11+ Practical Tips for Starting Plants from Seed
From Gardening with Sharon

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Tip #1: Always Use Clean Materials for Seeding. Even though plants grow in soil, working surfaces, tools, and growing mediums must be clean to control unwanted bacteria, fungus, and mold growth. Bleach is usually unnecessary.

Tip #2: Use Seeding Mix. Soilless seeding mix differs from regular garden soil and potting mixes for containers. Seeding mix is designed explicitly for germinating seed, it has a finer texture to allow the microscopic root hairs to grow unobstructed. It also has added surfactants to break water surface tension, making water more accessible to the developing seeds. Some gardeners make their own mix with materials like pasteurized & sifted compost, sand, & perlite.

Seeds only need about 4 cm (1.5") of soil to germinate. It's better for them to grow in a shallow tray that drains well and stays moderately moist rather than in a deep layer of soil that stays soaked. Make sure that the seeding tray has drainage holes to drip off excess water.

Moisten the seeding soil before sowing and mix it by hand, adding just enough water so the soil stays together when you squeeze it lightly. There shouldn't be any water dripping out when you gently press it. Fill the seeding flats to the top and gently firm the soil, making sure the corners are full. The level surface should be no deeper than 1 cm from the rim.

Tip #3: Use Good Quality Seed. Seeds are started ahead of time to get a jump start on the limited number of growing days here on the Canadian prairies. Use fresh seeds each year with germination rates of over 75%. The germination rate, or percentage, should be indicated on the back of each seed package. Mark the year on the seed packages when they arrive or when you harvest your seeds so you can keep track of their age.

Tips #4: Start Seeds on Time. A critical factor in sowing seeds indoors is to start them at the right time. Sowing crops too late results in slower-maturing flowers or produce. But, don't be tempted to start seeds too soon. Seeding dates are flexible within a 2-week window. As you gain experience growing transplants, you will fine-tune seed dates to work best for your garden.

How to Calculate Seed Dates: Seed dates vary as different types of annuals, vegetables, herbs, and perennials have different growth patterns. Determine your target date for transplanting outdoors. For plant hardiness zones 3-4, late May to early June is a reasonable time to plant outdoors. To determine how long it takes a type of plant to develop to the transplanting stage, see the links below for seed germination guides e.g. Many vegetables and herbs are ready for transplanting in 4-6 weeks. The formula for determining seed dates:
Date to transplant outdoors – # weeks for the seedlings to be ready = approx. seed date

Tip #5: Sow Seeds at the Correct Depth. If seeds are sown too deep or too shallow, germination can be stalled or halted. A simple rule of thumb is to sow seed at a depth that is twice its width. Most seed packages include instructions for seed depth.

Tip #6: Which Seeds Need to be Covered After They are Sown. Seeds imbibe water to activate germination hormones. For this to happen, they need to stay evenly hydrated. Dehydrated seeds will germinate poorly (or not at all), and the seedlings will struggle. Whether or not seeds need to be covered depends on seed size and light requirements. Large seeds, like Lupines, Swiss Chard, Cosmos, Marigolds, Asters, and Zinnias, must be covered. Don't cover tiny seeds like Coleus, Lobelia, Petunias, and Begonias.

What is a good seed covering material? Commonly gardeners use sifted potting mix while some prefer vermiculite and others use coarse sand.

Remember to label your seed trays! Crop name, cultivar, date planted, (# of seeds planted?)

Tip #7: Seeds Need Warmth. All seeds have minimum, maximum, and optimal temperatures for germination. The optimal soil temperature range for *most* annual and perennial seed germination is 20-23^{0}C (68-74^{0}F). However, some plants germinate in cooler temperatures. Seeds and plants love bottom heat, so the top of the refrigerator is an excellent spot to keep them. Heat mats will work too, but be careful to monitor the soil temperature. See the links below for seed starting temperatures.

Tip #8: Seedlings Need Light. As soon as seeds have germinated, seedlings need light to grow. Check them regularly, some seeds germinate in 3 or 4 days. Light quality and quantity impact plant growth, and northern locations don't get enough of either during winter.

A sunny, south-facing window may be sufficient. Be careful of overexposure to direct sun, as the seedlings could burn. Very often though, plant lights are needed for uniform growth. LED lights are a good solution because their light spectrum promotes stocky growth and flower initiation, and they are energy efficient. Plants need to be close to the grow lights, about 10cm (4") above the leaves. Seedlings need 12-18 hours of bright light every day- an automatic light timer is very helpful.

Inadequate light causes: poor germination after the initial radical stage, poor rooting, stem & leaf stretching (weak "leggy" plants), slowed growth due to decreased photosynthesis, & weak roots.

Tip #9: Seeds & Seedlings Need Consistent Soil Moisture. Seeds need 90% humidity and consistent soil moisture to germinate, grow well, and avoid water stress. Dehydrated seeds will germinate poorly or not at all, and the seedlings will struggle.

Use a clear plastic dome, or plastic wrap, that fits lightly over the seeding tray to maintain soil moisture by keeping the humidity up for new seeds. Remove the clear plastic covering when 50% of the seeds have germinated. Keep seeds and seedlings evenly hydrated with a fine mist

using clear water from a spray bottle. The rest of the seeds will continue to germinate. As the plants get bigger and need more water, set the seedling flats into trays and let them soak up water from below. Remove them from the water as soon as the surface of the soil is damp. If water is coming from a rural water or from a water softener, it is often high in sodium and may be detrimental for plant growth. Rainwater and melted snow are better for seedlings.

Tip #10: When to Fertilize. Seedlings don't need any fertilizer at the initial stages of growth because seeds carry enough nutrients to give them a good start. A fertilizer routine can begin when the first true leaves emerge. Start with dilute fertilizer. Using recommendations on the label, start with 1/4 strength, e.g. 10-52-10, 20-20-20, or Nature's Source 10-4-3.

Fertilize new seedlings weekly or every 2 weeks. If the seedlings look pale, you may give them an additional fertilizer top-up by increasing the concentration to 1/2 strength or by giving an extra dose of 1/4 strength fertilizer. As seedlings mature, they will tolerate higher fertilizer concentrations. Increase slowly to full strength.

Tip #11: Take Good Notes About Your Seeding Progress. Your growing notes are gold and this is where the real learning as a grower happens. These are some of the details to include in your records: cultivar name, date sown, date germinated, date transplanted into bigger pots, date transplanted outdoors, first harvest, weather notes, adjustments to make the next year.

Next steps- often seedlings need to be transplanted into individual pots before they go outdoors (called pricking out or potting on). Plants grown indoors need to be acclimatized to outdoor conditions before being transplanted into the garden (called hardening off).

There are many advantages to growing your own seedlings.You get to control the quality and quantity; more importantly, it expands your selection of plant varieties.

Other references:
Video for sowing seeds & potting on. https://www.rhs.org.uk/videos/advice/half-hardy-annuals
Veseys https://www.veseys.com/ca/growing-from-seeds
Veseys Planting Guide
https://www.veseys.com/media/contentmanager/content/Veseys_planting_guide.pdf

Iowa State University Extension and Outreach
Guide to Starting Seed Indoors
https://yardandgarden.extension.iastate.edu/how-to/guide-starting-seed-indoors
Germination Requirements for Annuals and Vegetables
https://yardandgarden.extension.iastate.edu/how-to/germination-requirements-annuals-and-vegetables