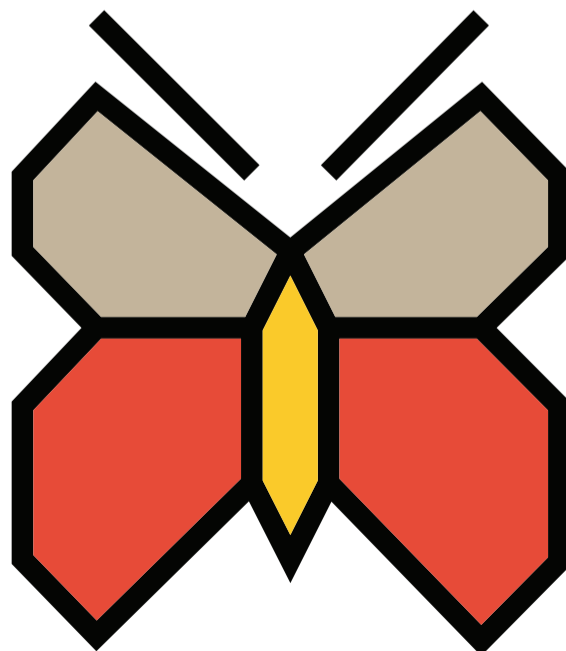
Read books about pollinators all week leading up to this lesson.

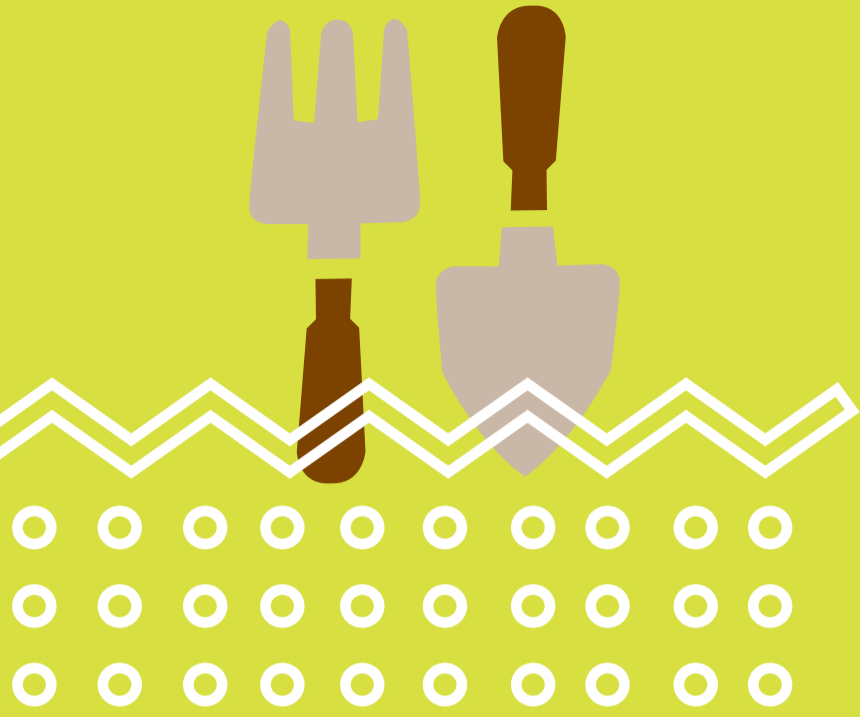
 DIGGING DEEPER

▶ Companion planting is useful for pest control, pollination, and to increase crop productivity. Use the Companion Planting Guide in Toolbox Chapter.

 DID YOU KNOW?

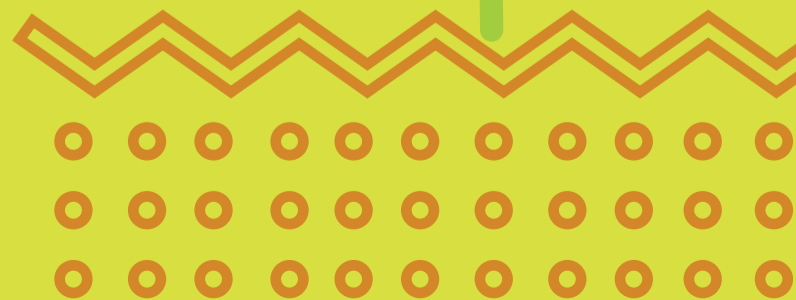
▶ Sunflowers are a great example of companion planting. Sunflowers help certain vegetables grow and attract bees. Make sure to plant your potatoes and beans separate from your sunflowers.





Lesson Six

Garden Pests





OVERVIEW

Students will learn about insects that may do harm to the garden and how to keep them away.



OBJECTIVE

- ▶ Students will learn about pests in the garden and how it relates to our job as Garden Caretakers.



STANDARD



Nevada Standards

- (K) 1.1 Record observations and explanations using pictures, words or numbers.
- (K) 1.2 Use equipment to gather information.



Next Generation Science Standards

- K-L S1-1 Use observations to describe patterns of what plants and animals need to survive.
- K ESS2-2 Construct an argument supported by evidence for how plants and animals and the places they live.



TEACHER INFORMATION

Please see chapter 8 – Gardener’s Toolbox for detailed information about the kind of “bad bugs” you may find in your school garden and how to handle them.



TIME

30 minutes, anytime of year though this lesson would be best in the spring around the same time as the butterfly unit.



QUESTIONS

- ▶ What kind of worms do you find in a garden?
- ▶ What are some of the ways worms can help a garden grow?
- ▶ What are some of the ways worms can hurt the garden?



MATERIALS

- ▶ Books about worms *Wiggly Worms at Work* and *Garden Wigglers*



PROCEDURE

1. The students will gather altogether and the teacher will tell them what we have discussed before that our job is to help keep the garden clean. One thing we need to do is to keep the bad worms away.
2. The teacher will read the story *Garden Wigglers* by Nancy Lowen. Through the story the students will learn about the worm's job and how they can be good for the garden.
3. Next the teacher will share with the children that we just read about some good worms and now I will show you a picture of a bad worm for the garden. They are called inch worms. The reason they are bad for the garden is because they eat the food that we are growing. We know when they are around because we will find holes in the leaves. One of our jobs is going to be to look for the inch worms and get rid of them.
4. The teacher will tell the students that we will collect the inch worms in a jar or plastic baggie. The teacher will model how to pick up an inch worm and place it in the jar or plastic baggie.
5. Next the teachers and the students will go to the garden to begin to look for the inch worms.

For management, have students go to collect the worms one table group at a time.

Closure: The students will gather altogether to discuss which worms are good for the garden and which worms are bad for the garden. Students will share with their partner which worms are bad for the garden and how did they know where to find them. Next students can share out with the class.

In the Science Journal: Ask the students to draw a picture to show how they know that the worms were destroying the garden. (The children should show a picture of the leaves with holes in them.) Students can illustrate and write about the worms they picked from the garden. (Ex : "Today we learned that inch worms eat our garden plants." or "In the garden the leaves have holes because the worms are eating our plants.")



ASSESSMENT

The teacher will conduct informal observations of the students while they are in the garden to notice if they are picking up the right worms. While students are in the garden the teacher can ask the students the essential questions. Informal observations of students overheard conversations about the picking of the worms. The teacher can ask some of the essential questions while students are picking worms in the garden. Check the Science journals to see if their drawing and writing matches what we did in the garden today.



ADAPTATION

Students can create their own garden habitat using a shoe box they can use paint construction paper to make the garden flowers. They can use play dough to make the inch worms. They can also use playdough or clay to make themselves in the garden taking out the inch worms.

Students can work in small groups to role play how to take the inch worms out of the garden.



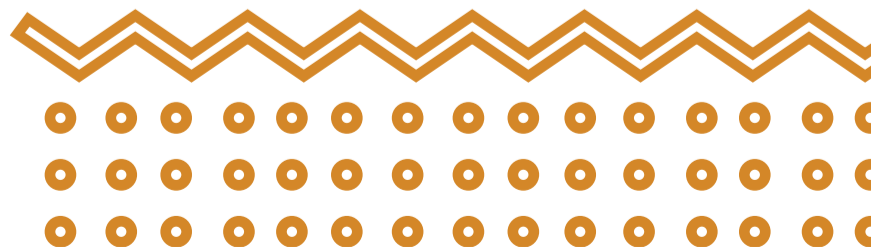
DIGGING DEEPER

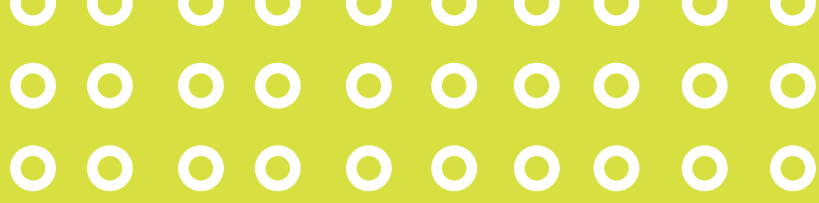
- ▶ Have the students write a poem using words about the garden.



DID YOU KNOW?

- ▶ Cactus thorns are actually called "spines" which are modified leaves.
- ▶ The squash leaves act like a sunscreen for the fruit. While squash plants as a whole like a lot of sun, the fruit of a squash plant does not.
- ▶ Hummingbirds can see colors, where bees cannot. So, the red flowers are "invisible" to the bees, leaving plenty of red flower nectar for the hummingbirds.





Lesson Seven

Garden Caretakers





OVERVIEW

After learning about the basic needs of plants and helpful insects in a garden, students will create a job list of ways to take care of the garden.



OBJECTIVE

- ▶ Students will learn what a garden needs to stay healthy. Students will learn about their garden job.



STANDARD



Nevada Standards

- (K) 1.1 Record observations and explanations using pictures, words or numbers.
- (K) 1.2 Use equipment to gather information.



Next Generation Science Standards

K-ESS3-3 Communicate solutions that will reduce the impact of humans on the land, water air or other living things local environment.



QUESTIONS

- ▶ What do you need to keep you healthy?
- ▶ What does the garden need to stay healthy?
- ▶ How often will we need to do our jobs to keep the garden clean?
- ▶ Why do we crumple the leaves? How does it help our garden?



MATERIALS

- ▶ Chart paper
- ▶ Markers



PROCEDURE

1. Review with students the basic needs of a growing garden. Extend the discussion to include other ways of caring.
2. The teacher will chart the student's response on chart paper.

3. Move out to the garden and ask students to identify things in the garden that will not help it to grow. We will discuss what we do with the things that will not help the garden to grow. Trash that falls in the garden gets thrown in the garbage. Brown leaves can be crumpled into tiny pieces because that will help the soil by adding food to the soil for worms, acts like a blanket to keep the soil warm in winter and moist in the summer. The teacher will tell the students that this is our garden job we have to help keep the garden healthy.
4. Next, break the students into 4 groups of 5 two sets will look and pick up trash and the next two sets will pick up the brown leaves.
5. Once students have finished their garden jobs the students will go back to the classroom to discuss what they learned about the garden.
7. Make an entry in your science journal to draw a picture of what your garden job was today.
8. Make a garden jobs poster that students co-write and illustrate that have weekly assigned roles. This could become an ongoing weekly assignment for the class. Students could write and draw in their journals about their weekly garden job. This could culminate in a class book or how-to video for Kindergartners next year.



ASSESSMENT

The teacher will conduct informal observations of the students while they are in the garden to notice if they cleaning the right parts of the garden. Teachers will ensure the students are getting rid of the dead leaves not the green leaves. Check the Science journals to see if their drawing and writing matches what we did in the garden today. Example sentence stem (Today we learned that brown leaves if we crumple them up can stay in the garden. (Trash duz not beln in a grdn) * () examples of invented spelling.



ADAPTATION

Include pictures of students completing each job on the poster.



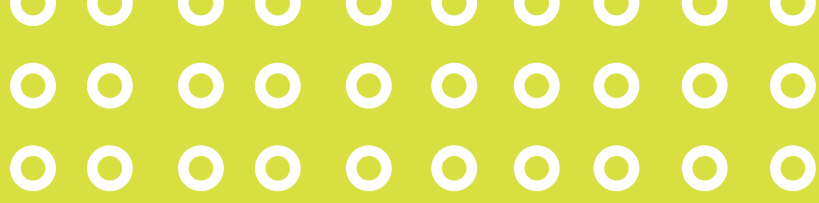
DID YOU KNOW?

- ▶ Why use mulch? Mulch helps control weeds, retains moisture, prevents soil erosion, maintains soil nutrients, controls pests, and encourages earthworms to move in.
- ▶ Plants can be considered a high commodity and are often expensive. Such as tulips, saffron, and orchids.



GARDENER TIPS

- ▶ Take the time to spread mulch evenly. This will allow for all the benefits of mulch to flourish.



Lesson Eight

Growing Through the Seasons





OVERVIEW

Students will gain a better understanding of how different plants require different growing conditions, including time of the year.



OBJECTIVE

- ▶ Students will learn about plants that grow in different seasons.



STANDARD



Nevada Standards

(K) 1.1 Record observations and explanations using pictures, words or numbers.

(K) 1.2 Use equipment to gather information.



Next Generation Science Standards

K-L S1-1 Use observations to describe patterns of what plants and animals need to survive.



TEACHER INFORMATION

In southern Nevada, the growing season is year round! Many of the kinds of plants we think of as edibles from the garden are ready to harvest over the summer when school is out. Take this opportunity to expand the palates of your students by planting and harvesting something new!

WHEN TO PLANT	WHEN TO HARVEST	WHAT
Late May	Late August	Summer crops like celery, radish, rutabaga, cucumbers, eggplant, spinach, green beans, tomatoes, bell peppers, hot peppers, corn, squash, okra, melons, strawberries, herbs
Mid September	November	Fall crops like pumpkins, herbs, winter squash, eggplant, rutabaga, spinach, turnips, radish, peas, parsley, green onions, mustard greens, leaf lettuce, head lettuce, leeks, kohlrabi, kale, swiss chard, chives, cauliflower, carrots, cabbage, brussels sprouts, beets, broccoli

WHEN TO PLANT	WHEN TO HARVEST	WHAT
November	February	Winter crops like broccoli, brussels sprouts, cabbage, carrots, cauliflower, celery, swiss chard, chives, garlic, kale, kohlrabi, head lettuce, leaf lettuce, mustard greens, dry onions, spinach,
Mid February	April	Spring crops like artichokes, asparagus, beets, carrots, swiss chard, chives, garlic, kale, leeks, head lettuce, leaf lettuce, mustard greens, green onions, parsley, peas, radish, rhubarb, spinach, turnips, strawberries
March	May	Late spring crops like artichokes, asparagus, beets, carrots, swiss chard, chives, garlic, kale, kohlrabi, leeks, green onions, parsley, peas, radish, spinach, turnips, green beans, eggplant,



TIME

30 minutes



QUESTIONS

- ▶ What do you think might happen if we plant seeds in the garden that are out of season?
- ▶ What would happen if we plant seeds that are in season?
- ▶ How did you decide which seeds should be planted in what season?
- ▶ Did you make any changes?



MATERIALS

- ▶ Groundhogs Garden Grew by Lynne Cherry
- ▶ Four season charts
- ▶ Vegetable pictures, (onions, radishes, lettuce, peas, swiss chard, cabbage and other greens)

- ▶ Science journals
- ▶ Pencils
- ▶ Crayons



PROCEDURE

1. Students will enter classroom and sit on the rug. The teacher will ask student “Does food grow in Las Vegas during the summer?” Run through the basic needs checklist to determine if it makes sense. Yes, because Las Vegas has unique weather and seasonal patterns.
2. The students will be told that they will make a prediction about what vegetables may grow in which season by using the fruit and vegetable Velcro pieces and their four season chart. Guide them to think about temperature as another need for plants. As a class categorize into hot and cold seasonal varieties (use the chart above to guide you).
3. Next the students will be broken up into small groups and will begin to make their predictions. The teacher will listen and ask the students why they chose the season they did. Once students have finished making their predictions they will rejoin the class on the rug.
4. Next the teacher will ask one student from each group to explain why that vegetable or fruit is in a particular season.
5. The teacher will then read the following story to the students How Groundhog’s Garden Grew by Lynne Cherry.
6. Next the teacher will discuss with the children about the vegetables in our garden and what we learned from the story about vegetable gardens.
7. Next we will discuss what vegetables will grow best in the winter months.
8. The students will go back to their small groups and make changes to their chart as needed.



ASSESSMENT

Teacher will review their science journals to see if they included a picture of themselves planting ___ in the winter look for a hint that you know it is winter example of a coat or a hat ect. (if you are not sure of the drawing have the students ask).

Students will draw and write about what they learned about plants that will grow best in the winter. Ex sentence stem Today we learned (invented spelling tda we lrnd that __ groz in the wintr The students can drw a picture of them planting ___ in the winter).



ADAPTATION

Write riddles to go with each sample vegetable or fruit so students can use clues to draw conclusions.

Have test tastes of each fruit or vegetable to help aide students in predicting (a lot of spicy/hot vegetables are harvested after a long hot summer).



DIGGING DEEPER

- ▶ The garden is an ideal place for students to observe the lifecycle of a butterfly or cabbage moth caterpillars.



DID YOU KNOW?

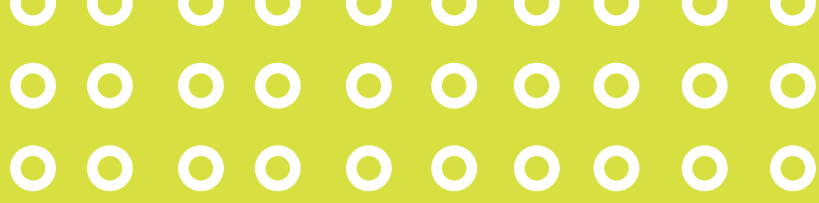
- ▶ Ant ranches are a sign of aphids in the garden or sticky things in the garden.



GARDENER TIPS

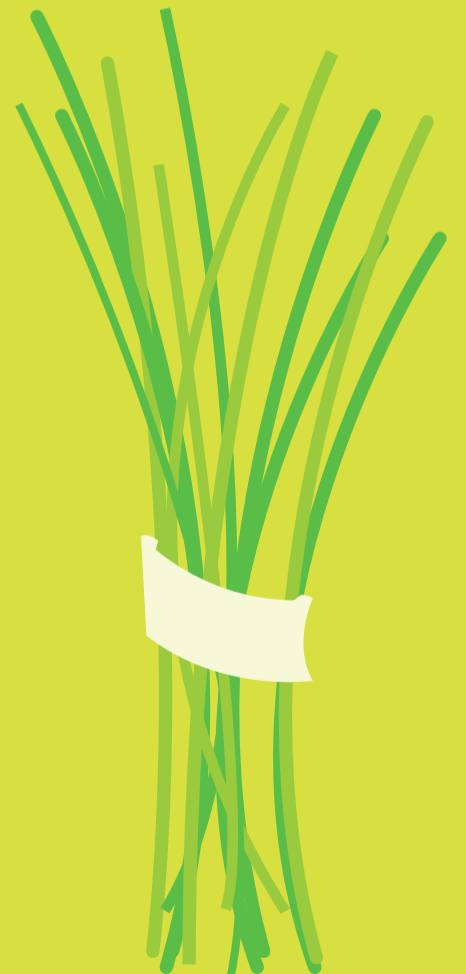
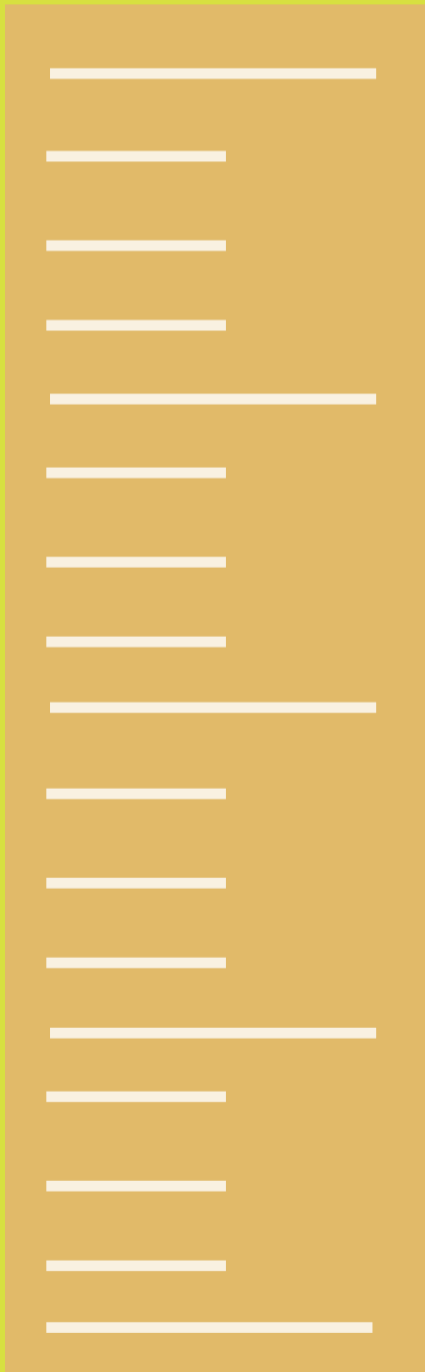
- ▶ Aphids, also known as “plant lice”, are small, sap-sucking insects often found in gardens. Control aphids by spraying them with a mixture of 1 quart of water, 1 tsp of liquid dish soap and a pinch of cayenne pepper.
- ▶ Go to Gardener’s Toolbox to see the Bad Bugs Diagram.





Lesson Nine

Measuring the Harvest





OVERVIEW

After harvesting, students will explore measurement of fruits and vegetables from the garden.



OBJECTIVE

- ▶ Students will measure the heights and lengths of vegetables in the garden using non standard measurement tools.
- ▶ Students will make predictions about the height or length, then check their predictions by using non standard tools to measure.



STANDARD



Nevada Standards

- (K) 1.1 Record observations and explanations using pictures, words or numbers.
- (K) 1.2 Use equipment to gather information.



Next Generation Science Standards

Describe and compare measurable attributes.

K.MD1 Describe measurable attributes of objects, such as length or weight. Describe several measurable attributes of a single object.



TEACHER INFORMATION

Use this lesson throughout the growing seasons of the school year to compare harvests. You can keep track of amounts and compare at the end of the year.



TIME

30 minutes



QUESTIONS

- ▶ Are we measuring the tops or the bottoms in our garden?
- ▶ Will the measurement height or length change if we change the tool?
- ▶ How would the measurement of the fruits or vegetable differ if we measured the bottom instead of the tops?



MATERIALS

- ▶ Unifix cubes
- ▶ Paper clips
- ▶ Coins
- ▶ Bottle caps
- ▶ Garden vegetables
- ▶ Science journal page
- ▶ Tops and Bottoms by Janet Stevens
- ▶ Camera (optional)



PROCEDURE

1. Start by introducing today's activity, "We will be going into the garden to make predictions and to measure the heights and lengths of our fruits or vegetables."
2. Read the book called Tops and Bottoms by Janet Stevens then have the discussion with the children whether they will be measuring the Tops or Bottoms in their garden.
3. The teacher will model for the students how to use the measurement tools to measure objects in the garden.
4. Next divide the children up into 4 groups and have each group have a different measurement tool. Within the four groups assign the students a partner to work with. Students will use their check list to record their measurement of the fruit or vegetable (you can limit it to four items).
5. Students will have some time to begin their measurement in the garden and record in their science journals.
6. Next students go back to the class and gather altogether to share.
7. Place a long sheet of butcher paper on the floor about the size of your bulletin board. Explain that the students will make a mural showing how big their harvest was this season. Model tracing a vegetable (like a zucchini) and coloring in to show what vegetable it is. Then, model measuring the length in paper clips or coins. Label the picture with the unit # (Example: 6 paperclips).



ASSESSMENT

Informal observations, over heard conversations. The teacher will check the science journal entry to see if they drew a picture representation of the object they measured and completed the sentence stem.



ADAPTATION

Students can extend their learning by measuring objects in their home and bring in their findings.

Students can measure things in their classroom garden.

Students who are unable to complete the sentence stem will be asked to draw a picture on their journal page.

If a student is unable to draw a picture the teacher can allow the students to model how they used the non standard measurement tools and the teacher can then take a picture to record the students work.



DIGGING DEEPER

- ▶ Have students compare produce from the grocery stores to the produce grown in your garden. Have them compare ripeness, colors, and taste.



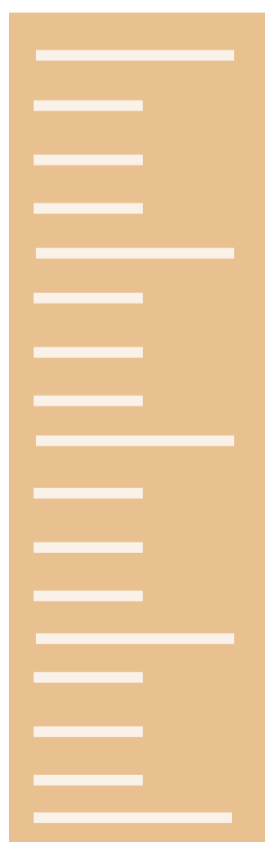
DID YOU KNOW?

- ▶ Halloween and Thanksgiving were established to celebrate the fall harvest of their crops.
- ▶ The reason that school ends in late spring is because traditionally children were needed to help their families harvest in early summer.



GARDENER TIPS

- ▶ Refer to the How to Harvest guide in the Gardener's Toolbox.
- ▶ Keep an eye on children snacking in the garden and be aware of all children's allergies.





Lesson Ten

Weighing the Harvest





OVERVIEW

After harvesting, students will explore measurement of fruits and vegetables from the garden.



OBJECTIVE

- ▶ Students will identify which vegetables are ready for the harvest.
- ▶ Students will use a scale to compare the weights of harvested vegetables.



STANDARD



Nevada Standards

- (K) 1.1 Record observations and explanations using pictures, words or numbers.
- (K) 1.2 Use equipment to gather information.



Next Generation Science Standards

Describe and compare measurable attributes.

K.MD1 Describe measurable attributes of objects, such as length or weight. Describe several measurable attributes of a single object.



TEACHER INFORMATION

Use this lesson throughout the growing seasons of the school year to compare harvests. You can keep track of amounts and compare at the end of the year.



TIME

30 minutes, to follow after Measurement Lesson or at another season's harvest



QUESTIONS

- ▶ How do you know when a vegetable or fruit is ready to be harvested?
- ▶ What do you do when a vegetable or fruit is not ready to be harvested?
- ▶ What is a gestation period and how does knowing that help you to identify when to harvest a vegetable or a fruit?
- ▶ Were there any fruits that you thought were heavier than they actually weighed?



MATERIALS

- ▶ Balancing scales for small groups of four students
- ▶ Journal page
- ▶ Harvested vegetables
- ▶ Camera (optional)



PROCEDURE

1. Start by introducing today's activity, "Today we will be going to the garden to identify which vegetables can be harvested. We can tell if a vegetable needs to be harvested if it is pushing out of the ground or if it has reached its gestation period according to the seed packet."
 - It is recommended you keep track of the gestation period on a class calendar so that you are able to more accurately predict when the harvest will occur. Or, talk to your gardener.
2. Next the teacher will tell the students that we will be comparing the weights of some of our harvested vegetables or fruits. We will use a scale to identify which is heavier and which is lighter.
3. The teacher will have students make a prediction about two objects to identify which one might be heavier and which one might be lighter. Next the teacher will tell the students that there is a tool that you can use to help make sure you can compare weights accurately.
4. The teacher will introduce a tool that we use in measurement called a balancing scale the scale is used to compare the weight of two objects. The teacher will model for the students how to use the balancing scale. Then the teacher will tell them that we will do this with the vegetables harvested from the garden.
5. The teacher will take the students to the garden to observe and discuss which vegetables are ready for the harvest.
6. Next the teacher will model how to harvest the vegetables and the students will work in small groups to begin to harvest the vegetables.
7. Take the vegetables back to the class to begin comparing the weights.
8. Students will be broken up into groups of four students to compare the weights of harvested vegetables.
9. Once students have had some time to compare weights of harvested vegetables have a discussion with the children about which vegetables were heavier which were lighter?

10. Have students complete a balancing scale journal page to show which of their harvested vegetables were heavier and lighter.



ASSESSMENT

Informal observations, over heard conversations. The teacher will check the science journal entry to see if it included the harvested vegetable that the students weighed and if they completed their sentence stem.



ADAPTATION

Students can extend their learning by comparing the weights of fruits or vegetables in their home. They can use their body as a body scale their hands can be the balancing scale. If it's heavier your hand should be down with the vegetable or fruit in that hand. The lighter object will be in the hand that is up in the air.

Students who are unable to complete the sentence stem will be asked to draw a picture on their journal page.

If a student is unable to draw a picture the teacher can allow the students to model how they used the balancing scale and the teacher can then take a picture to record the students work.

Invite the fourth or fifth graders to include the Kindergartners in the harvest.

