



NatureFest 2021

Seeds 101

Charles County Master Gardeners "Just for Kids"

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EXTENSION

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A MASTER GARDENER PROGRAM

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Seeds 101:

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Seed Germination



Before a seed can sprout and grow, it must go through a process called GERMINATION. The process of germination happens inside the seed.

1. If you look at different kinds of seeds, you can easily see that they are not all alike. They come in different sizes, shapes, and colors and some seeds have softer seed coats than others. All these differences mean that seeds germinate differently. Seeds with hard seed coats like beans or corn usually germinate slower than seeds with soft seed coats like tomatoes or peppers. There are also cool season seeds which are grown during cool weather, and warm season seeds that are grown during warm weather.

2. Four things are very important for a seed to germinate:

Water

Air

Light

Soil Temperature

The reason they are so important is that the seeds you plant need to be able to take in oxygen and minerals from the soil and water through the seed coat's tiny pores (holes) to give the inside of the seed the food it needs to break open and make its way through the soil so it can grow into a plant.

3. When the seed is full enough, it pops open. The first part of the seed to come through the seed coat is the root. It takes hold of the soil and starts to take in food from the soil. Next comes the understem which continues to grow upward with the first leaves of the new plant. When the first leaves are showing the plant is above the ground.

4. When this happens, the seed leaves which look like thin, dried brownish-white skin has finished its job. They fall off the plant and become part of the soil. Now the plant's tiny leaves take on the job of supplying food to the new plant. And that is the process called GERMINATION.

Seed Germination



1. What is the process a seed must go through to sprout, called?

2. Name one seed with a hard seed coat.

3. What are the four things very important for a seed to germinate?

4. What happens when the seed is full enough?

5. What is the first part of the seed to come through the seed coat?





It Starts With a Seed - Learning to Grow A Plant from Seed Indoors!



1. Select a container, making sure that it is sanitized, will drain, and is deep enough for root growth and development. Fill the container with moistened, sterile, seed-starting mix or very good potting soil.



2. Check seed package for planting depth. Make shallow indentations in the soil and sow the seed evenly. Lightly water the surface, and place the container in a warm area (not in direct sunlight). As seeds germinate, move seedlings to a well-lit area, such as under fluorescent lights or a window sill where it gets plenty of day light.



3. The seed leaves will emerge first. When two or three true leaves emerge, separate and transplant the small seedlings into flats or small pots filled with moist potting soil. Keep soil evenly moist.



4. Allow plants to grow several more sets of true leaves. Keep fluorescent lights 2 to 3 inches above seedlings, adjusting as necessary or make sure they get enough day light in a well lit area near a window.



5. Plants raised in a high humidity, sheltered location need to be prepared prior to planting in drier, harsher conditions, such as outside in the garden. This preparation process is referred to as "hardening off." One way to prepare plants is to move them outside to a shady location, gradually increasing the amount of sunlight over a period of several days. Repeat daily, extending the length of time that plants remain outside by an hour.

The idea is to slow growth and thicken plant cell walls. Start this process one to two weeks prior to planting seedlings in the garden. Take care to transition plants gradually as extreme changes can slow growth to the point of plant death.

6. Water the transplants well initially and for several weeks after planting.



It Starts With a Seed - Learning to Grow A Plant from Seed Indoors!



1. What do you select first to grow a seed in?

2. Where do I find the information about the planting depth of the seeds?

3. Where do I place the container after I first planted the seeds?

4. When is it time to transplant the seedlings into small flats or single pots?

5. Before putting the seedling outside there is a preparation process. What is the preparation process called?





It Starts With a Seed - Learning to Grow A Plant from Seed Outdoors!



1. After the danger of outdoor frost has passed, prepare your garden bed by loosening soil to a depth of 8 to 12 inches. If you can, add some composted organic matter (decayed matter like fruits, vegetables, manure, grasses, dead leaves and woody debris – if you don't have any, you can buy a bag at a gardening store) to enrich soil.



2. Rake the bed and remove roots and rocks. If you are planting different vegetables or flowers, plan the garden space so that taller plants are not shading the lower plants and use markers so you don't forget where you put each variety.

Make sure you weed the area so you can see which new greenery is a seedling and which is a weed.



3. Plant seeds at the depth recommended on the packet. Keep the area lightly moist. Germination will vary by seed variety, but most will sprout within five days to two weeks.



4. Once you see signs of life, a few other steps need to be taken. When seeds have all sprouted, thinning is an important step. Remove excess plants to give the saved sprouts room to grow. Keep a careful watch out for weeds and deal with those as they appear. Water regularly. Harvest vegetables when fully grown and enjoy.



It Starts With a Seed - Learning to Grow a Plant from Seed Outdoors!



1. When can I sow seeds outdoors safely?

2. What should I add to enrich the soil?

3. Should I weed the area where I sow the seeds?

4. Will all the seeds sprout at the same time?

5. What is an important step once seedlings have sprouted?



How to Read a Seed Packet!

Full Sun or Part Shade?

Most vegetables need full sun, which means 6 to 8 hours of sun, but some flowers can mature in part shade, which means 4 to 6 hours of sun.

How many days until maturity?

Will you have enough time to grow this plant from seed? The packet will tell you how long it takes until the flowers bloom or when you can harvest the vegetables.

When should you plant the seed?

Check the map on the package. It shows when it is safe to plant. If you plant too early, the seeds will not grow well.



How should you plant the seed?

The packet tells you how deep to plant the seeds and how to thin out the plants when they are seedlings. (Thinning out means you pull out some of the seedlings that are crowded by others.)

The packet will also tell you the best soil conditions for good growing results. Keep in mind that root vegetables like carrots and radishes will struggle to grow in clay soil. Maybe a container would be a better choice for these.

Check out our worksheets "It Starts With a Seed - Learning to Grow A Plant from Seed Outdoors!" or, if you are starting early in the year, see "It Starts With a Seed - Learning to Grow A Plant from Seed Indoors!"

How to Transplant Seedlings



Transplanting seedlings to a pot or garden bed:

Like a mature plant, seedlings also need space to grow. After 2-3 weeks of their germination, once seedlings have their first set of true leaves, you have to transfer them into larger containers or into the garden bed.

Sometimes you cannot move them right into the ground so you need to transfer them into larger pots. That's because not everyone has a garden, or maybe the weather is still not suitable for the seedlings to grow outside.

When to transplant seedlings:

The time of transplanting seedlings depends mostly on your locality. Always transplant your seedlings after the last frost, unless it is a cool weather crop.

If you have tender seedlings like tomato or peppers, it would be best to wait until nighttime temperatures are above 50°F before transplanting them outdoors.



Hardening off your transplants:

Before you transplant your seedling to the garden you have to do what we call hardening off seedlings. That means the plant makes some adjustments to suit the harsh outside environment. This process is called hardening off the transplants. One way to prepare plants is to move them outside to a shady location, gradually increasing the amount of sunlight over a period of several days. Repeat daily, extending the length of time that plants remain outside by an hour. The idea is to slow growth and thicken plant cell walls. Start this process one to two weeks prior to planting seedlings outside.

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How to Transplant Seedlings

5 simple steps in transplanting seedlings:



First, make a hole in the ground where you want to transplant the plant. It should be as deep as the height of the container you grew the seed in and double as wide.



Before transplanting it is important to give water to the plants. It takes some time for the plants to grow roots in its new place and for that it needs water.



Keep a hold on the stem of the plant and put the pot upside down. Due to the gravitational force, it will be far easier to take the plant out of the container. Plant the seedling the same depth as it was in the container.



Cover it with the garden soil and press gently to ensure the roots are in solid contact with the soil. Make sure the soil remains moist constantly till you see the plant grow.

Try to transplant on an overcast day. It will give the plant a better chance to adjust to their new home without being burned by direct sunlight.

See our other work sheets for more information:

"It Starts With a Seed—Learning to Grow A Plant from Seed Outdoors!"

"It Starts With a Seed - Learning to Grow A Plant from Seed Indoors!"

Carrots - Rainbow Mix

This mix of carrots will produce orange, yellow, light orange and occasionally white, 8 to 10 inch roots (which are the carrots). These carrots will mature to be very crisp and sweet to taste. They are an excellent choice for salads and other dishes.



- ⇒ Botanical name: *Daucus Carota*
- ⇒ Height mature plant : 16 inches
- ⇒ Width mature plant: 3 inches
- ⇒ Plant seeds 1/4 inch deep and keep the soil lightly moist to speed germination
- ⇒ Plant seeds 2 to 3 inches apart
- ⇒ Grow in Full Sun (6 to 8 hours of direct sun per day)
- ⇒ 12 to 15 days to germination and first seedlings sprouting
- ⇒ Keep young seedlings well watered until they are established to encourage strong root growth
- ⇒ Time to harvest is about 9.5 weeks

How to grow seeds: See work sheets "It Starts With a Seed - Learning to Grow A Plant from Seed Outdoors!" or, if you are starting early in the year, see "It Starts With a Seed - Learning to Grow A Plant from Seed Indoors!"

Lettuce - Leaf Blend Mix

Lettuce is most often grown as a leaf vegetable, but sometimes for its stem and seeds. It is most often used for salads, although it is also seen in other kinds of food, such as soups, sandwiches or wraps.



- ⇒ Botanical name: *Lactuca Sativa*
- ⇒ Height mature plant : 5 to 10 inches
- ⇒ Width mature plant: 5 to 8 inches
- ⇒ Plant seeds 1/8 inch deep and keep the soil lightly moist to speed germination
- ⇒ Plant seeds 4 to 8 inches apart
- ⇒ Grow in Full Sun to Partial Shade (4 to 6 hours of direct sun per day)
- ⇒ 5 to 10 days to germination and first seedlings sprouting
- ⇒ Keep young seedlings well watered until they are established to encourage strong root growth
- ⇒ Time to harvest is about 3 to 6 weeks - can be cut and will regrow

How to grow seeds: See work sheets "It Starts With a Seed - Learning to Grow A Plant from Seed Outdoors!" or, if you are starting early in the year, see "It Starts With a Seed - Learning to Grow A Plant from Seed Indoors!"

Sunflower Dwarf Teddy Bear

The Teddy Bear sunflower has multiple blooms that are bright, golden yellow and fluffy. These plants are ideal for middle or border planting, and growing in containers. Attracts pollinators.



- ⇒ Botanical name: *Helianthus Annuus*
- ⇒ Height mature plant : 18 inches
- ⇒ Width mature plant: 18 inches
- ⇒ Plant seeds 1/4 to 1/2 an inch deep and keep the soil lightly moist to speed germination
- ⇒ Plant seeds 16 inches apart
- ⇒ Grow in Full Sun (6 to 8 hours of direct sun per day)
- ⇒ 7 to 21 days to germination and first seedlings sprouting
- ⇒ Keep young seedlings well watered until they are established to encourage strong root growth
- ⇒ Time to bloom is about 9 weeks



How to grow seeds: See work sheets "It Starts With a Seed - Learning to Grow A Plant from Seed Outdoors!" or, if you are starting early in the year, see "It Starts With a Seed - Learning to Grow A Plant from Seed Indoors!"

Sweet Basil

Sweet Basil is an herb used for cooking and in salads. It will grow great in your garden and its flowers are good for pollinating insects. The leaves have a little bit of a peppery taste with a hint of mint.



- ⇒ Botanical name: *Osmium Basilicum*
- ⇒ Height mature plant : 18 to 24 inches
- ⇒ Width mature plant: 12 to 18 inches
- ⇒ Plant seeds 1/4 to 1/2 an inch deep and keep the soil lightly moist to speed germination
- ⇒ Plant seeds 10 inches apart
- ⇒ Grow in Full Sun (6 to 8 hours of direct sun per day)
- ⇒ 5 to 10 days to germination and first seedlings sprouting
- ⇒ Keep young seedlings well watered until they are established to encourage strong root growth
- ⇒ Time to harvest is about 10 weeks

How to grow seeds: See work sheets "It Starts With a Seed - Learning to Grow A Plant from Seed Outdoors!" or, if you are starting early in the year, see "It Starts With a Seed - Learning to Grow A Plant from Seed Indoors!"

Zinnia - Thumbelina

Zinnia Thumbelina is well-known for its many pom-pom blooms in bright, vivid colors. Blooming from mid summer until frost, this mixture can be cut all season long for beautiful summer bouquets and is extremely easy to grow. Attracts pollinators.



- ⇒ Botanical name: *Zinnia Elegans*
- ⇒ Height mature plant : 6 inches
- ⇒ Width mature plant: 12 inches
- ⇒ Plant seeds 1/4 inch deep and keep the soil lightly moist to speed germination
- ⇒ Plant seeds 10 inches apart
- ⇒ Grow in Full Sun (6 to 8 hours of direct sun per day)
- ⇒ 5 to 10 days to germination and first seedlings sprouting
- ⇒ Keep young seedlings well watered until they are established to encourage strong root growth
- ⇒ Time to bloom is about 5 to 8 weeks



How to grow seeds: See work sheets "It Starts With a Seed - Learning to Grow A Plant from Seed Outdoors!" or, if you are starting early in the year, see "It Starts With a Seed - Learning to Grow A Plant from Seed Indoors!"

The enclosed information was provided courtesy of the Charles County Master Gardeners

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