



## **How to Grow Garlic: Plant It in Fall, Savor It in Summer!**



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In this pair of lessons, students will learn about the life cycle of garlic and be exposed to what a bulb is. They will explore how a bulb is planted and harvested later. Through hands-on learning they will begin the growing process and will experience the process of waiting for harvest.

### **Subject Levels/ Suggested Grade:**

Science K-3

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Grade and Subject	Curricular Competencies	Content Connections
Science K	<p>Questioning and predicting</p> <ul style="list-style-type: none"> <li>• Demonstrate curiosity and a sense of wonder about the world</li> <li>• Ask simple questions about familiar objects and events</li> </ul> <p>Processing and analyzing data and information</p> <ul style="list-style-type: none"> <li>• Represent observations and ideas by drawing charts and simple pictographs</li> </ul>	<ul style="list-style-type: none"> <li>• Plants and animals have observable features.</li> <li>• basic needs of plants and animals</li> <li>• adaptations of local plants and animals</li> <li>• living things make changes to accommodate daily and seasonal cycles</li> </ul>
Science 1	<p>Questioning and predicting</p> <ul style="list-style-type: none"> <li>• Demonstrate curiosity and a sense of wonder about the world</li> </ul> <p>Processing and analyzing data and information</p> <ul style="list-style-type: none"> <li>• Sort and classify data and information using drawings, pictographs and provided tables</li> </ul>	<ul style="list-style-type: none"> <li>• Living things have features and behaviours that help them survive in their environment.</li> <li>• classification of living and non-living things</li> <li>• names of local plants and animals</li> <li>• structural features of living things in the local environment</li> </ul>
Science 2	<p>Questioning and predicting</p> <ul style="list-style-type: none"> <li>• Demonstrate curiosity and a sense of wonder about the world</li> </ul> <p>Processing and analyzing data and information</p> <ul style="list-style-type: none"> <li>• Sort and classify data and information using drawings, pictographs and provided tables</li> </ul>	<ul style="list-style-type: none"> <li>• Living things have life cycles adapted to their environment.</li> <li>• </li> </ul>
Science 3	<p>Planning and conducting</p> <ul style="list-style-type: none"> <li>• Make observations about living and non-living things in the local environment</li> </ul> <p>Processing and analyzing data and information</p> <ul style="list-style-type: none"> <li>• Sort and classify data and information using drawings or provided tables</li> <li>• Use tables, simple bar graphs, or other formats to represent data and show simple patterns and trends</li> </ul>	<ul style="list-style-type: none"> <li>• Living things are diverse, can be grouped, and interact in their ecosystems.</li> <li>• biodiversity in the local environment</li> </ul>

## Teacher Background:

Allium vegetables are a group of true bulbs (rounded bulbs with a flat bottom that produces roots and a top that produces a stem) that often have a strong smell and flavour. In Latin, the word *allium* means garlic, so naturally this group includes garlic as well as onions, shallots, leeks, scallions and chives.

Allium vegetables are thought to have been cultivated around 5000 years ago and were used in traditional medicine as well as for food. Today, the whole allium family has become staple ingredients used throughout the world in cooking. (*Allium sativum*) grows from cloves and matures into bulbs over 6-8 months.

## Lesson One: The Garlic Plant

### Materials:

- Garlic clove in a brown paper bag
- Garlic plant (or Image 1 on page 5)
- Garlic bulb
- *Garlic Lifecycle Vocabulary Poster*
- Student Handouts
  - *Life Cycle of Garlic Worksheet*

### Introduction:

- Place a clove of garlic (can cut or crush it slightly) in a brown paper bag and let students smell without looking inside. Ask students to guess what is in the bag.
- If students do not guess garlic, help guide them to the answer by giving them clues. Tell them that it is edible, and it's grown to put into yummy dishes.
- Ask students if they can think of any dishes, they enjoy that have garlic in them. Share with them your favourite dish using garlic.

### Body:

- Ask students if they know what a life cycle is.
- Lead students to an understanding that life cycles involve change and reproduction. Discuss why a plant needs to reproduce. What are the benefits and challenges necessary in protecting this plant? What are the obligations that we have if we are going to be responsible citizens in caring for the garlic plant?
- Ask: If we are going to grow garlic, what do you think we need?
  - Students may talk about seeds. Help students to understand that garlic is a plant that does not start with a seed. This is a unique feature of the garlic plant.
- Show students a garlic plant or a picture (Image 1) of one. Show students a whole garlic bulb and peel back the skin of the garlic to reveal the clove.
- Introduce *Garlic Lifecycle Vocabulary Poster* and ask students to touch their shoulders whenever they hear one of the new vocabulary words.
- Lead students through a visualization activity. Visualize that you ARE a clove of garlic. "What do you need to grow?"
- Help students to embody their understanding of life cycle by acting out (as a class) planting the garlic clove (themselves) in soil, growing a scape, drying up and then being harvested.

**Closing:**

- Distribute *Life Cycle of Garlic Worksheet* and have students complete on own, in partners or as a whole class depending on ability.
- Once completed have students take them home to share about this lifecycle at home.

**Extensions:**

- Watch How We Grow, Cure & Store Garlic: From Clove to Bulb
  - <https://www.youtube.com/watch?v=nEVwV7LQwhM>
- Explore the [Alluim Vegetables GrowBC Map](#) and explore where they are grown in BC.



Image 1



# LIFE CYCLE VOCABULARY

# GARLIC

**GERMINATION:** THIS IS WHEN A GARLIC CLOVE STARTS TO GROW INTO A NEW PLANT. IT MAKES LITTLE ROOTS AND SHOOTS AFTER WE PLANT IT IN THE GROUND.

**PLANTING:** THIS MEANS PUTTING GARLIC CLOVES INTO THE SOIL SO THEY CAN GROW. WE USUALLY DO THIS IN THE FALL OR EARLY WINTER.

**VERNALIZATION:** THIS IS A BIG WORD THAT MEANS WE KEEP GARLIC CLOVES IN THE COLD FOR A WHILE. THIS HELPS THEM GROW INTO BIG AND STRONG BULBS LATER.

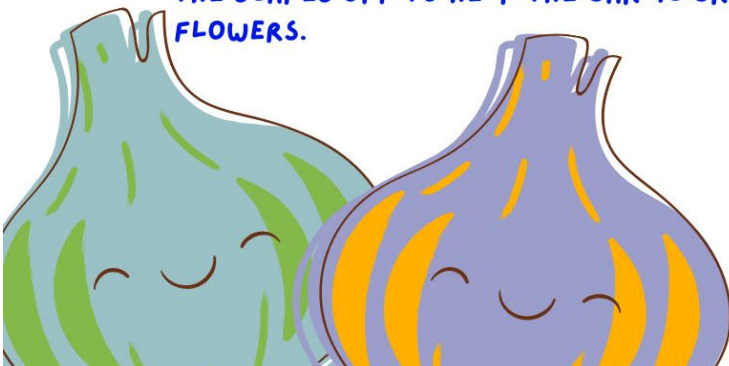
**GREEN GARLIC:** THESE ARE YOUNG GARLIC PLANTS THAT WE PICK BEFORE THEY GROW INTO BIG BULBS. THEY TASTE Milder AND ARE YUMMY TO EAT!

**SCAPES:** THESE ARE THE FLOWER STEMS THAT GROW FROM HARDNECK GARLIC. WE CUT THEM OFF SO THE PLANT CAN FOCUS ON MAKING BIGGER BULBS. SCAPES ARE ALSO TASTY IN COOKING!

**YOUNG BULB:** THIS IS A GARLIC BULB THAT WE PICK EARLY. IT'S SOFTER AND HAS A Milder FLAVOR COMPARED TO THE BIG ONES.

**MATURE BULB:** THIS IS A FULLY GROWN GARLIC BULB THAT IS READY TO BE PICKED. IT HAS SEPARATE CLOVES INSIDE AND IS USUALLY HARVESTED IN THE SUMMER.

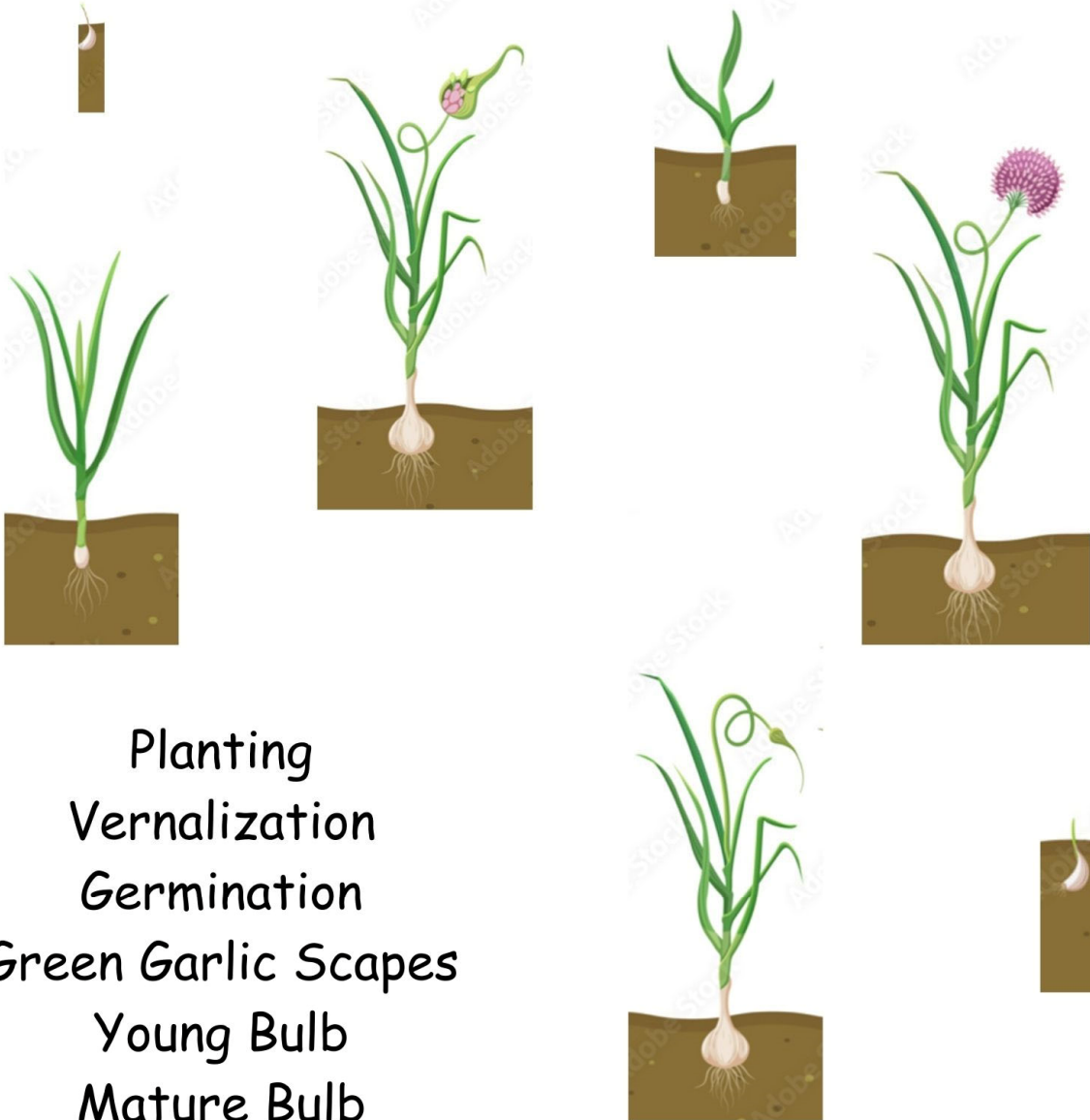
**FLOWERING:** THIS IS WHEN GARLIC BLOOMS WITH FLOWERS. WE OFTEN CUT THE SCAPES OFF TO HELP THE GARLIC GROW BETTER BULBS INSTEAD OF FLOWERS.



# Life Cycle of Garlic Worksheet

Let's play a game of "Picture This"!

Match the terms with its perfect visual buddy by drawing a line to it!



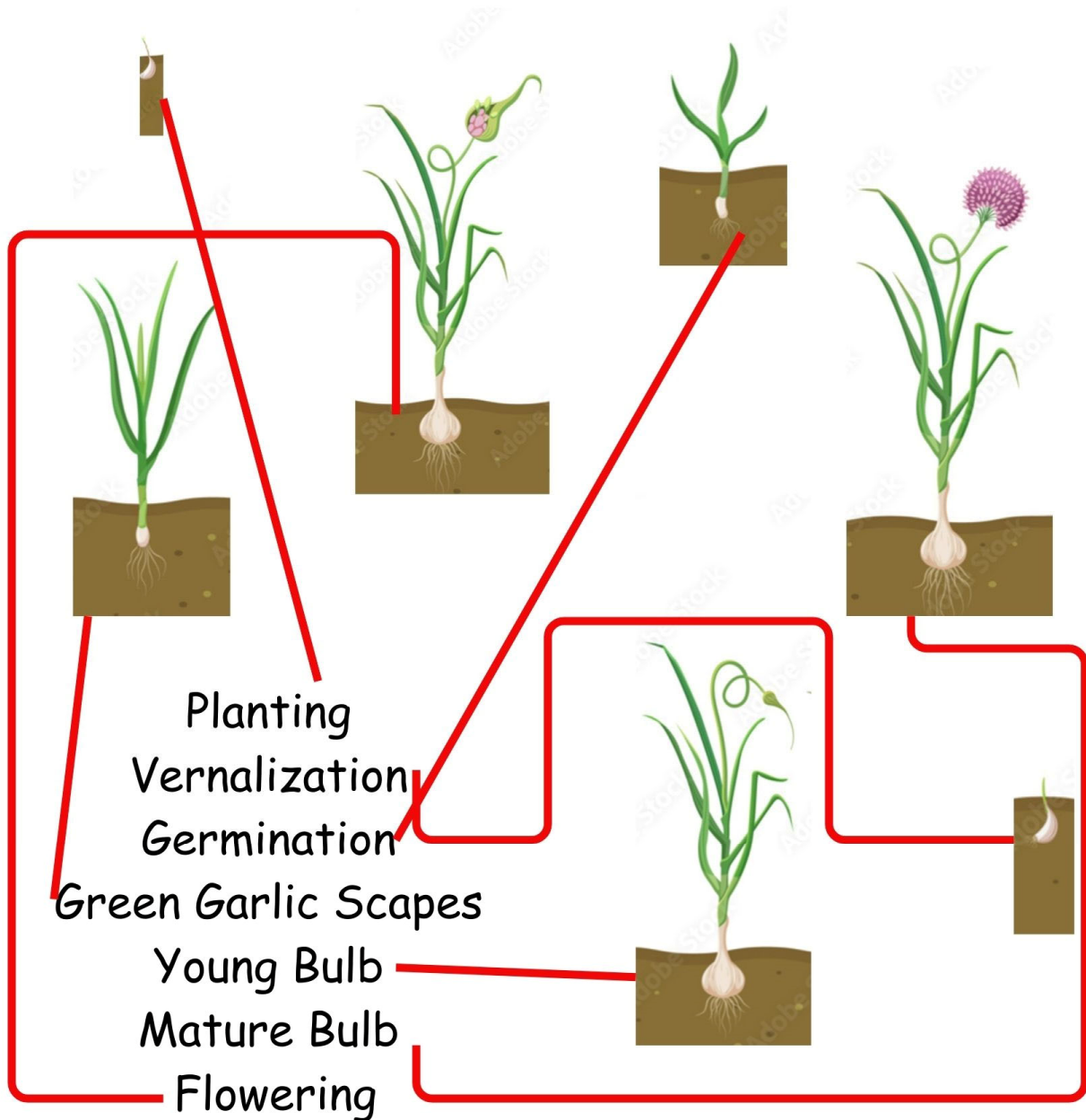
Planting  
Vernalization  
Germination  
Green Garlic Scapes  
Young Bulb  
Mature Bulb  
Flowering



## Life Cycle of Garlic Worksheet-KEY

Let's play a game of "Picture This"!

Match the terms with its perfect visual buddy by drawing a line to it!





## **Lesson Two: Planting Garlic**

### **Teacher Background:**

Garlic is typically planted in the fall, ideally before the end of October, and is harvested in the summer. Students will have the opportunity to plant and care for the garlic throughout the school year; however, since most students will be on summer break during July and August when the garlic is ready to be harvested, the yield will be utilized in the following school year.

There are two main varieties of garlic: hardneck and softneck. Hardneck garlic produces scapes, features larger cloves, but contains fewer cloves per bulb compared to softneck garlic. On the other hand, softneck garlic does not produce scapes, can be braided, and has smaller cloves but offers a greater number of cloves in each bulb compared to hardneck garlic.

### **Materials/Resources:**

- *Garlic Planting Guide*
- Soil
- Garlic (hardneck or softneck)
- Compost or manure.
- Mulch (can be grass clippings, straw, or chopped leaves)
- Rake
- Optional: Small shovel or dibbler

### **Before the lesson:**

- Review the *Garlic Planting Guide*
- Choose your space for garlic planting carefully, ensure it has 6 plus hours of sunlight a day, and enough space for 4-6 inches between the cloves, 12-18 inches between the rows and is 5-6 inches deep.

### **Introduction:**

- Tell students that today you are going to be planting garlic.
- Review the steps:
  1. Prepare the soil
  2. Break apart the bulbs
  3. Prepare the planting space
  4. Plant the garlic cloves!
  5. Wait...
  6. Harvest

### **Body:**

- Prepare the area where the garlic is to be planted by turning the soil and raking it. This is also a good time to work in some good compost or commercial composted steer/mushroom manure.
- Choose for your garlic patch an area which gets good sunshine and hopefully has well drained soil.
- Break apart the garlic bulbs. (**IMAGE 1, page 12**)
- Plant your garlic cloves in a grid. Use a piece of doweling or the end of a garden rake to poke holes about 3 - 4" deep in the soil. A good guide is about 5 - 6" apart (**IMAGE 2**).

Other options are to poke holes into the ground into a small shovel or dibbler (**IMAGE 3**). If you do not have access to any of the tools mentioned, you can also use your hands.

- Put the clove into the hole with the hard, flat root side down and the pointy part up.
- Cover with soil, and move on to the next hole, until all your garlic cloves are planted. Avoid walking on any of your new plantings. If you are planting different varieties of garlic, make sure to include a label beside what you have planted so that you are able to identify the different varieties when harvesting.
- Cover the area you've just planted with mulch to a depth of about 4 or 5 inches. This mulch provides a warm blanket for the garlic over winter. Don't be surprised when one day 2 or 3 weeks after planting you suddenly see green garlic sprouting up through the hay!
- The garlic will continue to grow slowly over the winter and then will shoot up in the spring and early summer. The hard neck garlic will form scapes. While still in the curl, they should be cut and used in stir fries or sautéed with onions and mushrooms. Delicious!! Do not allow the scapes to start straightening, as they won't taste as tender and also then the garlic bulb will not grow as large.
  - If you do not cut the scapes, they will grow an umbel and bulbil. As the scape grows, it will curl, and the umbel will start to fill out with bulbils. Depending on the Hardneck Garlic variety, there can be anywhere from as few as two to as many as 150 bulbils in the umbel when fully mature.
- If weeds form between the rows of garlic, pull them out. Garlic does not need a lot of watering. Only water if the soil becomes dry.
- Leave the mulch in place right up until harvest time towards the end of July or early August. It keeps weeds under control and also helps retain moisture in the soil when the weather is hot.
- Prior to harvesting your garlic, it is important that you do not water it for about 2 or 3 weeks. You want the soil and the garlic heads to be very dry when harvesting. You will know the garlic is ready for harvesting when two-thirds of the leaves are yellow and brown.
- When the garlic has been harvested, it is time to cure the garlic. Cure the garlic by laying it in a single layer away from direct sunlight. With time, the leaves will dry out. Once the garlic has been cured, clean the dirt left on the garlic. Using scissors, trim the roots.

### **Extensions:**

- Experiment with different planting locations (e.g., container, raised garden bed, areas with various amounts of sun), different types of mulch (e.g. straw, grass clippings, clippings of leaves), different types of compost or manure (e.g. mushroom manure, steer manure, chicken manure) to see which creates the most ideal conditions for growth of the garlic. Make sure you label the planting bed with the variables you decide to experiment with.
- If working with a secondary school, secondary student volunteers can harvest garlic during summer and record the process to share with students during the new school year.

## Garlic Planting Guide

# How to grow

# Garlic



West Coast Seeds



### Plant

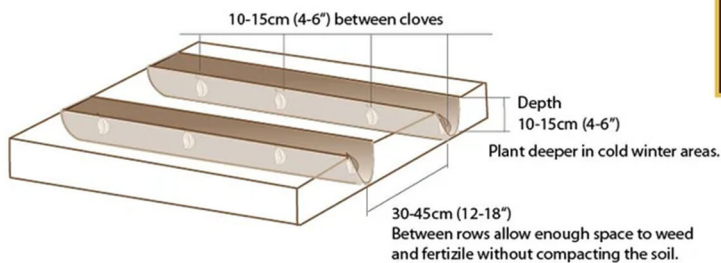


Choose a site with 6+ hours per day.



Plant individual cloves, pointed end up, with the skin intact.

Plant garlic in rows or more densely in 8 x 10' bed.

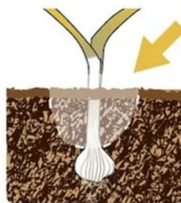


### Fertilize

When new growth starts in late winter/early spring, apply a balanced organic fertilizer to the soil around/between plants



### Harvest



Gently remove soil, and then lift bulb with tool or hands.

### Lift

Careful not to bruise or cut which will reduce the storage ability.



Fall			Winter			Spring			Summer		
S	O	N	D	J	F	M	A	M	J	J	A

Sow

Fertilize when spring growth starts.

Harvest

Harvest garlic scapes, for hard neck varieties.



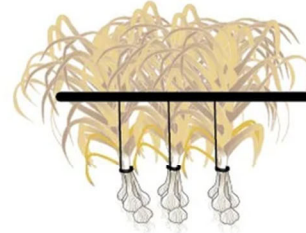
### Dry

When first lifted, bulbs will be very pungent. Lay plants somewhere shady and dry for 1-2 weeks, turning daily.



### Cure

Curing is allowing the whole plant to air dry on its own time in a shady space with good air circulation. When this stage is complete, no more green will be visible.



The plants are still intact during the drying and curing process.



### Clean

Trim the bulbs with 1-4 inches of stem intact. Trim the roots with scissors. Use a brush to gently remove soil. Remove the fewest number of papery layers to the outermost intact layer.



SM1205



IMAGE 1



IMAGE 2



IMAGE 3

**Sources:**

- Garlic Cloves Image: <https://seeds.ca/d/?n=web/ebulletin/2016-08-en/articles/garlic>
- Garlic Planting Guide: <https://www.westcoastseeds.com/blogs/wcs-academy/garlic>
- Dibble Image: <https://www.gardenersworld.com/product-guides/growing/best-dibbers/>
- Garlic Plant Image: <https://ca.pinterest.com/pin/147070744060502209/>
- Watch How We Grow, Cure & Store Garlic: From Clove to Bulb: <https://www.youtube.com/watch?v=nEVwV7LQwhM>