



Growing Young Minds

For more information on
Growing Young Minds
with Tower Garden®
in your classroom,
contact us at
schools@towergarden.com.



Activities
and
Lesson Plans
for the
Classroom



Teacher's Guide



Make School a Growing Place!

Tower Garden® isn't just a no-mess, no-fuss way to grow fruits and vegetables; it's a powerful real-life teaching tool. It's packed with engaging opportunities to bring science, math, and other curricular areas to life. High-interest lessons aren't the only rewards though. Count on students' self-esteem, responsibility, and healthful habits to grow right along with the garden.

Introduce, Intrigue, Inspire

No soil, no digging, no weeding. That's gardening? With Tower Garden it is! This method of gardening is bound to be an unfamiliar concept to many students. Use the tips below to build on what students know about gardening and spark enthusiasm about having Tower Garden at school.



1. Get students thinking and talking.

Ask young students questions such as the ones below.

- Where do fruits and vegetables come from?
- What do gardens look like?
- What is a tower?
- What do you think Tower Garden looks like?

Use these questions to spark discussion with older students.

- What do plants need to grow?
- What are some challenges of planting and maintaining gardens? Are the challenges different in urban areas than in rural areas?
- What are benefits of gardening?

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2. Show Tower Garden® at work.

Tell students that they will plant, tend, and harvest Tower Garden. Explain that, just as the name suggests, Tower Garden is vertical. Point out that since Tower Garden doesn't need soil, it can grow indoors and in small places, even inside schools! Then show students several photos of school Tower Gardens. You'll find some nice ones at towergarden.com.

3. Set students' sights on the harvest.

Here's what to do.

- Name each type of plant you plan to grow in the garden. Describe any plants that are unfamiliar to students and show pictures of them. Talk about different ways the fruits and vegetables can be eaten.
- If you plan to buy seeds rather than use the ones in Tower Garden Growing System, invite students to help you decide what types of plants to grow. Consider factors such as the popularity of the foods and how easy the plants are to grow.
- Talk about the potential harvest with great enthusiasm and suggest a celebratory garden snack or lunch after the harvest.

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How Tower Garden® Works



The Basics

Don't have a green thumb? No problem. Tower Garden® is a no-hassle approach to gardening. That makes it ideal for busy teachers and students of all ages. Set the stage for your young gardeners with the discussion guide below, adapting it for your grade level as needed.

Aero...What?

To introduce the concept of aeroponics to students, invite them to name various places they have observed plants growing. List the places on the board and then circle the ones that have soil. Point out that growing plants in soil is very common. Tell students there's another way to grow plants called *aeroponics*. Write the word on the board. Underline *aero* and explain that it means "air." Explain that *aeroponics* is the process of growing plants in air or a mist environment rather than in soil.



If There's No Soil, What Holds the Plants?

Show students the rockwool from Tower Garden Growing System and invite them to feel it. Explain that they will start growing seeds in the rockwool. When the plants are about three inches tall, students will transfer the plants to the net pots in Tower Garden. The net pots and rockwool will hold the plants in place.

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How Do the Plants Get Water?

A mixture of water and nutrients is poured into the bottom of the tower. The water pumps upward and then drips down onto the roots of the plants that are exposed. The water and nutrient mixture helps the plants grow well.



What about Sunlight?

Most plants need light, and the plants in Tower Garden® are no exception. The plants need sunlight for about eight hours every day. That's why it's important to place the garden in a consistently sunny location or to use grow lights. Some plants grow best outdoors and others do well indoors or outdoors. Learn more at towergarden.com. Check out the blog post titled "Growing Tomatoes Indoors (Is It Worth It?)"

When Can We Harvest?

That depends. Different crops take different amounts of time to grow, so the garden needs to be observed closely. It's important to make sure it has plenty of water, nutrients, and sunlight and that it stays healthy. It's also important to keep an eye on the crops. Pay attention to the size, color, and hardness of the fruits and vegetables. Those details are important factors in deciding when the crops are ready to be harvested.



Share Your Successes!

How are you using Tower Garden? Tell us! Share on Facebook, Twitter, or Instagram. We love to hear your stories and see your photos!

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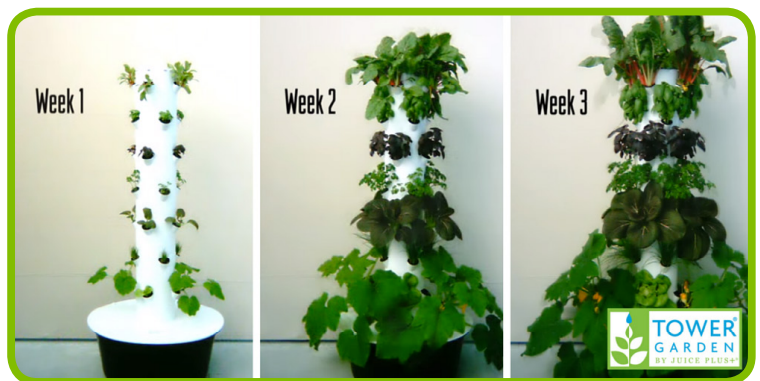
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Make Tower Garden® Part of Your Lesson Plans

Try these skill-based ideas for language arts, math, science, and social studies.

- **Crop Talk (Grades PreK–K):** Have students cut out pictures of fruits and vegetables from magazines and grocery store sale circulars. Organize the pictures by color on a bulletin board. Encourage students to name the foods and describe them using color, shape, size, and texture words. *Vocabulary*
- **From Tower to Table (PreK–Grade 5):** Take photos throughout the gardening and harvesting process. Sequence the photos on a bulletin board and add student-generated captions. *Shared writing, explanatory text*
- **Dinner Plans (Grades 1–5):** Have each student write and illustrate a restaurant menu for foods grown with Tower Garden. Encourage students to include an enticing description of each menu item. *Descriptive writing*
- **“Sense-ational” Crops (Grades 1–5):** Guide students to create a class chart of sensory words that describe the plants growing in the garden. *Sensory words*
- **In the Know (Grades 2–5):** Have small groups of students create pamphlets, posters, or class books to share information about Tower Garden with classroom visitors. *Informative writing*
- **Great Gardens (Grades 3–5):** Ask students to brainstorm the similarities and differences between aeroponic gardens and traditional gardens. Then have each student write a persuasive essay promoting gardens for schools. *Compare and contrast, opinion writing*





Cultivate Students' Vocabularies

There's no better way for students to learn new words than by using them. Display vocabulary words relevant to Tower Garden® and add to the list throughout your class gardening experience. For younger students, increase print awareness by using the words to label plant diagrams. Encourage older students to keep a log of vocabulary words by completing copies of the reproducible provided on the next page. *Vocabulary*



Suggested Vocabulary Words

PreK–Grade 1

blossom
fruit
harvest
leaf
roots
seed
soil
vegetable

Grades 2–5

aeroponic
environment
herbs
horizontal
nutrients
photosynthesis
sustainable
vertical

Name _____

Watch My **Vocabulary Grow!**

Word	Meaning





- **Count on Gardens! (PreK–K):** Throughout the gardening experience incorporate counting, from exploring one-to-one correspondence between the seeds and rockwool holes to counting the vegetables that students harvest. Be sure to have students compare the quantities of fruits and vegetables, too. *Counting, comparing sets, comparing numbers*
- **Size Them Up (PreK–Grade 2):** Help students keep a log that includes the length of vegetables such as cucumbers and eggplants. Guide younger students to directly compare the lengths by placing them side by side. *Linear measurement, comparing lengths*
- **Tipping the Scales (Grades K–5):** Each time students harvest, have them estimate the weight of the produce and then determine the actual weight. Help students graph and compare the information. *Estimating and determining weight, organizing and interpreting data*
- **Delicious Data (Grades K–5):** Have younger students use a class tally chart to record the results of a harvest taste test. Ask older students to survey classmates about their preferences and then make individual graphs or tally charts. *Organizing and interpreting data*
- **Shopping Savvy (Grades 3–5):** After students harvest their garden, have them use grocery sales circulars to determine how much it would cost to buy the same produce at a local grocery store. *Adding and comparing money amounts*



Tower Garden Challenge

Do aeroponic gardens produce more food using less land and water than soil-based gardens? That's the question students answer through the scientific experiment outlined by the Buck Institute for Education. The step-by-step teaching guide is geared toward middle school students but may be adapted for upper elementary classes. Get your free lesson here: pblu.org/projects/the-tower-garden-challenge.



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- **Fresh, Frozen, and Canned (PreK–Grade 5):** Guide students to compare and contrast frozen vegetables, canned vegetables, and vegetables grown in Tower Garden®. Encourage students to consider factors such as color, taste, and texture. Older students may also incorporate math by comparing the costs per serving. *Observation, compare and contrast, comparing costs*
- **Plant Investigators (PreK–Grade 5):** Invite each student to use a hand lens to periodically observe the garden plants. Instruct students to describe the similarities and differences among the plants. Then guide them to identify the basic structures that the plants have in common. *Observation, compare and contrast, plant parts*
- **Got to Have Plants (Grades K–5):** Describe a food chain and the essential role that plants play in sustaining animal life. Invite older students to use strips of paper and arts-and-crafts materials to make paper chains that show food chains. *Interdependence*
- **Growing People (Grades 1–5):** Create a class Venn Diagram comparing people and plants, including their needs and how they grow and change over time. *Comparing living things, comparing needs of living things*
- **Start With a Seed! (Grades 3–5):** Have students create posters that show the life cycles of different plants. Discuss ways in which the life cycles are alike and different. *Plant life cycles*



Inquiring Minds

What's inside a seed? Why do plants need leaves? These are just two questions that students explore through lessons created by Seton Hall University. The lessons support Next Generation Science Standards and are designed for grades 2 and up, grades 5 and up, and grades 7 and up. Find the lessons here: towertalk.jiveon.com/community/technology-showcase.

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- **Everyone Has a Role (PreK–Grade 2):** Add the tasks involved in tending the garden to your class jobs. Give each role a kid-pleasing name, such as Awesome Observer, Water Crew, and Happy Harvester. Rotate the jobs among students. *Participating in a classroom community*
- **On the Job (PreK–Grade 2):** Take a class field trip to a local fruit or vegetable farm. Ask the farmer to talk about his or her growing practices and discuss challenges such as weather and producing more food in less space. *Economics*
- **Tower Power (Grades K–5):** Ask students to brainstorm ways Tower Garden® can be used to make a positive impact on the community. Create a web of ideas and then challenge the class to plan and carry out a garden-related service project. *Contributing to the well-being of a community*
- **Towers Everywhere! (Grades 3–5):** Have students research and chart various locations where people use Tower Garden, including on rooftops, in schools, on apartment balconies, and on farms. *Understanding how people adapt to their environments*
- **Growing Changes (Grades 4–5):** Introduce the word *agriculture* to students. Guide them to research how agriculture has changed over time. Ask students to create a poster-size timeline to showcase what they learn. *Understanding how events influenced the history of agriculture*



People Farmer

Don't underestimate the power and influence of gardening in the classroom! Bronx educator Stephen Ritz refers to himself as the CEO (Chief Eternal Optimist) of the Bronx for good reason. After he incorporated gardening into the curriculum at his high school, discipline problems decreased and attendance and graduation rates climbed. Ritz's innovative and inspiring programs have been celebrated around the world and include Tower Garden.

Learn more here: towergarden.com/grow/school-gardens.

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No doubt you and your students are excited about Tower Garden®. Now it's time to spread the word to your community!

Meet with your principal and share ideas like these:

- **Send a press release.** Contact local newspapers, TV stations, radio stations, and websites that feature community information. You'll find a sample press release template on page 12.
- **Post to social media.** Share photos when Tower Garden arrives; then periodically post photos as students plant, harvest, and taste what they've grown. See the next page (page 12) for a few sample Facebook posts.
- **Feature updates in your class newsletter and class or school website.** Everyone will enjoy seeing your progress.
- **Do a presentation at a PTA meeting or conference.** Show what Tower Garden is and share the valuable lessons your students have learned.
- **Share the bounty.** Hold a produce sale, use your harvest in the cafeteria, serve it at a school event, or donate it to a food bank. For something really special, invite a local chef to visit the school and cook what you've grown. No matter what you do, take and share photos on your school's Facebook page and website.



One fun way to get the community involved in Tower Garden is to hold a contest. Invite community members to vote on what you should grow next or ask them to submit favorite recipes that use your produce. Be sure to congratulate your winners and share your results.

Sample press release

Here's what to include:

- Date
- Your name, your title and school, and your contact information (phone or email)
- Headline—Share what makes your school Tower Garden® program newsworthy. For example, “Jones Elementary Enjoys Record-Breaking Harvest” or “Jefferson Elementary Grows and Donates Vegetables to Johnstown Food Bank.”
- An introductory paragraph with an overview of your program
- A quote or two. Include your principal, PTA leaders, students (with parent permission), or community members involved in the program. Be sure to include the person's title.
- A few sentences about how Tower Garden works. For example, “Tower Garden is a vertical, aeroponic growing system that allows you to grow up to 20 vegetables, herbs, fruits, and flowers in less than three square feet—indoors or out. With aeroponic systems, plants grow in air or a mist environment rather than soil. Learn more at towergarden.com.”
- Several photos showing students caring for or harvesting your Tower Garden. As always, be sure you have parents' permission to photograph students.

Sample Facebook posts

- When Tower Garden arrives, before you even open the box, take a photo and post this teaser: “What's in this box? Here's a hint: Our school is GROWING very excited about it!”
- Once Tower Garden is set up, snap another photo. Include a close-up of the seeds and rockwool. Post this: “Introducing our Tower Garden! It's a vertical growing system that we can use all year long. Stop by room 302 to see it in action. We'll be growing lettuce and dill.”
- With parent permission, periodically post photos of students caring for the garden. Here's sample text: “Ian spotted the first blossoms on our Tower Garden. It won't be long now until we're eating fresh strawberries!”
- Also with parent permission, post photos of students interacting with Tower Garden as part of their lessons. “First graders in Ms. Johnson's class practiced new vocabulary words, such as ‘harvest’ and ‘blossom,’ with their class's Tower Garden” or “Third graders weigh and measure the cucumbers they've just harvested from their outdoor Tower Garden.”
- Have a little fun. Post a photo of a plant blossom and ask Facebook friends to guess what's growing.
- Show off your harvest. Post photos of what you've grown and celebrate the biggest strawberry or the crazy-shaped squash. Be sure to share what you do with the produce.
- Don't feel limited to Facebook. Tweet links to news stories about your class's Tower Garden, upload stunning garden photos to Instagram, and save your favorite garden-related classroom activities to Pinterest.

Tag “Tower Garden” in your posts so we can share them with our friends and fans too.



Family Newsletter



Our Class Is Growing a Garden!

Dear Family,

I'm so excited that we are incorporating gardening into our curriculum. We're growing much more than fruits and vegetables; we're growing students' math, science, language arts, and social studies skills. We're also promoting student responsibility and healthful eating.

Our garden isn't an ordinary garden with soil; it's Tower Garden®. This earth-friendly approach to gardening uses much less water and space than soil gardens. Plus we can grow our plants year-round. Read on to find out more about this fun way to garden and how you can support your child's learning at home.



What's Tower Garden?

Just as its name implies, Tower Garden is vertical. This gardening system grows plants in air rather than soil. The sides of the tower have pockets for holding seedlings. The base of the tower holds a water-nutrient mixture. An electric pump sends water upward inside the tower. Then the water drips down onto the roots of the plants. This is called aeroponics. Along with water, the plants also need consistent light to grow well.

Garden Talk

No doubt your child will be excited to talk about our garden. Get conversations rolling with questions like these:

- How are the plants alike? How are they different?
- How are the plants changing as they grow?
- What did you notice about the garden today?



Want to learn more about Tower Garden? Visit towergarden.com.



Fit Fact

Think the only benefit of a healthy diet is good nutrition? Think again. A diet rich with fruits and vegetables contributes to a better academic performance in school. Remember, about half of a child's mealtime plate should be filled with fruits and vegetables.

More Veggies, Please!

If students grow fruits and vegetables, they're more likely to eat fruits and vegetables. Even children who usually shy away from nutritious foods are more likely to eat fresh produce after they become involved in gardening. Keep your child's healthful habits growing with these simple ideas for adding more fruits and veggies to meals.

- Put veggie toppings on pizza.
- Serve sandwich wraps made with lettuce instead of bread or tortillas.
- Add shredded carrots or other veggies to your favorite meatloaf or burger recipe.
- Top cereal, yogurt, or oatmeal with sliced fruit.
- Add veggies—such as spinach, peppers, and tomatoes—to scrambled eggs.



Did You Know?

- Tower Garden[®] uses only 10% of the land and water used by a traditional garden.
- Plants grow up to three times faster in Tower Garden than in a traditional garden.
- Tower Gardens use the same gardening technology (aeroponics) that NASA uses.

Want to learn more about Tower Garden? Visit towergarden.com.



**Pre-K
Activities
and
Lesson Plans**

Pre-K

- 1 My Tower Garden Journal
- 2 Tower Garden Booklet
- 3 Good for Me
- 4 Mini Poster
- 5 Picture Cards

My Tower Garden® Journal

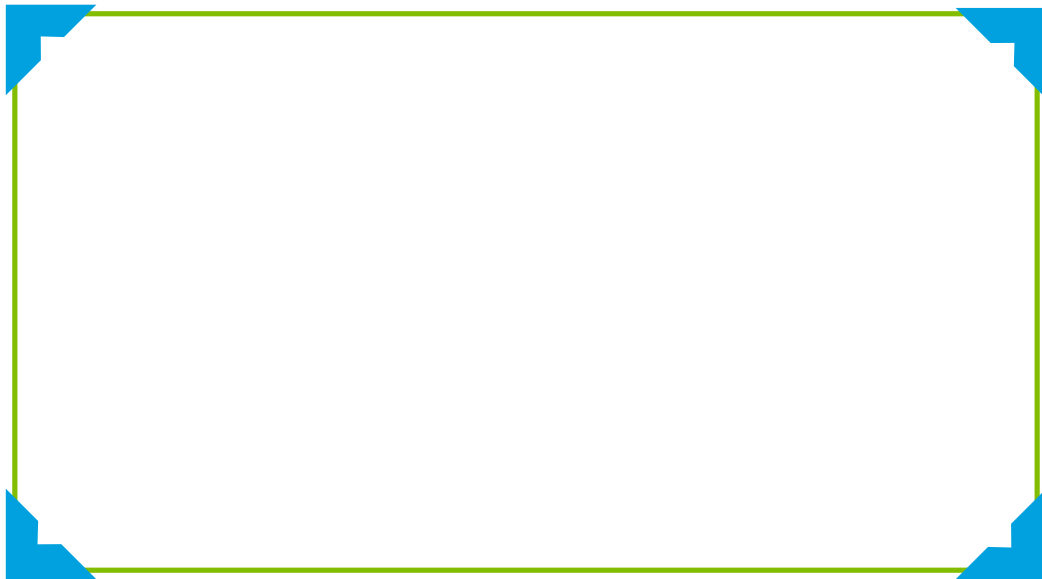


Name _____

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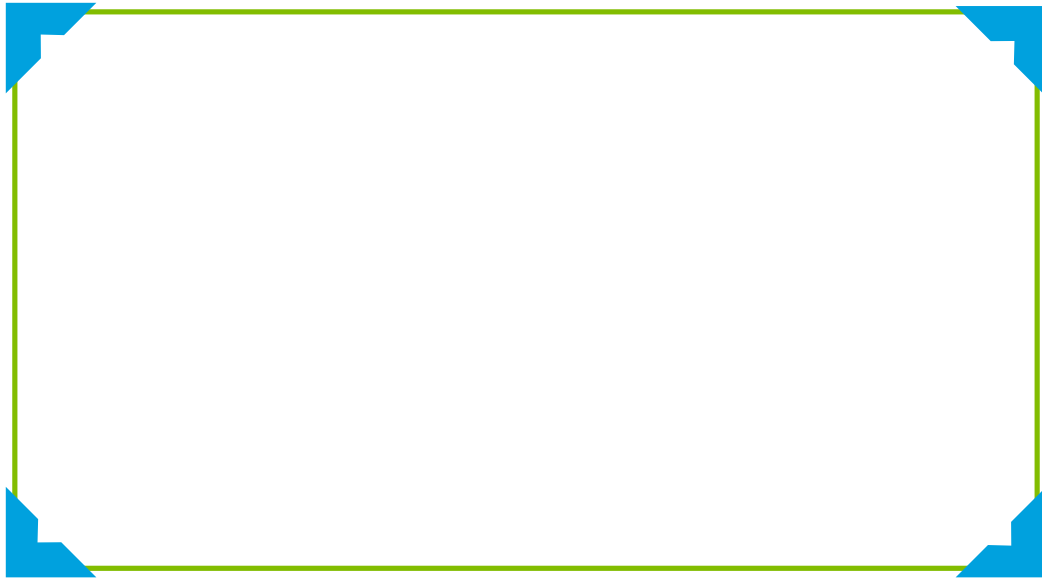
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Today is _____ .



We plant seeds.

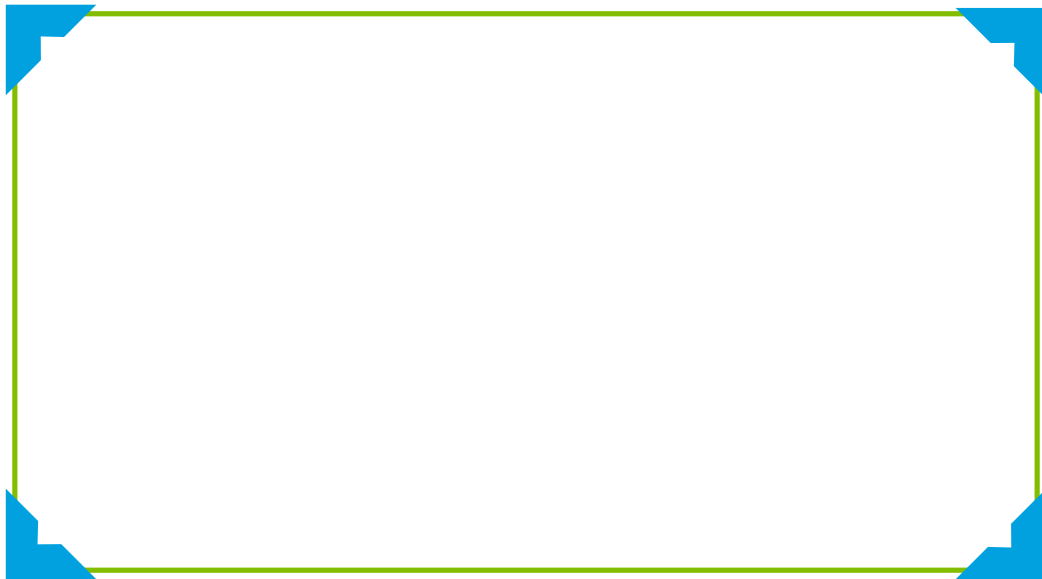
Today is _____ .



We see plants grow.

2

Today is _____ .



We harvest the garden.

3

How to Use “My Tower Garden® Journal”

Copy the journal pages for students. Cut apart each student’s cover and pages. Stack the cover and pages in order and then staple them to make a journal. Have each student write his or her name on the journal cover. After the class plants the seeds for their Tower Garden, help each student write the date on the first booklet page. Read the sentence at the bottom of the page with students. After they illustrate the page, collect the booklets for safekeeping. Help students complete pages 2 and 3 at appropriate times in the gardening process. Then have students take their booklets home and refer to them as they tell their families about their Tower Garden experience.



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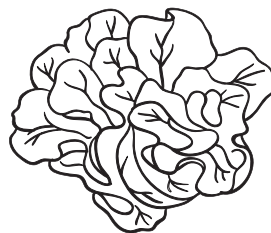
Count on a Garden!

Name _____

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1



I get one head of lettuce,

1

2



two cucumbers, and

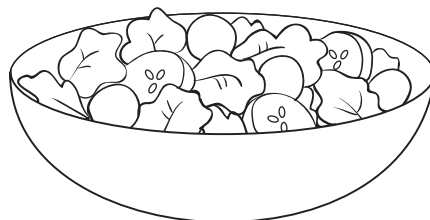
2

3



three tomatoes

3



to make a big garden salad.

4

How to Use “Count on a Garden!” Booklet

Copy the booklet for students. Cut apart each student’s cover and pages. Stack the cover and pages and then staple the stack along the left edge. To begin, ask students to name various ways they eat fruits and vegetables. Next, give each student a booklet. Read the booklet with students. Then instruct each student to write his or her name on the cover, trace the large numbers on the first three pages, and color the illustrations. Have students practice reading their booklets before they take them home to share with their families.



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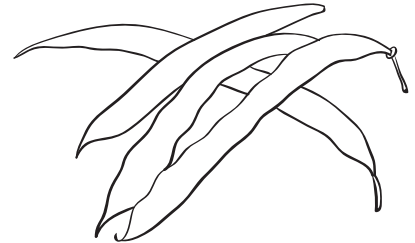
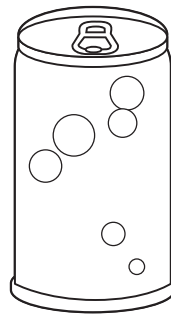
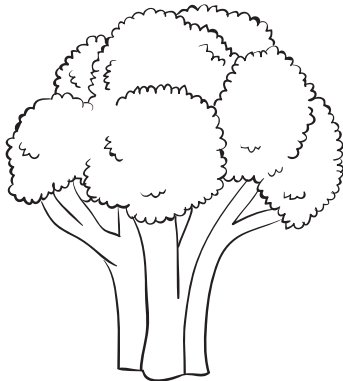
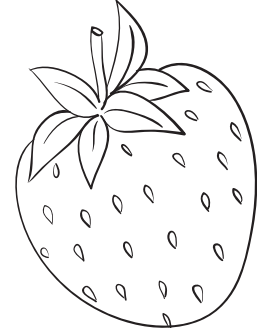
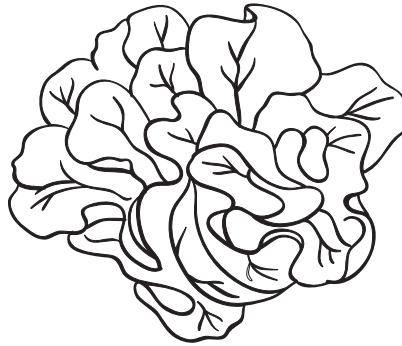
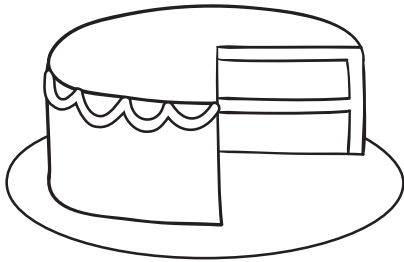
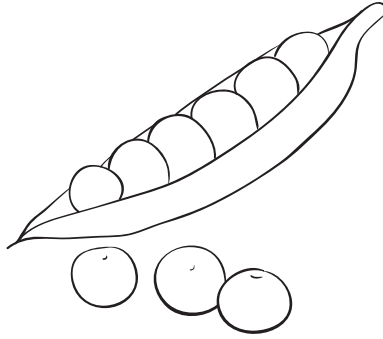
Name _____

Distinguishing fruits and vegetables from other foods

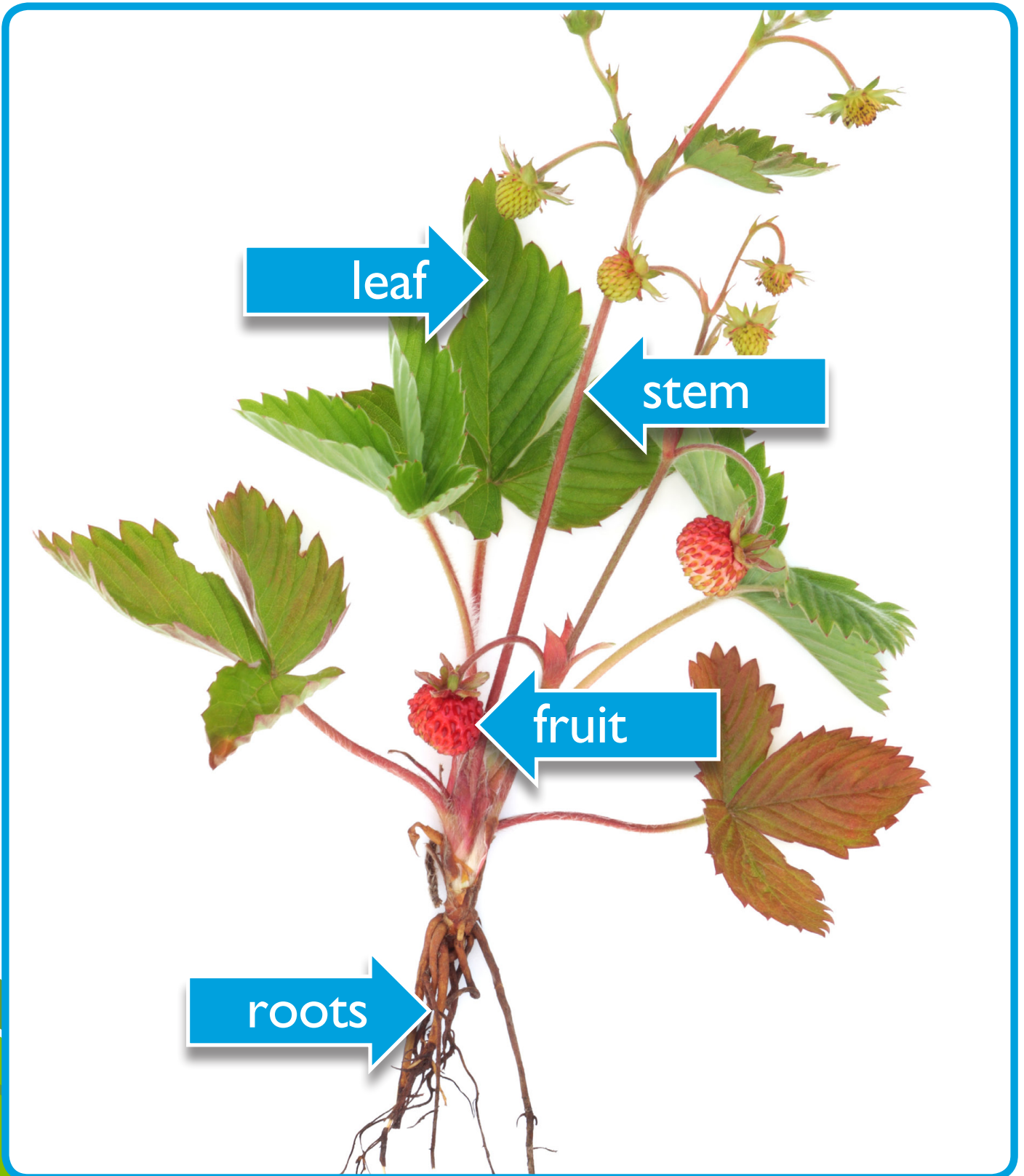
Good for Me

 Color each fruit and vegetable.

 Cross out things that are not fruits or vegetables.



We Can Name Parts of a Plant



© Can Stock Photo / marilyna

How to Use “Parts of a Plant” Mini Poster

Display the poster. Tell students that the poster shows several parts of a strawberry plant. Point out each labeled part and name it. Explain the main functions of the plant parts:

- A **fruit** gives seeds a covering.
- A **leaf** captures light to make food for the plant.
- A **stem** supports a plant and takes water from the roots to other parts of the plant.
- The **roots** take in water.

Refer to the poster periodically throughout your Tower Garden® growing process. Encourage students to use the correct plant part names as they describe their observations.



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tomato



pepper



green beans



strawberry



lettuce



cucumber

Fruit and Vegetable Cards



squash



© Can Stock Photo / mblach

watermelon



© Can Stock Photo / mg7

broccoli



Photo / Baloncici

cauliflower



© Can Stock Photo / webking

green peas



eggplant

How to Use “Fruit and Vegetable Cards”

Stretch students’ vocabularies and increase their awareness of the many healthful foods they can grow with Tower Garden®.

- **Discussion Starter:** Display each card on a different day. Name the food. Then guide students to describe the food and encourage them to tell what they know about it.
- **Name It!** Select three cards. Show students each card in turn, and guide them to name the fruit or vegetable. Then hand each card to a different student. Have the students pass the cards around the circle as you lead them in the chant below. At the end of the chant, ask each student holding a card to show the picture to the class and name it. Repeat the chant to begin another round of vocabulary-building fun.

Fruits and veggies,
Fruits and veggies,
Be sure to eat some every day.
That’s the healthy-living way!

- **Now You See It...** Display four cards on the ledge of an easel or a similar surface. Have students identify the pictured foods. Then cover the cards and remove one. Show students the display again and have them name the card you removed. Continue with additional rounds of play.
- **Make a Match!** Cut out two copies of the cards. Shuffle the cards and then display them facedown in a pocket chart. Have students pair cards as in the traditional game of Concentration and name each card pair. For an easier version, use fewer card pairs or display the cards faceup.



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**Grades K-1
Activities
and
Lesson Plans**

Grades K-1

- 1 Foldable Writing Page K-1
- 2 Huge Harvest K-1
- 3 Plant Part Booklet K-1
- 4 Reading Comprehension
- 5 Science Journal Page

From Seed to Table

Name _____

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1. Plant.



2. Grow.



3. Harvest.

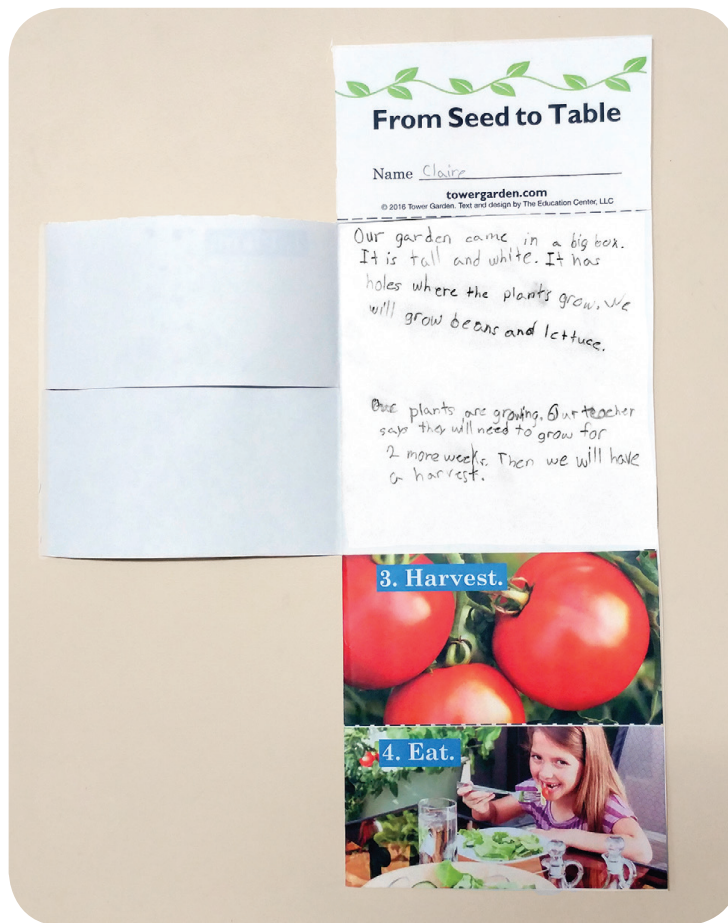


4. Eat.

“From Seed to Table”

How to Use

Give each student a copy of the page. Help each child fold the paper in half vertically, keeping the photos and text to the outside. Then guide the student to cut on the dashed lines to make five flaps. Have each child write his or her name on the first flap. Invite the student to open the first flap and describe the class’s Tower Garden®. After each stage of the garden-to-table process, instruct students to fold back the corresponding booklet flap and then draw or write to tell about the experience.



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Name _____




Comparing quantities; organizing and interpreting data (K.CC.C.6; 1.MD.C.4)

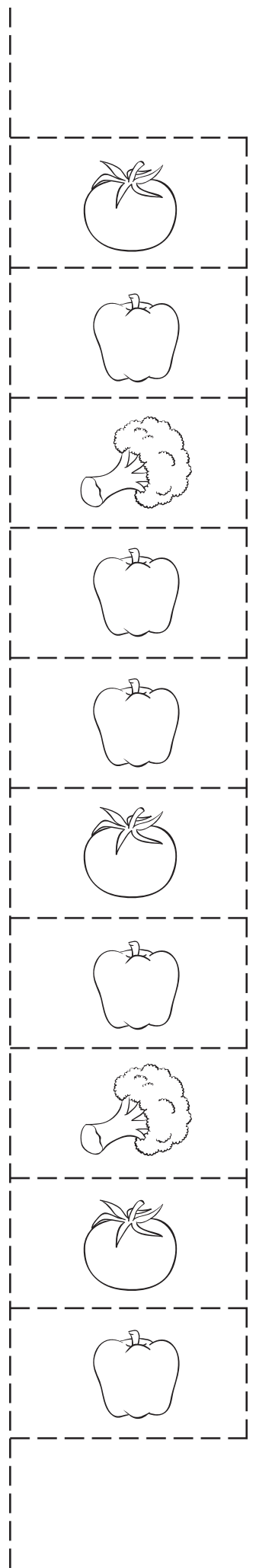
Huge Harvest



TOWER
GARDEN
BY JUICE PLUS+

Cut. Glue to match.

 tomatoes	 peppers	 broccoli



Write how many.

 _____
  _____
  _____

Write.

How many more  than ? _____














How many more  than ? _____

Fun Fact Tower Garden® can produce a big harvest in just weeks.




towergarden.com

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“Huge Harvest” Answer Key

		
		
		
		
		
 tomatoes	 peppers	 broccoli

Write how many.

 5  2  3

Write.

How many more  than  ? 2

How many more  than  ? 3



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Plant Parts We Eat



Name _____

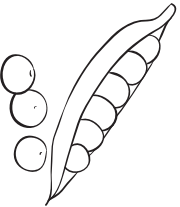
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Seeds

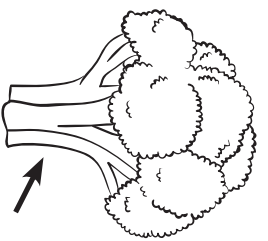


lima
beans



green
peas

Stems

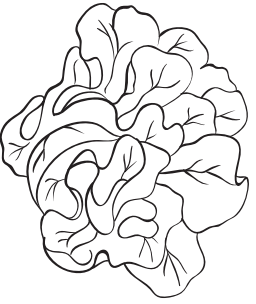


broccoli



kohlrabi

Leaves



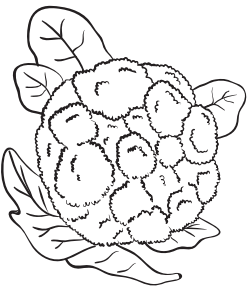
lettuce



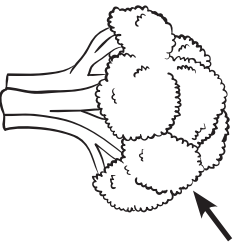
spinach

Discard.

Flowers

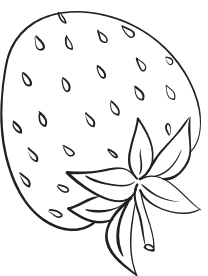


cauliflower

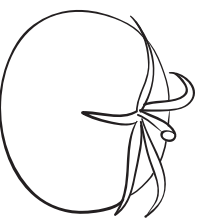


broccoli

Fruits



strawberry



tomato

Glue here.

“Plant Parts We Eat” How to Use

Give each student a copy of the booklet cover and pages. Instruct each student to write his or her name on the booklet cover. Tell students that the booklet features plants that the class can grow with Tower Garden®. Read the pages with students and guide them to name the colors of the fruits and vegetables. Then have students color the illustrations. Next, ask students to cut along the bold cut lines, discard the gray rectangle, and then glue the two long paper strips together where indicated. After you help each child accordion-fold the booklet, reread the booklet with students. Then name each featured plant, in turn, and ask students to name a part of the plant that people can eat.



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Gardens Where?

Where can gardens grow? They can grow in the country. They can grow in big yards. These are not the only places. Some gardens grow in cities. Some gardens grow in schools. Some gardens grow in small homes. Some gardens grow on rooftops! Tower Garden® can grow in all these places. It is shaped like a tall tube. It does not need a lot of space. It does not need soil. It needs water and light. It needs food. Tower Garden can grow in all kinds of places!



Write **yes** or **no**.

1. Do all gardens need lots of space? _____
2. Can some gardens grow indoors? _____
3. Underline the sentence that tells what Tower Garden looks like.
4. Write four places you might see Tower Garden.

“Gardens Where?”

Answer Key

1. no
2. yes
3. It is shaped like a tall tube.
4. Possible answers include on a rooftop, in a school, in small homes, in cities, in the country, and in big yards.



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Name _____ Recording observations



Our Tower Garden®

Today's date is _____.

I observed a _____ plant.

This is what it looks like.

- Word List**
- wide
 - narrow
 - smooth
 - bumpy
 - jagged
 - curly

The plant has _____

“Our Tower Garden®”

How to Use

Copy the journal page for students. Have each student write the date and the name of a plant growing in Tower Garden®. Ask the student to observe the plant closely and draw it. Then have the student refer to the word list as he or she writes a description of the plant. Instruct the student to store the completed paper in a folder. Repeat the activity throughout the growing cycle. Later, bind each student’s journal pages to create a garden observation log.



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**Grades 2-3
Activities
and
Lesson Plans**

Grades 2-3

- 1 Math
- 2 Mini Poster
- 3 Nonfiction Passage
- 4 Science Journal
- 5 Writing Prompts

Name _____

Odd and even numbers, word problems
(2.OA.C.3; 2.OA.A.1; 3.OA.A.3; 3.OA.D.8)

Growing Plants? No Problem!

Did you know Tower Garden® can hold up to 20 plants?

Use this fact to help you solve the problems below.

Explain your thinking with numbers, pictures, or words.



1 Grace and DeShawn have 16 seedlings to plant in Tower Garden. Do they have an even or an odd number of seedlings? How many more seedlings can they put in Tower Garden?

2 Juan has 7 seedlings, and Ava has 6 seedlings. How many more seedlings can they plant in Tower Garden?

3 Ms. Bright's class has 6 lettuce plants, 4 tomato plants, and 4 cucumber plants in Tower Garden. If the rest of Tower Garden has strawberry plants, how many strawberry plants does it have?

4 Flora and her classmates have an equal number of lima bean plants, green bean plants, bush bean plants, and fava bean plants in Tower Garden. How many of each kind of plant do they have?

5 There are 10 kale plants growing in Tower Garden at the community center. There are also an equal number of leek and okra plants growing in Tower Garden. How many leeks and okra plants are growing in Tower Garden?

6 Mr. Segundo's class wants to plant herbs in Tower Garden. They would like to use chives and dill. If they use at least 6 of each plant and they fill Tower Garden, how many of each herb can they have? List all possible answers.

“Growing Plants? No Problem!”

Answer Key

Explanations will vary.

1. even; 4 more seedlings
2. 7 more seedlings
3. 6 strawberry plants
4. 5 of each plant
5. 5 leek plants, 5 okra plants
6. 6 chives, 14 dill; 7 chives, 13 dill; 8 chives, 12 dill; 9 chives, 11 dill; 10 chives, 10 dill; 11 chives, 9 dill; 12 chives, 8 dill; 13 chives, 7 dill; 14 chives, 6 dill



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Urban Gardens Versus Rural Gardens



Urban Gardens

- Found in cities.
- Have limited space.
- Plants might be grown in pots, planters, vertical towers, or greenhouses. They might be found on rooftops, patios, or small plots of land.
- Provide food to people who are close by.

Rural Gardens

- Found outside of cities.
- Often have large areas of open space.
- Plants are most often grown in the ground, but they may also be grown in pots, planters, vertical towers, or greenhouses.
- Provide food to people who are close by or far away.



“Urban Gardens Versus Rural Gardens”

Mini Poster

How to Use

Introduce the social studies words *rural* and *urban*. Lead students to understand what each term means. Next, have each child think about what a rural garden might be like. Provide time for each child to share his or her ideas with a partner; then invite students to share their ideas with the class. Then repeat the think-pair-share technique, having students consider what an urban garden would be like. After students have shared their ideas, use a document camera to project the mini poster onto the board. Review the descriptions of each garden, and have students share what they notice in the photos of each type. Follow up the activity by having each child draw and complete a Venn diagram comparing and contrasting the two types of gardens.



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Urban Farming at a Ballpark

What do you think—do baseball and gardening go together? The San Francisco Giants think so. With the help of Bon Appétit Management Company, they built a garden in their baseball stadium, and it's amazing!

The Garden at AT&T Park can be found behind the centerfield wall, just under the scoreboard. This garden covers 4,320 square feet. Like other gardens, fruits and vegetables are grown there. You can find peppers, lemons, blueberries, lettuce, and more. These plants are grown in planter beds and **aeroponic towers** made by Tower Garden®. Aeroponic towers have many advantages. Since the plants grow without using soil, there are no weeds to pull or messes to clean up. Also, these towers use a lot less water than regular gardens. Aeroponic towers can also grow many plants in a small space. How many plants will one tower grow? Each tower can grow up to 44 plants in a vertical (up and down) space.

There's more to the Garden than just growing plants. The Garden has two **bistros**, or small restaurants. These bistros serve dishes prepared with fruits and vegetables grown in the Garden. This food is served to fans who come to the park before or during a game. The Garden also serves as a classroom for students who visit it on field trips. Students get to see where food comes from, get to see how it grows, and even get to cook some of the food! The goal of the Garden is to teach the community about the **benefits**, or good results, that come from a healthy lifestyle.



Source: giants.mlb.com/sf/ballpark/attractions/

Use the passage to answer the questions.

1. What is topic of this reading? _____

2. Where in the ballpark is the Garden found? _____

3. When can fans visit the Garden? _____

4. What is the goal of the Garden? _____

5. What are three advantages of aeroponic towers? _____

“Urban Farming at a Ballpark”

Answer Key

1. the Garden at AT&T Park
2. behind the centerfield wall, just under the scoreboard
3. before or during a game
4. to teach the community about the benefits that come from a healthy lifestyle
5. There are no weeds to pull or messes to clean up since the plants grow without using soil. The towers use a lot less water than regular gardens. Each tower can grow a lot of plants in a small space.



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Name _____ Date _____

Science Journal Page



Plant:

What I observe (see, smell, feel, hear, taste):

What I predict:

How this plant is like _____.

How this plant is different than _____.

What I wonder:

“Science Journal Page”

How to Use

Copy the journal page for students. Have each student write the name of the plant being observed. Then instruct the child to write about and/or draw the plant. Guide the student to predict what changes the plant will undergo. Then have the child compare this plant to another, writing the name of the other plant on the lines. Finally, have the student record any questions he or she has about the plant and its potential changes. Instruct the student to store the paper in a folder. Repeat the activity throughout the growing cycle. Later, bind the journal pages to create a book of each student’s journal pages.



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Writing Prompts

Glue this page into your science or writing journal. When you use a prompt, write the number on the next page in your journal. Then write a detailed response. Check off the prompt on this page so you know you have used it.



- 1. A benefit is a good or helpful result. What kinds of benefits, or good results, come from growing your food?
- 2. What is the difference between a seed and a seedling?
- 3. How do roots and stems work together?
- 4. Describe the steps you take to grow plants in Tower Garden® to someone who has never seen or used one.
- 5. What does it mean to harvest plants?
- 6. Compare and contrast two different plants grown in your Tower Garden. Describe how each plant grew. Then tell how each plant looks and tastes.
- 7. Write a true story about an event that happened with your Tower Garden. Tell who was there, what happened, and how you felt. If you learned a lesson from the event, tell that too.
- 8. Pretend that another school is curious about whether they should get Tower Garden. Write to explain your opinion.



**Grades 4-5
Activities
and
Lesson Plans**

Grades 4-5

- 1 Blogging
- 2 Math
- 3 Mini Poster
- 4 Nonfiction Passage
- 5 Science Journal

Blogging about Tower Garden®



Prompt: The word is out that your classroom has Tower Garden! You want to be sure that everyone gets the real scoop on your garden, so you've decided to write a blog about it. What information will be interesting and help others understand what aeroponic gardening is all about?

Plan Include lots of concrete details as you explain each topic below. Use the back if you need more space.

Facts about & Benefits of Aeroponic Gardening

How Tower Garden Works

What We Are Growing

Activities Our Class Is Doing with Tower Garden

Write: Use your notes to write a blog post on another sheet of paper that tells about your class's Tower Garden. Include the details above.

Name _____

Solving math word problems (4.MD.A.1, 2; 5.NBT.B.7)

Date _____

Wow, Does Your Garden Grow!



Use the information in the chart to answer the questions.
Show your work on the back of this page.

Value of Produce Grown in Tower Garden®



Growing your own food can save you money at the grocery store.

Tower Garden can hold up to 20 plants!

Plant	Price	Amount Grown in 6 Months	Value of the Produce (rounded to nearest dollar)
arugula	\$0.82/ounce	48 ounces from 1 plant	\$39.00
bell pepper	\$0.85/pepper	5 pounds from 1 plant	\$15.00
cabbage	\$1.69/head	18 heads from 1 plant	\$30.00
celery	\$1.19/bunch	12 bunches from 1 plant	\$14.00
cherry tomatoes	\$3.00/pint	25 pints from 1 plant	\$75.00
cucumber	\$0.79/cucumber	40 cucumbers from 1 plant	\$31.00
eggplant	\$2.00/eggplant	15 eggplants from 1 plant	\$30.00
kale	\$1.49/bag	18 bags from 1 plant	\$27.00
lettuce	\$2.99/bag	90 bags from 5 plants	\$269.00
squash	\$0.95/squash	24 squash from 1 plant	\$23.00
tomatoes	\$1.99/pound	25 pounds from 1 plant	\$50.00

- How many ounces of regular tomatoes can be grown from one tomato plant in 6 months? _____
- The fifth grade's Tower Garden includes four squash plants and three kale plants. What is the combined value of the kale and squash produced in six months? _____
- How many pounds of arugula can Tower Garden produce in six months? _____
Nine months? _____
- According to the chart, how many bags of lettuce are grown in six months from one plant? _____
What is the value of this amount of lettuce (rounded to the nearest dollar)? _____

- If the price of squash goes up to \$0.98/squash, what would be the value of the squash grown from one plant in six months (rounded to the nearest dollar)? _____
- Which has the greater value: 4 kale plants or 7 eggplant plants? _____
How much greater? _____
- How many cups of cherry tomatoes does one plant produce in six months? _____
How many ounces? _____
- If your class plants all of the plants in the chart, what would be the total value of the produce grown in six months? _____
What would the average value be per month? _____
- Create your own word problem using the chart. Have a classmate solve it and write the answer in the blank. _____

“Wow, Does Your Garden Grow!”

Answer Key

1. 400 ounces
2. \$173.00
3. 3 pounds; 4½ or 4.5 pounds
4. 18 bags; \$54.00
5. \$24.00
6. 7 eggplants; \$102.00
7. 50 cups; 400 ounces
8. \$630.00; \$105.00
9. Problems will vary.



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It's Great to Grow UP↑!



What are the benefits of aeroponic gardening compared to soil gardening?

- **Increases crop yield by an average of 30%**
With aeroponic gardening, you can grow more food.
- **Plants grow up to three times faster**
That means you can harvest sooner and grow more often.
- **Uses as much as 98% less water**
Traditional gardening uses about 80% of our water. That's a lot of H₂O, which could be a big problem in areas where water is scarce.
- **Uses 90% less space than a traditional garden**
Developing less land as farmland is good for our environment. Plus more people will have space for gardening.
- **Fewer problems with pollution and pests**
Since aeroponic gardens don't use soil, you don't need to worry about pollutants getting into your food from contaminated soil. Plants are also less stressed when grown using aeroponics. That reduces the need for pesticides and herbicides—another earth-friendly benefit.

Less space
Less water
Faster growing
More food
More earth friendly



“It’s Great to Grow UP!”

Mini Poster

How to Use

To introduce the poster, have students stand at their desks. Number the first four students 1, 2, 3, and 4; then ask students 1, 2, and 3 to remain standing and student 4 to sit down. Repeat until you have counted every child and about three-fourths of the students are standing. Explain that more than 3 in every 4 American households participated in do-it-yourself lawn and garden activities, both indoors and out. The standing students represent those Americans.

Next, write the term *aeroponic gardening* on the board. Explain that aeroponic gardening is the growing of plants by suspending their roots in the air and spraying them with nutrient solutions. With aeroponics, plants typically are planted in a tall, vertical column like Tower Garden® rather than horizontally as in a typical soil garden. Divide the class into pairs and have each twosome spend five minutes brainstorming what they think might be benefits of aeroponic gardening as compared to soil gardening. Provide time for students to share their suggestions. Then use a document camera to project the mini poster onto the board. Review the benefits listed on the poster. Follow up the activity by having each student (or student pair) write a letter to a family member explaining why the class’s Tower Garden system is so beneficial.



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Name _____

Reading informational text (RI.4.1–4; RI.5.1–4)

Date _____



The O'Hare Urban Garden



What does an airport have to do with gardening? As it turns out, a lot! Right in the middle of Chicago's O'Hare International Airport, you'll find the O'Hare Urban Garden. It is the world's first vertical aeroponic food farm inside an airport terminal. Aeroponics is the process of growing plants with only water, air, and nutrients.

Like most big airports, O'Hare International Airport includes restaurants that feed hungry travelers. The O'Hare Urban Garden supplies these restaurants with fresh produce. It features 26 vertical Tower Garden® growing systems. Each contains 44 slots for growing plants. The O'Hare garden has over 1,100 plants, including herbs, lettuces, greens, and other vegetables.

Each Tower Garden sits on top of a **reservoir**. The reservoir holds a 20-gallon solution of water and a special plant food. The plant food contains minerals and nutrients that help produce strong, healthy plants. A pump in the base moves the solution to the top of each Tower Garden. Then the solution drips back down the column and falls over the 44 sets of plant roots. This process is repeated continuously, recycling the water and nutrients. Very little water evaporates or is wasted. The gardens don't require the use of pesticides or chemicals. No soil is used.

Why is the O'Hare Urban Garden such a good idea? For one thing, it uses **sustainable** technology. That means the garden uses methods that do not completely use up or destroy natural resources like land or water. The O'Hare Urban Garden doesn't use herbicides and pesticides, and that is good for the environment. It also uses far less water and minerals than a traditional garden. The garden is close to the restaurants that use its food, so the produce is picked when it is freshest and most nutritious. There is also no need to store or ship the produce. One more thing: because the garden is not planted in soil, there's no weeding or digging either. Now that's a cool way to garden!

Answer these questions on your own paper.

Include evidence from the text to support your answers.

1. Who uses the food produced by the O'Hare Urban Garden?
2. True or false: An aeroponic garden uses soil, like a traditional garden.
3. How do you know your answer to question 2 is correct?
4. What is the best meaning for *reservoir* in the third paragraph?
 - a. large lake or pond
 - b. place where fluid collects
 - c. pump
5. What are three advantages of Tower Garden?
6. Why might the owners of restaurants at O'Hare International Airport like having their own Tower Garden?

“The O’Hare Urban Garden”

Answer Key

1. restaurants at O’Hare International Airport
2. false
3. The third paragraph states “No soil is used,” and the last paragraph states “Because the garden is not planted in soil,...”
4. B
5. Answers will vary but could include that it uses sustainable technology, it doesn’t completely use up or destroy natural resources, it doesn’t use herbicides or pesticides, it uses less water and minerals than a traditional garden, the produce is picked when it is freshest and most nutritious, there is no need to store or ship the produce, or there’s no weeding or digging.
6. Answers will vary.



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It's Tower Garden® Time!



When did I observe Tower Garden? _____
date time

What did I notice/observe?

Sketch and label what you observe.

How is this different from what I observed earlier?

Why might this be important?

What do I wonder?

Where could I find out more information?

“It’s Tower Garden® Time!”

Science Journal Page

How to Use

Have each student bind several copies of the pages together between construction paper covers to create a science journal. Ask each student to observe Tower Garden at least once a week and then complete a journal page. Guide the student to describe what he or she observes in detail and then draw and label a sketch. Then have the student describe any changes in Tower Garden and hypothesize why this change might be important. Have him or her list at least one question about the observations and suggest where to find the answer. If desired, have student pairs complete their journal pages together to encourage collaboration.



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