

Learning with Lettuce



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



4th Grade Overview



This lesson plan will help you take your 4th 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 students, and should be ready to harvest in six weeks: arugula, red salad bowl, buttercrunch, bok choy, and black seeded simpson.

The lessons can be accomplished in about one hour per week.

Week 1

Building the Tower Garden and Planting Seeds

Main Lesson Objective

Building the Tower Garden

Develop solutions that could be implemented to reduce the impact of humans on the natural environment and the natural environment on humans.

Planting seeds

Objectives learned while planting seeds

The first week you'll lead students through putting the Tower Garden together and planting seeds.

Since the curriculum uses the building of the Tower Garden to teach several standards, the steps to building it are a little different than what comes with the Tower Garden.

What you will need.

- 2 - 32 oz bottles - (Juice bottles work well)
- Construction paper
- If you want students to know which seedlings are theirs, then get enough empty butter containers for each student. If not, then use the seed starting tray that came with the Tower Garden.
- Seeds - arugula, red salad bowl, buttercrunch, bok choy, and black seeded simpson are good choices.

Week 1

Develop solutions that could be implemented to reduce the impact of humans on the natural environment and the natural environment on humans.

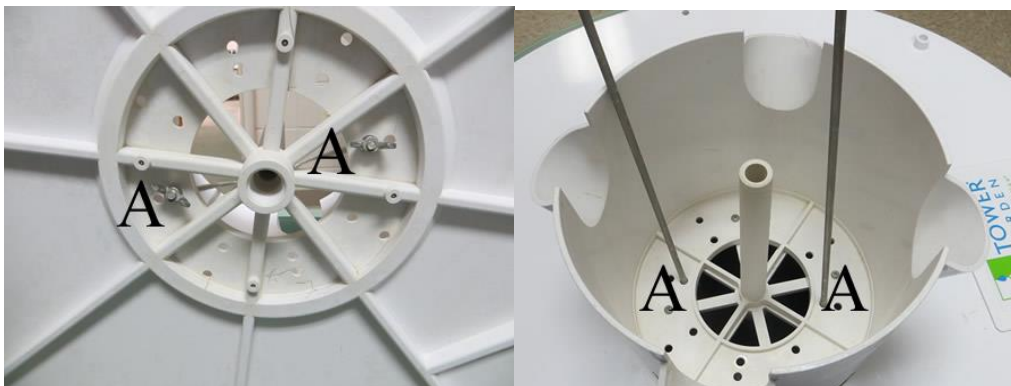
Before building the Tower Garden, talk with students about the impact humans have on the earth through farming, etc. and brainstorm solutions.

Place the base on its side and push the long metal rods through hole 'A' in the base and secure with the wing nuts. Place one wing nut on the bottom of the base and one on the top of the base.

Screw the other end of the supply hose into the bottom of the base.



Thread the rest of the tower pieces through the rods, alternating between A and B holes.



Start the rods in hole 'A'

Lesson Plans for the Tower Garden® by Juice Plus+



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



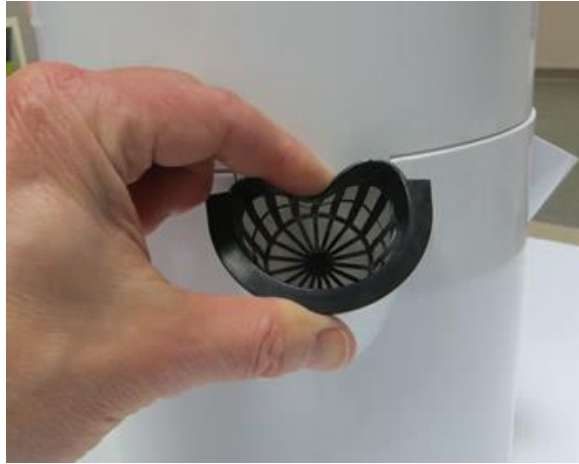
Push the pieces down firmly



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

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

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If your school purchased LED lights that sit on top of the Tower Garden, follow the directions that came with the light kit. Otherwise, build the light cage with your students and place the lights on the light cage. 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.



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Light clipped to support

Planting Seeds

(See the last page for more details on planting seeds.)

Plant seeds in rockwool. (Good seeds to plant for different textures and shapes: arugula, red salad bowl, buttercrunch, black seeded simpson. These will be ready to harvest in 5-6 weeks.)

Give each student an empty butter (or similar) container that will fit two rockwool cubes. Cut construction paper the size of the containers to cover the rockwool. Have students pour seeds onto the construction paper, pick up 6 or 7 seeds and sprinkle them into the hole in the rockwool. Write names of students and lettuce varieties on masking tape and place masking tape on side of container.

Each day, ask students to check if seedlings have sprouted and replace the water in the butter container with $\frac{1}{4}$ " of fresh, pH adjusted water. At the first sign of growth (you'll see a little bit of fuzz by the seeds.) uncover the seedlings and place them on the Tower Garden base and turn on the lights. Continue to replace the water with $\frac{1}{4}$ " each day. If planted on Monday, most lettuce seeds will have sprouted by Wednesday.

Week 2

Putting seedlings in the Tower Garden

Main Lesson Objective

The design of the Tower Garden

Identify a simple problem with the design of an object that reflects a need or a want. Include criteria for success and constraints on materials, time, or cost.

Construct and compare multiple plausible solutions to a problem based on how well each is likely to meet the criteria and constraints of the problem.

Construct and perform fair investigations in which variables are controlled and failure points are considered to identify aspects of a model or prototype that can be improved.

Tower Garden exercise:

Take the Tower Garden apart in order to fill the green tube with water, re-build the Tower Garden with the support rods, and place the seedlings into the ports. (Make sure the rockwool is pushed all the way into the port.)

Week 2

Put 20 gallons of water into the Tower Garden green tub and re-build the Tower Garden

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.

Measure 200 ml of Tower Tonic 'A' and 200 ml of Tower Tonic 'B' and pour into the Tower Garden 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.

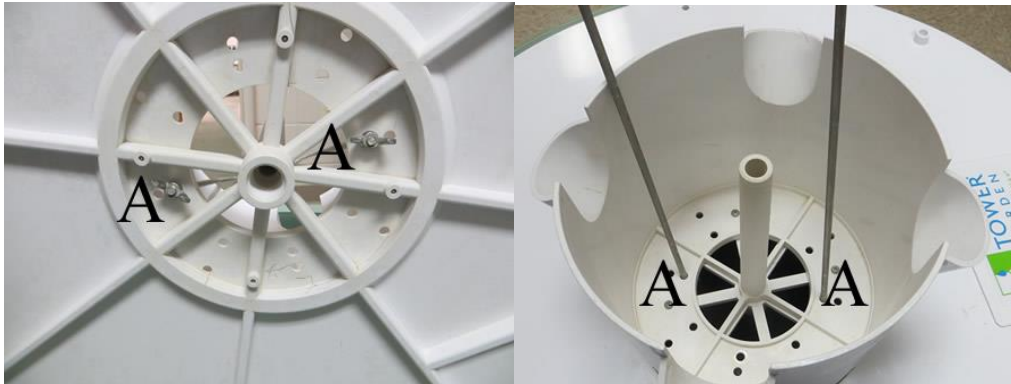
Place the base on its side and push the long metal rods through hole 'A' in the base and secure with the wing nuts. Place one wing nut on the bottom of the base and one on the top of the base.

Screw the other end of the supply hose into the bottom of the base.



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Thread the rest of the tower pieces through the rods, alternating between A and B holes.



Start the rods in hole 'A'



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



Push the pieces down firmly

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Week 3

Main Lesson Objective

Use evidence to support the explanation that a change in the environment may result in a plant or animal will survive and reproduce, move to a new location, or die.

Week 3

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. Check and balance the pH if required.

Use evidence to support the explanation that a change in the environment may result in a plant or animal will survive and reproduce, move to a new location, or die.

Cover one of the plants with a paper cup blocking out as much light as possible. By the next week, you should see a marked difference in the growth of that plant.

Week 4

Main Lesson Objective

Use evidence to support the explanation that a change in the environment may result in a plant or animal will survive and reproduce, move to a new location, or die.

Week 4

Add water, 50 ml of Tower Tonic A and 50 ml of Tower Tonic B, and balance pH. (About 2 gallons of water will need to be added.)

Use evidence to support the explanation that a change in the environment may result in a plant or animal will survive and reproduce, move to a new location, or die.

Uncover the plant and talk with your students about the difference between the plant in the dark and the other plants.

Week 5

Main Lesson Objective

Construct an argument that plants and animals have internal and external structures that function to support survival, growth, behavior, and reproduction in different ecosystems.
(4.LS.3)

Other Lesson Objectives

Add water, 50 ml of Tower Tonic A and 50 ml of Tower Tonic B, and balance pH. (About 2 gallons of water will need to be added.)

Week 5

Construct an argument that plants and animals have internal and external structures that function to support survival, growth, behavior, and reproduction in a different ecosystems.

1. Create microscope slides to look at the structure of the lettuce and compare.
2. Discuss how the leaves and the stems move to help the plants survive.

Week 6

Main Lesson Objective

Salad Party

Other Lesson Objectives

Watch your students have fun eating the lettuce they've grown themselves!

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.

Develop solutions that could be implemented to reduce the impact of humans on the natural environment and the natural environment on humans.

Talk with your students about how the Tower Garden uses less water than conventional farming to grow veggies helping to lessen the impact humans have on our water supply.

Seed Starting Procedure

The seed starting procedure below works well in a classroom with students. It's a little different than what's in the Tower Garden manual. You will want adult or older children helpers when the students are planting seeds.

To start seeds: This seed starting procedure has been adapted for the classroom from a procedure shared by Joe of level2concepts.com. This procedure works best growing arugula, red salad bowl, buttercrunch, and black seeded simpson in a classroom. For the full procedure to use with other crops, visit tgardener.com/seedstarting.

- Make up a 32 oz bottle of pH adjusted water. (Do NOT use softened water) The pH should be between 5.5 and 6.5. See the directions on the pH test kit to test the water. Use the pH + or pH - bottles to adjust the water.
- Soak rockwool cubes in the pH adjusted water for 30 minutes.
- Shake excess water from the rockwool cubes. (Don't squeeze)
- Place rockwool cubes into empty butter (or similar) containers. (2 per container works well to divide among the students.)
- Drop 6-10 seeds into the hole and sprinkle a few on top of the rockwool cube.
- Make up a second 32 oz bottle of pH adjusted water to be used during the week.
- Pour about ¼" of pH adjusted water into the bottom of the empty container.
- Cover container with construction paper and place in the warmest place in the room.
- Check next day for sprouts and replace water in the container with pH adjusted water.



- When you see white 'fuzz' around the seeds, they've sprouted. (See picture above.) Now place container onto the base of the Tower Garden and turn on the lights. Each day replace water in container with pH adjusted water.
- If you started the seeds on Monday or Tuesday, by the next week, you should be able to place the seedlings in the Tower Garden.