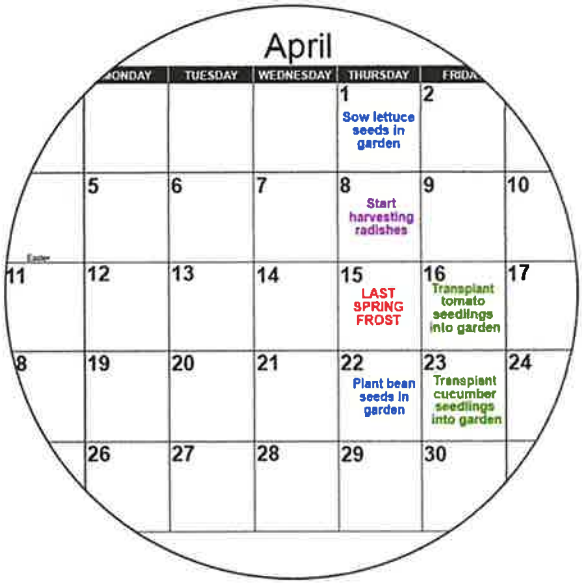
Create a School Garden Planting Calendar



Overview: Creating a planting calendar for your school garden is an excellent way to help your students understand how weather and climate impact the life cycle of plants. If you are planting edibles, it also provides a glimpse into the complexities of our food system. An indoor seed-planting activity illustrates the effect of temperature on germination to help reinforce the importance of planting at the proper time.

Grade Level/Range: K – 3rd Grade

Objective: Students will:

- explore the impact of temperature on seed germination and plant growth
- research local weather patterns and the average first and last frost dates
- create a planting calendar based on what they have learned about plant needs and regional weather conditions

Time: 2 weeks

Materials:

- Dried lima bean seeds (from the soup bean aisle at the grocery store)
- Paper towels
- Plastic cups
- Construction paper (optional)
- Seed catalogs (optional)

Background Information

When planning your school garden, picking the optimum time to plant seeds — either directly outdoors, or indoors to later transplant outside — can contribute greatly to your success rate. There's no single best date for sowing all types of seeds. Different seeds grow best in different conditions. Some types of seeds, for example, may rot if planted in cold, wet soil. And some may sprout but the shoots will be damaged by cold air. Later in this lesson, we'll look at how temperature affects the germination of lima bean seeds. First, let's explore some of the factors that affect planting times. Understanding these factors will be essential when it's time to create your custom planting calendar.

Pea seeds germinate and grow best in cool weather.

Planting times are based on your region and are closely tied to your local weather conditions. The temperature of both the air and soil

are key considerations. As we all know, weather varies from year to year. However, scientists have gathered and summarized many years of weather data to help gardeners and farmers plan target planting dates. Two key data points are the **average last frost date in spring** and the **average first frost date in fall.**

You can discover your average first and last frost dates by contacting your local Extension Service, or you can also look them up by zip code at: https://www.almanac.com/gardening/frostdates/zipcode/.

In the sample calendar shown at right, we've marked the average last spring frost date as April 15.

Additional considerations, especially for school gardens, are target harvest dates. If your garden will not be closely maintained during summer months, you will want to plan your spring garden calendar to make sure you can harvest your plants before the end of the school year. You will need to select plants that can be grown to maturity before the last day of school.

Or, if you want to plan a fall garden and you do not want to start seeds until students arrive back so they can be involved in all steps of the process, you will need to look for plants that you can sow, grow, and harvest between the first day of school and the average first fall frost date.

If you are able to provide some maintenance during the summer, you may have more flexibility on this timing.

Deciding What to Grow

To determine what crops you'll be able to grow, create a planting calendar. Begin by marking a blank calendar with your average frost dates. Then make a list of plants of all the plants you'd like to grow. Research your selections to find out:

- the estimated time between seed planting and harvest
- if seeds are best directly seeded outdoors or should be started indoors, to later be transplanted outside

This information is usually available on the seed packet, but can also be found in seed catalogs and online resources.

Outdoor planting. Some plants grow best when their seeds are planted directly in the garden (rather than starting them

March

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
	1	2	3	4 Start tomato seeds indoors	5	6
7	8	9	10	11 Sow radish seeds in garden	12	13
14	15	16	17	18 Sow carrot seeds in garden	19 Start cucumber seeds indoors	20
21	22	23	24	25 Sow pea seeds in garden	26	27
28	29	30	31			

April

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
				1 Sow lettuce seeds in garden	2	3
4	5	6	7	8 Start harvesting radishes	9	10
11	12	13	14	15 LAST SPRING FROST	16 Transplant tomato seedlings into garden	17
18	19	20	21	22 Plant bean seeds in garden	23 Transplant cucumber seedlings into garden	24
25	26	27	28	29	30	

May

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
						1
2	3	4	5	6 Start harvesting lettuce	7	8
9	10	11	12	13	14	15
16	17	18	19	20 Start harvesting peas	21	22
23	24	25	26	27	28	29
30	31					

June

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
		1	2	3	4	5
6	7	8	9	10 Start harvesting carrots	11	12
13	14	15	16	17 Harvest first tomatoes	18	19
20	21	22	23	24	25	26
27	28	29	30			

indoors). Examples include radishes, peas, carrots, and corn. Most seed packets will provide information on when to sow the seeds, usually in relation to the last spring frost date. Here are some examples:

- Radishes: Sow seeds of this cool-season crop directly in the garden about 4 to 6 weeks before the average last spring frost date.
- Corn: Sow seeds for heat-loving corn in your garden after your last spring frost date or once soil is at least 65° F.
- Pumpkin: These seeds require warm soil, so plant seeds a week or two after the last spring frost date.

Sowing radish seeds in early spring

Seed catalogs and packets will also tell you the number of days to harvest. Use your calendar to determine if you have enough time between the recommended planting date and your target end date to grow them. If yes, add them to your calendar. If no, remove them from your choices.

Indoor Planting: For seeds that can be started indoors, seed packets, catalogs, and online resources will tell you when they should be started indoors, when to plant the seedlings outdoors and how much time until harvest. Find the total amount of time needed from seed to harvest and work backwards from your targeted end date.

If for a fall garden that you want the students to be able to plant, do you have enough time after school starts to plant them? If yes, add to your calendar. For a spring garden, check to see how many weeks this puts you before your average last frost dates to determine how many weeks they would need to grow inside. Compare this time frame with the recommendation for how many weeks to grow indoors to see if the timing matches for you.

Planting indoor-grown seedling after last frost date.

Tips Creating Your Calendar

- As you move through this process, remember you have lots of options. Choosing plants that will grow well for you in the time you have available will increase your chances of success.
- For more details and recommended planting dates read: **When to Plant Seeds**: https://kidsgardening.org/gardening-basics-when-to-plant-seeds/

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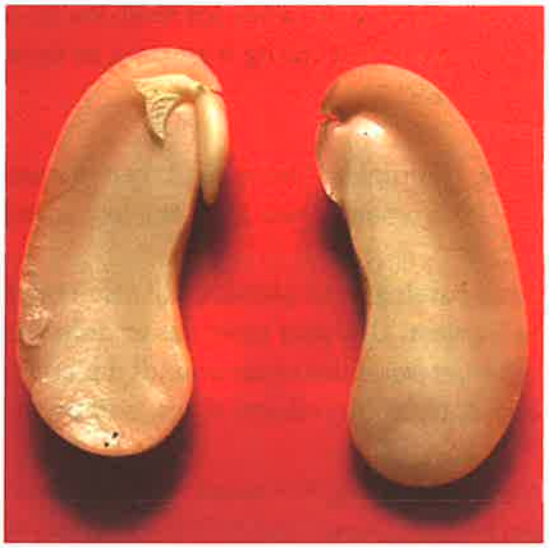
- Germination and days to harvest dates are just estimates. Factors such as temperature, along with water and nutrient availability, can also contribute significantly to speed of growth and maturity.

- Use **KidsGardening's Interactive Spring Planting Calendar** to calculate planting dates by entering your last spring frost date: https://kidsgardening.org/wp-content/uploads/2021/01/interactive-planting-calendar.pdf
  (Note: To open the PDF file you many need to download free Acrobat Reader: https://acrobat.adobe.com/us/en/acrobat/pdf-reader.html

Does Temperature Affect Lima Bean Seed Germination and Growth?



After soaking, the skin on this kidney bean slipped off and the bean split open to reveal the tiny plant inside.

Advanced Preparation

Soak lima bean seeds (enough for at least one per student) in water for at least 4 hours to overnight.

Laying the Groundwork

Pass out at least one paper towel and a soaked lima bean seed to each student. Carefully have them peel back the seed coat and open up the seed and find the new baby plant inside.

Ask, what does the seed need to start growing?

You will likely get responses that match the needs of a mature plant, including water, air, light, and nutrients, so you may need to ask the prompt, What about temperature? Does the temperature affect whether seeds will start to grow? What kind of impact do you think it has? Share with the students that you are going to explore whether temperature affects seed growth.

Seed viewer

Exploration

1. Have each student make a seed viewer using dried lima beans, a clear plastic cup and wet paper towels. To make a seed viewer:
   - Cut a piece of construction paper into a rectangular strip to fit inside the plastic cups. This is optional, but it helps with viewing.
   - Ball up a few pieces of paper towels and place them inside the construction paper liner until the cup is full.
   - Place 3 to 4 lima beans in the cup between the side of the cup and the paper towels or construction paper liner so the seeds are visible from the outside of the cup.

- Gently water the paper towels in the center until saturated.

2. Ask student to brainstorm different places you could place the cups to test if air temperature impacts seed growth. Ideas may include: a windowsill, in a refrigerator, in a freezer, in a dark closet, and outside. For best results, put multiple cups in each location. Take the temperature at each location as you place them and record again daily as you observe your viewers.

3. Track the growth of your seeds for 2 weeks, making sure to keep the paper towel moist at all times (you may need to add water to some of your samples depending on their location).

4. Compile your results and compare the germination rate of the seeds and growth of your young seedlings to the temperatures collected in each location. Ask, does temperature impact seed growth and development? What kind of connection did we see? What does this mean for our garden?

Making Connections

Your seed viewers should reveal that cooler temperatures can slow and/or prevent germination. Explain that gardeners and farmers have to be careful to plant at the right time so that seeds can grow when planted. Introduce the science behind the average first and last frost dates then find out the dates in your area by contacting your local Extension Office, or you can also look it up online at: https://www.almanac.com/gardening/frostdates/zipcode/

As a class, work together to create a planting calendar for your school garden (it can be a real garden or your dream garden) using the steps listed in the Background Information. You can find timing information on seed packets, in seed catalogs, and online. You can also use the new **KidsGardening's Interactive Spring Planting Calendar** to calculate planting dates by entering your last spring frost date: https://kidsgardening.org/wp-content/uploads/2021/01/interactive-planting-calendar.pdf

Share your calendar with friends, families, and your community.

Branching Out

Use your new knowledge to inspire your students to think about our food system. Ask, do the fresh fruits and vegetables we see at the grocery store or in our school lunch match with the harvest times in our area? How far do you think some of our foods travel? Find some fresh fruits and vegetables that come from distance locations (many will have a sticker labeling their country of origin) to share. Explain how the seasons vary because of the position of the Earth around the sun. Discuss the pros and cons of transporting food around the world.

Learn about season extenders like cold frames and row covers, which allow gardeners to control temperatures around their garden plants. Examples can be found in the article Extend the Season with Plant Cover-Ups at: https://kidsgardening.org/gardening-basics-extend-the-season-with-plant-cover-ups/. Have your students create designs for season extenders using repurposed materials for your garden.

Link to Next Generation Science Standards Performance Expectations

K-LS1-1. Use observations to describe patterns of what plants and animals (including humans) need to survive.

K-ESS2-1. Use and share observations of local weather conditions to describe patterns over time.

K-ESS3-1. Use a model to represent the relationship between the needs of different plants or animals (including humans) and the places they live.

2-LS2-1. Plan and conduct an investigation to determine if plants need sunlight and water to grow.

3-ESS2-1. Represent data in tables and graphical displays to describe typical weather conditions expected during a particular season.

3-ESS2-2. Obtain and combine information to describe climates in different regions of the world.