

Germination

: Seeds come equipped with everything needed to create a new plant. They're simply waiting for optimal environmental conditions to be met, then the process of germination can begin. First, the seed absorbs water. The seed coat softens and enzymes within are dissolved. Warm temperatures activate the enzymes to begin working. Oxygen combines with the seed's stored energy and new tissue is formed through cell elongation and cell division. This description of germination, though oversimplified, gives us a useful glimpse of plant life in its infant stage.

- All seed germination involves water, temperature and oxygen. However, each plant species has unique requirements for these three conditions. Therefore, follow seed package instructions carefully. Days to germination and planting depth are important knowledge for successful gardening.

- Seeds are often started indoors in order to extend the growing season in our Midwest location. Seed starting in early spring also gives the gardener an opportunity to optimize conditions for germination. Soil temperature can be controlled through the use of heating mats. Watering from the bottom at appropriate intervals keeps the soil moist, not water logged.

- Moisture is a pre-requisite for successful germination. However, too much water will exclude oxygen from the seed. Note that seeds need oxygen during this stage of their development; the need for carbon dioxide increases later when leaves emerge and photosynthesis begins.

- Each species has an optimal temperature and a range of temperatures for germination. ISU Publication PM 874 "Starting Garden Transplants at Home" includes a table of best soil temperature for germination of several flower and vegetable species. Most indoor seed starting will be successful at soil temperatures between 75 and 90 degrees, with cooler temperatures at night after the seedling has emerged.

- When planting seeds directly outdoors, you have less control over water, temperature and oxygen. However, there are gardening practices you can employ to help nature along. First, plant seeds into loose, friable soil. Test the soil for moisture content by squeezing a handful. If the soil forms a ball that does not fall apart, it is too wet to plant.

- Cold season plants like spinach and kale can tolerate cold temperatures. Other seeds, for example beans and corn, risk rotting if planted into cold, wet soil. Consult ISU Publication PM 534 "Planting and Harvesting Times for Garden Vegetables" and seed packages for appropriate planting conditions.

- Planting depth is important. A general rule is to cover the seed to the depth of its diameter. But, following planting depth recommendations on the seed packet is a better practice. All seedlings emerge from the soil with the shoot curled over as it pushes through the soil. This is nature's provision for protecting the precious growing tip. The more delicate the seedling, the shorter the distance it should be forced to travel to the surface.

- After planting, pat, don't pack, soil over the seed. This will allow oxygen to permeate the microscopic spaces in the soil and reach the softened seed coat.

Some plant species have special requirements beyond water, temperature and oxygen to break dormancy and begin germination. Practices such as stratification, scarification or pre-sprouting may be needed. Again, read and follow the seed packet instructions carefully.