

Seed Germination Experiment

A garden science lab for grades 6 to 8

Name _____ Class _____ Date _____

Background. A seed holds a tiny baby plant, called the embryo, and a supply of stored food. To sprout, or **germinate**, most seeds need three things: water, oxygen, and the right temperature. Most vegetable seeds, like beans and peas, can sprout in the dark, but a few, like lettuce, need light. In this lab you will change one thing and find out how it affects germination.

Materials

20 dry bean or pea seeds, 4 clear cups or jars, paper towels or cotton balls, water, a spray bottle, masking tape labels, a ruler, and a thermometer.

Step 1. Choose ONE variable to test

Check one	What to change	Example setup
	Light	Two cups on a sunny windowsill, two in a dark cupboard
	Temperature	Two cups in a warm room, two in the refrigerator
	Water	Damp towel, dry towel, and seeds under water
	Soaking	Seeds soaked in water overnight, and dry seeds
	Planting depth	Seeds in soil on top, 1 inch deep, and 3 inches deep

Put **5 seeds** in each cup and label each cup with a letter (A, B, C, D).

Independent variable (the one thing I change): _____

Dependent variable (what I measure): _____

Controlled variables (3 things I keep the same): _____

_____

Step 2. Hypothesis

If _____

_____

Use this pattern: If I change _____, then the seeds will _____, because _____.

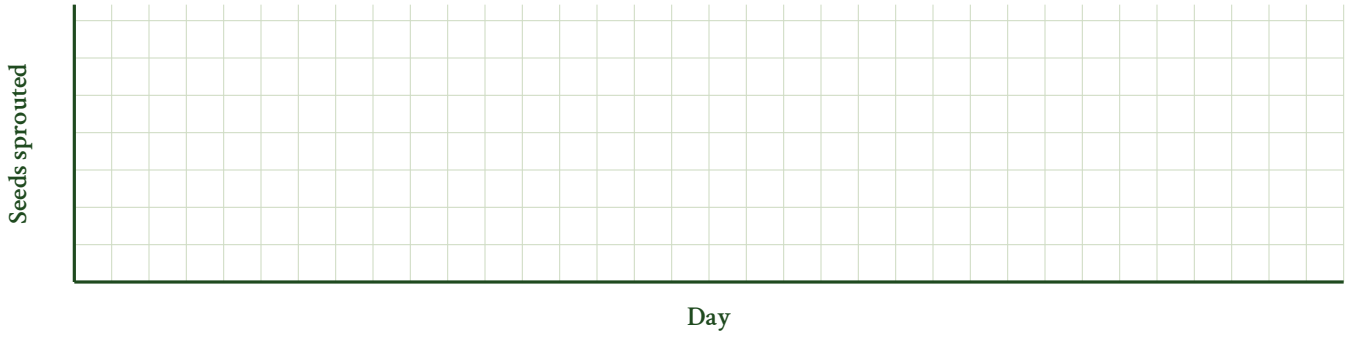
Step 3. Collect your data

Check your cups at the same time every day for 10 days. Keep the towels damp (unless water is your variable). Write how many seeds have sprouted in each cup. A seed counts as sprouted when the root pokes out.

Day	Cup A	Cup B	Cup C	Cup D	Notes
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					
Root length, day 10 (cm)					

Step 4. Graph your results

Make a line graph with a different color for each cup: the day goes along the bottom and the number of seeds sprouted goes up the side.



Step 5. Conclusion

Germination rate = seeds sprouted ÷ seeds planted × 100. Find it for each cup on day 10.

Cup A ____ % **Cup B** ____ % **Cup C** ____ % **Cup D** ____ %

1. Which cup sprouted first? Which had the highest germination rate?

2. Was your hypothesis supported? Use numbers from your data table.

3. Why did you plant 5 seeds in each cup instead of just 1?

4. Gardener's question: based on your results, what advice would you give someone starting seeds in spring?

Seed Germination Experiment: Teacher Page and Answer Key

Standard: NGSS MS-LS1-5: Construct a scientific explanation based on evidence for how environmental and genetic factors influence the growth of organisms.

Good seeds to use: bush beans, peas, or radishes sprout in 2 to 10 days in a warm room. Large bean seeds are easy to see and count. Soak nothing ahead of time unless soaking is the variable.

What students should find

Light: beans and peas sprout about the same in light and dark. Seedlings grown in the dark are pale yellow and tall and spindly, because they stretch to find light and cannot make chlorophyll. This is a good surprise for students who expect light to matter.

Temperature: warm cups (about 70 to 85°F) sprout in about 4 to 8 days. Refrigerator cups (about 38 to 40°F) sprout very few or none in 10 days. Bean seeds need soil warmer than about 60°F, which is why gardeners wait until after the last frost to plant them.

Water: damp towels sprout best. Dry seeds do not sprout. Seeds kept under water sprout poorly or rot, because water fills the spaces where oxygen would be.

Soaking: seeds soaked overnight often sprout a day or two sooner.

Depth: seeds 1 inch deep do best. Seeds on top can dry out, and seeds 3 inches deep come up later because the seedling uses up more stored food reaching the surface.

Answers

1 and 2. Answers depend on the data. Look for numbers from the table to support the answer.

3. Each seed is a little different, and some seeds never sprout. Using 5 seeds per cup gives a fairer result than one seed, which might be a dud. Scientists call this using a larger sample size.

4. Example: keep seeds warm and evenly damp, but not soaking wet; plant at the depth on the seed packet; plant beans after the soil warms up.

Extension: have the class pool their data and compare results. Or test old seeds against new seeds to show how seed age affects germination rate.