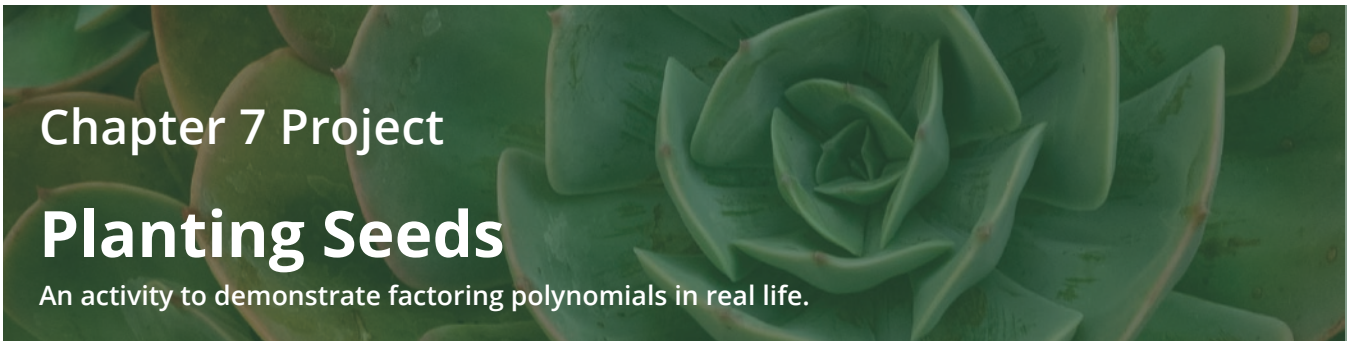

Chapter 7 Project

Planting Seeds

An activity to demonstrate factoring polynomials in real life.

Imagine you live within walking distance from a community garden where anyone in the neighborhood can plant, grow, and harvest various vegetables and plants. You have been given a plot of land in this garden that is in the shape of a rectangle. You also have been given seeds to plant tomatoes, peppers, cucumbers, and squash.

When planting seeds in a garden, it is important to know how much space you have for the crops, and to adjust your seeds accordingly. One possible way the plot of land could be divided is shown. For Problems 1 through 5, assume this is the layout of the vegetables.

Tomatoes	Cucumbers	Squash	Tomatoes
Tomatoes	Cucumbers	Squash	Tomatoes
Peppers	Cucumbers	Squash	Peppers

Width

Length

1. The squash sections each have a width of $2x - 1$ feet. What is the total width of the column of squash?

2. If the length of the column of cucumbers is $x - 4$, and the width of each section of cucumbers is $4x + 1$, what is the total area of the three cucumber sections?

3. The section of tomatoes on the left side of the plot of land has an area of $x^2 + 6x + 9$ ft^2. If this plot of tomatoes were in the shape of a square, what would be the length of its side?

4. One squash section has a width of $2x - 1$ feet and a length of $4x + 2$ feet.

a. What is the area of this section of squash?

b. Is there any other possible width and length of this plot of land that can exist with this given area? Explain why or why not.

5. The area of one section of peppers is $x^2 + bx + 24$ ft^2, where b is an unknown positive value.

a. What are several different options for the value of b so that this area can be factored? Explain how you arrived at your answer(s).

b. If the area of the section of peppers were $x^2 + bx - 24$ ft^2 instead, how would this change your answers to part a.?

For Problems 6 through 8, assume you are looking at a plot of land next to yours.

6. The total area of a square plot of land next to yours is $4x^2 + 20x + 25$. What is the length of one side of the square? Explain how you arrived at your answer.

7. The area of one section of tomatoes on the right side of the plot of land is $3x^2 - 2x - 5$ ft^2. What are the dimensions of this section? Explain how you arrived at your answer.

8. Assume you wanted to plant the cucumbers in the shape of a square. Is it possible for the area of a cucumber section to be $x^2 + 9$ ft^2 and have one side length of $x + 3$? Explain why or why not.