Gardening

Grades 3,5 Subjects: Science & Math Updated in 2024

Growing Timeline

Overview

The central question is, How is the growing season of a particular plant affected by variables? In answering this question, students will create a growing timeline for a plant.

Background

All seeds need soil, water, sunlight, and air in order to grow, although different seeds need them in varying degrees. Some seeds sprout rapidly, while others may take several days or more.

Regardless of the species of plant, when a seed sprouts it undergoes predictable growth: developing roots, stems, leaves and often flowers. Roots, with hair like extensions will usually sprout from the seed before or at the same time the stems or shoots will unfurl from the seed. The stems stretch up to reach for the sun (or other light source). Finally leaves will emerge, which capture the sun's energy and convert carbon dioxide from the air to make food for the plant.

If you allow them to grow long enough most plants also produce flowers, some showy like pansies; others less so, like grasses. The flowers make it possible for the plants to reproduce by seeds.

The Activity:

Warm Up

1. Read *The Tiny Seed* by Eric Carle
2. In their journals have the students write what they know about seeds and gardening.
3. Ask students to write down what they would like to know about seeds and gardening.
4. Discuss and share as a class.

Day 1

1. Show the *Minnesota Weatherguide Environment™ Calendar* and direct the students to read the Grow with KARE sections in the calendars to help build background knowledge about planting and growing plants.
2. If you have access to computers have the students also look up:

University of Minnesota Extension: *www.extension.umn.edu/garden/*

Minnesota Landscape Arboretum: *www.arboretum.umn.edu*

Minnesota Climatology Working Group: *www.climate.umn.edu*

Grow with KARE link: https://www.kare11.com/grow-with-kare

3. Once they have had the opportunity to explore the resources, have them choose a single plant to create a growing timeline. (tulip, tomato, radish, beets, green bean, corn, turnip etc.)
4. Using a straight edge and a pencil have them draw a timeline on white construction paper. Below the line they should list all the months of the year evenly spaced.

Time:

Day 1:50 minutes
Day 2: 30-40 minutes
Day 3: 50 minutes
Day 4: 30-40 minutes
Day 5: 30 minutes
Days 6-14: 5-10 minutes daily

Skills:

Writing
Recording
Data collecting
Drawing
Interpreting
Predicting
Drawing conclusions

Vocabulary:

growing season
variables
harmful
beneficial
interactions
invasive

Materials Needed:

· Current and old copies of *Minnesota Weatherguide Environment™ Calendar*
· white construction paper
· ruler/straightedge
· colored pencils or markers
· computers
· science notebooks
· *The Tiny Seed* by Eric Carle
· assorted garden seeds
· containers
· potting soil
· masking tape
· spray bottles filled with water

5. Their timeline should include: when and how their seed/bulb needs to be planted, how it should be watered, how frequently it should be watered, fertilizer or no fertilizer, when it germinates, when it reaches full growth, when can you harvest, etc.

6. Above the line have them illustrate what is going on with their plant and below the month have them write what is happening with their plant and tips for growing. Every month should have information even it is repeated information from the previous month if that is the case.

7. Allow time to research using calendars and websites.

Day 2

1. Time to work on timeline.

Day 3

1. Have a class discussion on interactions humans have with gardens and growing plants.

2. Included under the months they should write what interaction could happen during that month.

Day 4

1. Time to plant some seeds. Have students plant a selection of common garden seeds in small containers. Fill the containers ¾ full of dry potting soil, then use the spray bottles to wet the potting soil (students will have to stir the potting soil). Once the potting soil is thoroughly wet seeds should be planted about ¾ of an inch below the surface. Label each container with the date and the student's name.

A couple of hints: Radish seeds sprout and grow quickly—1 to 2 days to sprout and up to 2" in 3-4 days. Green bean seeds take 3-4 days to sprout, and 4-5 to break through soil surface. Students may want to take seeds home to grow or provide a place in the schoolyard where they can plant them.

Wrap Up & Assessment

Day 5:

1. Have the students meet with a classmate that researched a different plant than their own. They should take turns and share their poster and what they learned.

2. After five to seven minutes have them rotate and find another classmate to meet and share with.

3. Have them meet with as many classmates as time permits.

Days 6-14

1. Students should observe their seeds daily and record results in their journals or science notebooks. (Water as needed: according to observations of the soil, plants, and instructions for caring for the specific type of plants you are growing.)

2. Once the seeds start to sprout, students should measure and record the length of the sprouts and roots daily. (Only measure the roots if possible without harming the plant. Root length may only be measured on the final day in most instances.)

In addition to quantitative data, document qualitative data of the plant using multiple senses (color, smell/odor, texture). *Tasting should not be done, unless approved by the teacher.

3. Students can prepare line graphs of the growth of their seeds and compare those to other types of seeds.

Questions for Discussion

· Why do plants have different timelines? Plants have different timelines because of their need for different soil temperatures, nutrients, moisture levels, and sunlight. These needs are met at different times throughout the year.

Extensions:

· Compare and contrast the growing timeline of an annual versus a perennial.

· Grow the plant they wrote a timeline for.

Resources:

Carle, Eric: *The Tiny Seed*
University of Minnesota Extension: *www.extension.umn.edu*
A resource for additional information about growing crops and the conditions needed.
Minnesota Landscape Arboretum: *www.arboretum.umn.edu*
Breaks down gardening tips by seasons.
Minnesota Climatology Working Group: *www.climate.umn.edu*
Contains information about agricultural climate data.
Minnesota Weatherguide Environment™ Calendar
online: https://jeffersfoundation.org/programs/calendar-in-the-classroom/

Minnesota State Academic Standards

3-D Science Standards
Science Practices:
1. Asking Questions
2. Developing and Using Models (the timeline with drawings)
3. Plan and Carry out Investigations
4. Analyzing and Interpreting Data
5. Use Mathematics and Computational Thinking
8. Obtaining, Evaluating and Communicating Information

Crosscutting Concepts:
2. Cause and Effect
3. Scale, Proportion, and Quantity

Disciplinary Core Ideas:
LS1: From molecules to organisms: Structures and processes
3rd Grade: Plants have internal and external structures that function to support survival, growth, and reproduction
3rd Grade: Develop drawings/models of changes organisms go through during their life
5th Grade: Obtain evidence of growth patterns for plants grown in different environments
LS2: Ecosystems: Interactions, energy, and dynamics
3rd Grade: Determine how amounts of sunlight and water impact the growth of a plant

Math Standards (on next page)

Math Standards

Grade	Strand	Anchor Standard	Code	Benchmark
3	Data Analysis	Data Sciences: Identify, formulate and investigate statistical questions by collecting data considering cultural perspectives, analyzing and interpreting data and communicating the results.	3.1.1.3 3.1.1.5	Collect and organize data to answer a statistical question using various tools and addressing missing or incomplete data. Represent data in a variety of ways including technology. (MP1, MP5) Critically analyze data visualizations, including frequency tables, bar graphs, picture graphs or number line plots having a variety of scales to support a claim and solve situations. (MP1, MP3)
5	Data Analysis	Data Sciences: Identify, formulate and investigate statistical questions by collecting data considering cultural perspectives, analyzing and interpreting data and communicating the results.	5.1.1.1 5.1.1.2 5.1.1.5	Notice and describe patterns in data-rich situations or given related data sets that are descriptive and comparative. Ask meaningful statistical questions that can be answered with data. (MP7) Compare and contrast between qualitative and quantitative data. (MP3, MP6) Compare and contrast different data displays to determine how the visualizations impact analysis and interpretation. (MP3, MP8)