



## Exploring the Garden



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**Level** K – 8, see specific activities for each grade level

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**Number of Students** individual or small groups

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**Length** 30 – 60 minutes

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**Curriculum Connections** Number Sense (B1), Operations (B2), Equations and Inequalities (C2), Mathematical Modelling (C4), Measurement (E2)

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**Brief Description:** The story of “Our Little Kitchen” depicts a group of people cooking together for their neighborhood, using the nourishment gathered from their food bank and garden. The book is about celebrating the theme of community, full bellies, and looking out for one another. The author takes her inspiration from a past volunteer experience, which is included in the author’s notes, along with some recipes. The book is written and illustrated by Jillian Tamaki.

**Materials:** Handouts, scissors, rulers, pencils, calculator, strins, and vegetable encyclopedia / online resources

**Preamble:** The story shows a group of people cooking for their neighborhood soup kitchen using with limited amounts of time using materials gathered from the food bank and their garden. The image of the garden can be seen in the book. This lesson will focus on the ideas of designing a garden given a certain amount of space.

**Preparation:** Discuss with students what’s needed to make a garden and what type of preparation they need to do. Review perimeter and area equations with older students.

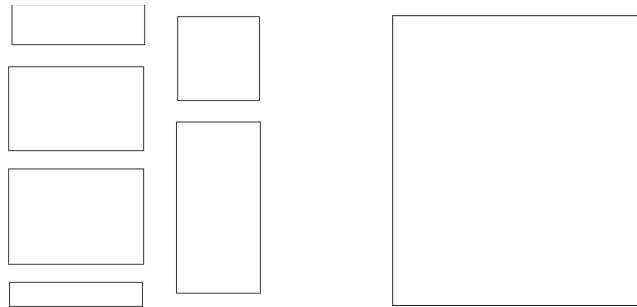
**Grades K - 2:** Have students develop a list of vegetables they'd like to plant in their garden (this can be done individually, in small groups, or as a whole class). Students will then cut out the shapes on their handout and colour each one a different colour. On their handout they should write down what colour represents each vegetable and/or write the name of the vegetable on the shape (see example below). Then have students organize their shapes in the empty rectangle on their handout.

**Prompting Questions:**

- Why did you choose those vegetables? Do they grow naturally where you live? (students can do research on their vegetables to find out where they grow natively)
- Did you leave space between your vegetables to walk around to take care of them (weeding, watering, picking when ripe, etc)?
- If you could plan the perfect garden what would it look like? What would you have in it?

**Garden Design Template**

Students will be provided with the following on their handout:



They should cut out the squares / rectangles on the left and colour them based on their chart and then place them in the rectangle on the right to make their garden. A sample garden is below but students can put their shapes in any order they wish (as long as it fits within the borders of the garden). They don't have to use all the shapes and may choose to omit some in order to have a walkway, or shed, or other object in their garden. They can draw these in by hand. They can also cut their shapes to be smaller to fit in the space if they like. They can also cut the rectangles into different shapes as well if they like.

**Examples**



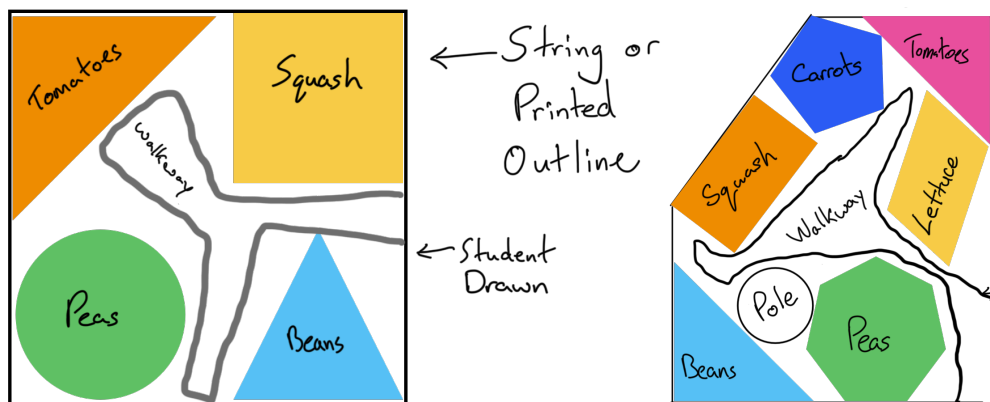
**Extensions:** have students measure the outside edges of their shapes and their garden and explain how this relates to perimeter. When designing their perfect garden encourage them to use other shapes for the garden, like a triangle or circle, and discuss how this changes the shapes they should use inside the garden (squares won't fill the space nicely now). They can also use other shapes to fill the inside of the garden as well.

**Grade 3 - 5:** same initial ideas and questions but the shapes provided on the handout are more complex (such as hexagons and trapezoids). Have students first draw the borders of their garden. They can create a square or rectangular garden or they can create a garden with a different, or irregular, shape. They can use as many of the shapes as they like, they can cut them down to smaller sizes, or to make other shapes of their own. Once they have created their garden, have students measure their shapes and calculate the perimeter of each section of their garden and their garden as a whole.

### Prompting Questions:

- What vegetables did you choose and why? Are these vegetables native to where you live? Would they grow well in natural conditions, or would they need special conditions? (students can use the internet to research various species of vegetable and how and where they grow)
- How did the perimeter of different sections of your garden compare to one another? For example, how does a hexagon relate to a square? Does the number of sides in a shape affect its perimeter and how?
- Did you leave space between your vegetables to walk around to take care of them (weeding, watering, picking when ripe, etc)?
- Did all of your vegetable plots fit in your garden? If not, how could you fix it? This could include cutting into multiple sections or trimming shapes to fit, if trimming how will this affect how much food you can grow?

### Examples



**Extensions:** use the shapes to introduce the concepts of area and tiling and how we can arrange different shapes to fit them into an area of specific size. Ask students to think about what are the optimal shapes to maximize the garden area for their chosen garden shape (for example, square

plots in a circular garden wouldn't work very well). Have students research which vegetables would be the most reasonable to grow in a garden like the one used for the soup kitchen.

**Grade 6 - 8:** Same as grade 3-5 but with more complex composite shapes, such as shapes with "holes" in them. You can also tell students that the garden must be built around pre-existing objects like a telephone poll in the middle of the space, or a walkway or that they need to include a shed for tools. Students will then be required to find both the perimeter and the area of the various shapes and the garden as a whole – remembering to subtract out the obstacles in the garden. Students should be encouraged to use a non-square/rectangle shape for their garden and plots.

### Prompting Questions:

- Why did you choose those vegetables? Do they naturally grow where you live? What types of growing conditions do your vegetables need? (students can do research on their vegetables to find out where they grow natively and their growing conditions)
- Do all of the shapes fit in your garden? If not, what could you do? (students could be allowed to cut the shapes to fit into the garden)
- Did you leave space between your vegetables to walk around to take care of them (weeding, watering, picking when ripe, etc)?
- How did you have to adapt your garden to fit within the given space? Could you use the space to your advantage? (for example, plant beans or peas or other climbing vegetables around the telephone poll so they can grow up it)
- If you could plan the perfect garden what would it look like? What would you have in it?

**Extensions:** Have students consider growing in stacked containers or trellises and use this to include volume calculations as well. They can also calculate the volume of raised bed gardens of both regular and irregular shapes or with objects obstructing part of them (so a raised bed around a pole). Consider sun and shade sections of the garden and what vegetables would grow best in each.

### Resources:

- Learn more about how to fully use a garden space
  - [5 Ways to Grow More in Less Space \(video\)](#)
- Learn about Companion plants that help each other grow
  - [Science-Based Companion Planting Combinations That WORK](#)

### Additional Connections

- This story takes place in a community kitchen, students can read and learn about community kitchens in their neighbourhood in order to make connections to activities outside of the classroom.
- Indigenous cultures also teach about "[The Three Sisters](#)" (beans, corn, and squash) as they grow well together and form a symbiotic relationship.