

# Charting Growth

Observe and track your garden's growth as you count down to harvest time

## Gardening Connection:

Students research and observe plant growth while waiting for harvest time.

## Time Required:

2 class periods plus garden growth time

## Grade Level:

Elementary to High School

## EDUCATOR NOTE:

This activity works well during the spring and early summer, but can work with indoor container plants during any season.

## OBJECTIVES

Students will be able to:

1. Predict seed and plant growth based on researched information
2. Track and chart the growth of plants
3. Compare ideal growing conditions to current growing conditions

## BACKGROUND

All plants need sunlight, water, nutrients, and space to grow. However, the amounts and ratios that are needed for seeds to germinate and plants to grow vary greatly.

Standard growing times can be used to predict the growth rate of a plant and when it will be ready for harvest. Actual growing times are dependent on growing conditions and how well the needs of the plant are met.

Variations between standard growth and actual growth can be used to determine what changes need to be made in growing conditions – for example: more water or a sunnier location may be needed for optimal growth.

## MATERIALS

- Almanacs, gardening books & resource materials
- Digital camera (optional)
- Garden journals
- Seed packets
- Measuring sticks

## Subjects

Biology / Botany  
Math  
Language Arts

## Vocabulary

Germination

## Project Connections

WET - Water log  
PLT - Did You Notice  
Rain Reasons

## **PROCEDURES**

### **Engage**

In front of the class and without giving students too many details, “plant” a seed (any type) in a flower pot.

Set a timer for 15 minutes and tell students that in 15 minutes they will be able to pick and eat “x” (whatever type of seed you planted).

Allow students to share their doubt in this situation. Ask them why you won’t be picking and eating “x” in 15 minutes.

Students should respond that the seed needs time to grow.

Reinforce with your students that they have learned seeds need water, sun and warmth, and nutrients to grow, but they also need time. They need time to germinate, or start growing, and they need time to grow until harvest, or when the entire plant or the part of the plant we eat can be picked and eaten.

### **Explore**

Ask students what things can affect how long a seed / plant takes to grow. As students provide their ideas, write the list on the board. The list may include specific or general factors such as weather, enough water, nutrients in the soil, the type of seed, time of year, etc. After students have developed a list, review the list with them and divide the list into those things that can be controlled or affected by the gardener and those that cannot.

For example, students as gardeners cannot affect the weather, but can affect if a seed gets enough water (however, they cannot control a seed or plant getting too much water because of rain).

Assign each student or group of students with a type of plant that will be grown in the school garden from seed. Using seed packets, almanacs, gardening books, or the internet, have students research how long the seed typically takes to germinate and how long until the plant is ready to be harvested. Students should also know approximately how much the plant will grow each week.

Have each student create a timeline for their seed(s). It should begin with the seed being planted and include the time to germination and harvesting. Timelines should also have at least two checkpoints for plant size. Consider a check point for two weeks after germination and five weeks after germination. Based on their research, have students predict how tall their plants should be at these points.

This first piece of the timeline will not have dates, just number of days. Students may also include other information on their timeline, such as the name of the seed / plant, illustrations of what the seed may look like at various stages, etc.

When the seeds are planted in the garden or classroom / greenhouse, record the date(s) on the timeline in the appropriate location. Based on their research, have students predict when they think the seeds will germinate and when the plants will be ready to harvest. Have students put the predicted dates on their timeline.

Students may track one specific seed’s growth or the entire planting of a type of seed (for example, all of the Champion variety radishes planted in the garden). If it is a single seed, the timeline will only show the data for that single seed / plant. If the student is tracking the entire planting, space will be needed to record multiple dates.

## **Explain**

Monitor the garden and note when seeds begin to germinate and plants begin to grow. Germination may be hard to detect, but students can document when small sprouts are seen. Record the actual date on the timeline. How does this actual date compare to their predictions? As a group, share the differences between the predicted dates and the actual dates. Discuss the growing conditions. Are there any changes students think should be made?

Photograph pictures of the seeds at various stages of the growing season. Incorporate these pictures into the timeline and/or post them on-line. Use the pictures to make a photo-timeline on the wall of the class or going down a hallway of the school, creating a “count-up” to harvest.

This is a process that should be done throughout the growing season – compare real data to predicted data and consider if any changes should be made to growth factors that students can control.

As the growing season continues, continue making observations and recording data. Using their timeline (and their garden journals), track growth until harvest. Record the height of the plant at the pre-determined check points and record actual height. Again, how does the actual data compare to the predictions?

## **Elaborate**

Ask students to imagine they were farmers whose livelihood depended on a successful harvest. How might they use knowledge of plant growth to improve harvests? How could growth factors affect their harvests? How would these issues affect what plants (or varieties) you might choose to grow?

This would also provide a good opportunity to tour a working farm. The questions above could be used as class questions for the farmer.

## **Evaluate**

Have students prepare a summary of their results. Questions to be addressed: How did their predictions compare to the actual growth? What were the actual growing conditions of the seeds / plants and how did that compare to ideal growing conditions? What growing conditions could they control and which could they not?

## **Extension Ideas**

Extension One:

Incorporate this activity into the online garden blog (and/or send garden updates in family letters). Use predictions, real data, and photographs to chart the gardens growth online.

Extension Two:

Have students grow seeds / plants under various conditions and compare the time to germination and growth patterns to the seed / plant that is growing in the school garden.

Consider trying to grow seeds in the refrigerator, with too much water, with too little water, planted too close to other seeds, etc. Some conditions may result in no growth while others may simply slow growth down.

**Extension Three:**

Compare the differences in germination time and growth patterns to different varieties of the same seeds / plants.

Have students share their ideas for why they think there are differences. Have students complete historical research into those varieties to determine if their ideas were accurate and for a more complete picture of varietal differences.

**Extension Four:**

Have students make a graph charting the growth of their seed.

**Resources:**

K-State Research and Extensions Vegetable Crop Planting Guide  
<http://www.ksre.ksu.edu/library/hort2/mf315.pdf>