

Learning with Lettuce



**Tower Garden® Lesson Plans that Match
Academic Standards**



1st Grade Overview



This lesson plan will help you take your 1st graders through a 6-week, Tower Garden growing cycle. Although a wide variety of crops can be grown indoors and outdoors on a Tower Garden, the following lettuces grow well inside, provide different shapes and textures for kids, and should be ready to harvest in six weeks: arugula, red salad bowl, buttercrunch, black seeded simpson, and pak choi.

Each activity re-enforces an academic standard. The lessons can be accomplished in about one hour per week.

Each week refers to the Tower Garden Journal, available for free download at <https://www.keepitwatered.com>

If you need supplies and don't have a distributor you can order rockwool, mineral blend, and more from my website at skoontz.towergarden.com. If you need help, email me at steve@tgardener.com. I've been supporting teachers who use Tower Gardens since 2015.

Overview

Lesson Plans for the Tower Garden® by Juice Plus+

Week 1

Build the Tower Garden and Plant Seeds

Week 2

*Fill the tub with water, nutrients, and balance the pH.
Place seedlings into the Tower Garden*

Week 3

Fill the tub, balance the pH, and add nutrients

Week 4

Fill the tub, balance the pH, and add nutrients

Week 5

Fill the tub, balance the pH, and add nutrients

Week 6

Salad Party

Week 1

Building the Tower Garden and planting seeds

Main Lesson Objective

- Match the ordinal numbers first, second, third, etc., with an ordered set up to 10 items.

Other Lesson Objectives

- Compare and order objects

The first week you'll lead students through putting the Tower Garden together and planting seeds. An overview video of setting up the Tower Garden can be found here: www.tgardener.com/setup. **Since the lesson plan uses the building of the Tower Garden to teach several standards, the steps to building it are a little different than in the video.**

What you will need.

- 1 - 32 oz bottle - (Juice bottles work well)
- Construction paper
- Seeds - arugula, red salad bowl, buttercrunch, black seeded simpson, and pak choi grow well
- A few older students or adult helpers to help students plant seeds

Use direct comparison or a nonstandard unit to compare and order objects according to length, area, capacity, weight, and temperature.

Show students the different parts of the Tower Garden and talk about the differences and similarities of each part. Example: netpots are flexible while the tower parts are solid. Have students organize the different objects into groups.



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Use place value understanding to compare two, two-digit numbers based on meanings of the tens and ones digits, recording the results of comparisons with the symbols $>$, $=$, and $<$.

Use the 5 (or 7 if you have the extension) sections of the Tower Garden tower and the netpots to help students understand place value. The sections of the tower represent the tens place and each netpot would represent the ones place. If you have 5 sections you would have 5 tens or 50 + 8 netpots which would equal 8 ones, therefore 5 tens + 8 ones = 58.

Seeds and seed packet could also be used with the seed packets representing 10s place and the seeds representing 1s place.

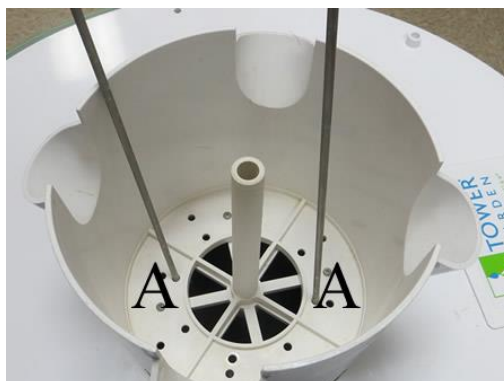
Match the ordinal numbers first, second, third, etc., with an ordered set up to 10 items.

The Tower Garden has 7 sections. (5 if you don't have the extension). Each section has 4 growing ports for a total of 28 growing ports. The sections and the growing ports can be used to teach students ordinal numbers. Here's how.

Before you build the Tower Garden, write the numbers 1-28 on individual pieces of masking tape and place the tape under each port on the Tower Garden sections. Keep the numbers in order going around each section. Start with the Tower Garden section that is attached to the base.

Write the numbers 1-7 (5 if you don't have the extension) on individual pieces of masking tape. Place the masking tape on the Tower Garden sections starting with the section attached to the base.

Help students place the base of the Tower Garden on the green tub. Then help them stack the parts of the Tower Garden on top of the base keeping them in order by the numbers written on the masking tape. Do not put water in the green tub, or insert the netpots. Have students stand next to the tower parts as they are placed to see when the tower is taller than they are.



Start the rods in hole 'A'

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Continue adding sections alternating between hole 'A' and hole 'B'



Push the sections down firmly



If you purchased the extension, screw the rods in like shown

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Build the support cage with the students and place the lights on the light cage. (Skip this step if you have the LED lights that attach to the top of the Tower Garden.) Connect the lights to the timer and show students how the timer will go on and off when needed. Set the timer for 12 hours on, 12 hours off. If the lights are too bright for students, they can be set to come on when students leave for the day and turn off 12 hours later.



Tower Garden Journal Activity

Need help with your Tower Garden or supplies and don't have a distributor?
Contact me at steve@keepitwatered.com.

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Draw a picture of the Tower Garden, number the growing ports from 1-28 and the sections from 1-7.

Planting Seeds

A free download of a basic seed starting procedure good for classrooms can be found at <https://www.keepitwatered.com/seed-starting-procedure>

Use seeds to teach the following standards:

Identify objects as two-dimensional or three-dimensional. Classify and sort two-dimensional and three-dimensional objects by shape, size, roundness and other attributes. Describe how two-dimensional shapes make up the faces of three-dimensional objects.

Talk with students about how the seed packets are 2-dimensional rectangles while the rockwool cubes are 3-dimensional cubes.

Create a real-world problem to represent a given equation involving addition and subtraction within 20.

As students plant seeds into the rockwool, have them add up the total number of seeds each group plants. Encourage students to count out 12 seeds, then place only 5 seeds into the rockwool and calculate how many seeds will be left.

Solve real-world problems that call for addition of three whole numbers whose sum is within 20 (e.g., by using objects, drawings, and equations with a symbol for the unknown number to represent the problem).

Use the netpots, seeds, or seed packets to visually represent an equation.

Solve real-world problems involving addition and subtraction within 20 in situations of adding to, taking from, putting together, taking apart, and comparing, with unknowns in all parts of the addition or subtraction problem (e.g., by using objects, drawings, and equations with a symbol for the unknown number to represent the problem).

Pose an addition and subtraction word problem for students to solve using netpots or seeds as manipulatives.

Create a real-world problem to represent a given equation involving addition and subtraction within 20.

Ask students to create addition and subtraction word problems using netpots or seeds as manipulatives.

Understand the meaning of the equal sign, and determine if equations involving addition and subtraction are

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true or false (e.g., Which of the following equations are true and which are false? $6 = 6$, $7 = 8 - 1$, $5 + 2 = 2 + 5$, $4 + 1 = 5 + 2$).

Use netpots and seed packets to illustrate an equation.

With support, conduct simple research on a topic. Identify several sources of information and indicate the sources. Organize information, using graphic organizers or other aids. Make informal presentations on information gathered.

Have students conduct research on what to expect from the growth of each type of lettuce planted. This could be size, color, texture, taste, how each plant is used in cooking, etc. Report back to the class the following week.

Tower Garden Journal Activity

Have students draw a picture of the Tower Garden in the journal and number the pots and sections.

Week 2

Main Lesson Objective

Conduct simple research on a topic and make informal presentations.

Fill the Tower Garden with water and place the seedlings into the ports.

Estimate how much water will go into the green tub. What tool would you use to measure the size?

Place the pump in the bottom of the green tub and thread the power cord through the hole. Screw the supply hose into the pump. When you're done with this lesson, plug the pump into the timer and set it for 15 minutes on, 45 minutes off for indoor growing.

Use different size containers to put the water into the Tower Garden. Talk about which size holds more water and how much each container weighs. Talk about the temperature of the water. If you have a thermometer, take the temperature of the water as it's going in. Measure out 200 ml of Tower Tonic 'A' and 200 ml of Tower Tonic 'B' and pour into the Tower Garden base while pointing out to students the size of the container used to measure. Balance the pH of the water and talk about how much water was used and how many drops of pH tester was used. (See directions on the pH test kit.) If the pH is off, adjust it gradually by using 10 ml at a time of pH up or pH down, retesting each time. The pH doesn't need to be exact for most lettuces to grow well. If you try a few times and it's not correct, wait a few days to let the water settle and try again.

Insert netpots into the Tower Garden ports as you talk about the order the netpots are placed into the ports and the number of the Tower Garden section.

Ask students to choose a plant and place their seedling in a numbered port on the Tower Garden. Remove the masking tape from the container and place it on the Tower Garden near the student's plant.

Tower Garden Journal

Students record their plant growth research under the heading "Planting the Seeds."

Week 3

Main Lesson Objective

Organize and interpret data with up to three choices

Ask students to fill up containers and pour water into the Tower Garden base to fill it to 3 inches from the top. (About 2 gallons will be required) Add 50 ml of Tower Tonic 'A' and 50 ml of Tower Tonic 'B' to the base. Balance the pH of the water and talk about how much water was used and how many drops of pH tester was used. (See directions on the pH test kit.) If the pH is off, adjust it gradually by using 10 ml at a time of pH up or pH down, retesting each time. Don't stress out if the pH isn't exact. Most lettuces will grow fine if the pH is a little off.

Organize and interpret data with up to three choices (What is your favorite fruit? apples, bananas, oranges); ask and answer questions about the total number of data points, how many in each choice, and how many more or less in one choice compared to another.

Answer questions about what students like to eat and plot on a graph. Of the different lettuces being grown, ask students to plot which ones they think they will like the best. Repeat this lesson when they actually taste the lettuces grown.

Develop a model mimicking how plants and/or animals use their external parts to help them survive, grow, and meet their needs. Explore how those external parts could solve a human problem.

Talk about how plants take up nutrients through the roots. Explain how the water needs to be the proper pH for the roots to take up the nutrients. **Place a cup over one of the plants. Note the next week the shape of the plant compared to the other plants.**

Pose questions, make observations, and obtain information about a situation people want to change. Use this data to define a simple problem that can be solved through the construction of a new or improved object or tool.

Talk with students about the problem of diminishing farm land and how alternative growing like the Tower Garden can offset that.

Cover one of the plants with a cup and ask students what they think will happen to the plant in one week.

Tower Garden Journal - Have students plot which lettuce they think they'll like the best and record what they think the covered lettuce will look like the next week.

Week 4

Main Lesson Objective

Develop a simple sketch, drawing, or physical model to illustrate and investigate how the shape of an object helps it function as needed to solve an identified problem.

Ask students to fill up containers and pour water into the Tower Garden base to fill it to 3 inches from the top. (About 2 gallons will be required) Put 50 ml of Tower Tonic A and 50 ml of Tower Tonic B in the green tub. Check the pH and adjust with the pH+ and pH- as needed

Develop a simple sketch, drawing, or physical model to illustrate and investigate how the shape of an object helps it function as needed to solve an identified problem.

Talk with students about how the water needs to get to the plants once they're placed in the Tower Garden. Talk about how the pump will pump water through the pipe in the middle of each piece to the top of the Tower Garden, that the water will spread out, drain through the holes, and run down onto the rockwool that's placed inside the netpots getting the roots of the plants wet. Once the Tower Garden is built, turn on the pump so students can see how it works.

Uncover the plant that was covered last week

Notice how much smaller the covered plant is than the other plants. It might also be pale in color.

Tower Garden Journal Activity

Describe and draw a picture of how the plants will get water in the Tower Garden.

Week 5

Main Lesson Objective

Analyze data from the investigation of two objects constructed to solve the same problem to compare the strengths and weaknesses of how each performs.

Ask students to fill up containers and pour water into the Tower Garden base to fill it to 3 inches from the top. (About 2 gallons will be required) Put 50 ml of Tower Tonic A and 50 ml of Tower Tonic B in the green tub. Check the pH and adjust with the pH+ and pH- as needed

Analyze data from the investigation of two objects constructed to solve the same problem to compare the strengths and weaknesses of how each performs.

The Tower Garden is called an aeroponic growing system because the roots hang in the air. Have students investigate a hydroponic system where the roots hang in the water and compare the effectiveness of both. For extra credit, you could have your students investigate an aquaponic growing system. Hydroponic systems the roots are always in the water. Aquaponic growing systems, the roots are always in the water, but fish are added to the water.

Tower Garden Journal Activity

Record your growing system findings in the journal.

Week 6

Plants should be large enough to harvest and eat. If not, wait another week. Have a salad party with students tasting the lettuce and deciding which varieties they like and which they don't like.

Tower Garden Journal Activity

Have students record what they liked and didn't like about the lettuce.