

Seed Sprouting Science – Educator Resource

Approximate Activity Time: 15 minutes for experiment prep, 5 minutes/day for 1-2 weeks

How to use this resource

1. Read the “Instructions and Background” thoroughly with your kids. Ask if they have any questions!
2. Prepare your seed samples for the experiment by following the instructions in “Preparing Your Seeds”
3. Fill in the “Experiment Prediction” section with your thoughts on what might happen.
4. Check on your samples daily and write down the changes you see in the “Experiment Observation Chart”.
5. Once the experiment is finished, fill in the “Conclusion” section with what you saw.
6. Check out our “Complimentary Resources” at the bottom

Instructions and Background

This resource helps you and your kids conduct a fun science experiment with supplies you may already have around the house! The goal is to try to get a seed to sprout in different growing conditions and to write down what happens, similar to what scientists do in a laboratory.

For seeds to germinate (sprout out of the seed to eventually grow a plant), they need a few things. Mostly importantly, they need moisture and warmth. With this experiment, you will create these conditions (moisture and warmth) and see what the quickest way to get your seeds to sprout is! Follow along with the instructions and suggestions along the way to try and yield the best results! Some great sources of warm include sunlight and body heat!

This experiment includes two major factors: constants and variables. A constant is something that does not change over time. A variable is something that may change based on different factors or conditions. For our experiment, we only want to have **one variable**. Ideally, all other factors will be constant so that we can conclude based on the evidence (use what we observe to come up with a final thought) what caused the difference!

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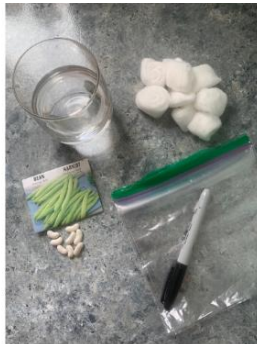
Preparing Your Seeds

Supplies Needed

- 1 type of dried bean seed (We used garden beans but in theory, dried cooking beans/peas/lentils should work the same!)
- Water
- Plastic Baggie
- Cotton Balls or Cotton Pad or Paper Towel
- String or yarn

Directions:

1. Pick your VARIABLES and CONSTANTS. *See suggestions below*
2. Select 2 beans for each living environment
3. Wet the cotton balls/cotton pad/paper towel until it is very wet and wring out the excess water
4. Place the beans on the wet material and cover it with another wet cotton ball or by wrapping the wet cotton pad/ paper towel
5. Put the cotton wrapped seeds in labelled plastic bags and put them in their environments.
6. Check back and mark your observations daily in the “Experiment Observation Chart”



Supplies



Wet cotton and wring out excess water



Place 2 beans on wet cotton



Add another wet cotton ball to cover beans



Place cotton in plastic bags and put them in their environments

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Suggestion – Constants vs Variables

- We suggest starting with 1 type of cotton ball/pad/paper towel and changing the environment where you keep the bag. This way your bag contents stays the same and the only difference is the place you are storing it!
- The seed, bag and content on the CONSTANTS, the place you are storing the bag is the VARIABLE. If we use the same type of seed and bag, where we store the seedling (in theory) is the only factor that causes a difference.
- For our variables, we have selected the following environments:
 1. Necklace – to be worn around the neck or in our pocket during the day
 2. North Facing Window – it gets no direct sunlight, but some non-direct
 3. South Facing Window – it gets A LOT of direct sunlight
 4. Closed Cupboard – in a cupboard not opened often to try to get very little sunlight

Experiment Prediction

1. What are your CONSTANTS and what is your VARIABLE?
2. Look up what the germination period (time it takes a seed to sprout) is for your seed type. If it's a garden seed, it could be right on the back of the pack. If not, you can google it! What is the germination period?
3. Which environment do you will with sprout seeds the quickest, and why?
4. Which environment do you think will result in the biggest sprouts and why?
5. Which environment do you think will result in the smallest spouts? Why?

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Experiment Observation Chart

Write down your observations each day. Indicate if you have taken a photo!

Suggestion – Observation Chart

- Take photos each day of your experiment. It is important to keep track of what you are seeing in each photo so make a label that includes: Which Environment and Which Date

Type of Seed:	VARIABLE 1	VARIABLE 2	VARIABLE 3	VARIABLE 4
Day 1				
Day 2				
Day 3				
Day 4				
Day 5				
Day 6				

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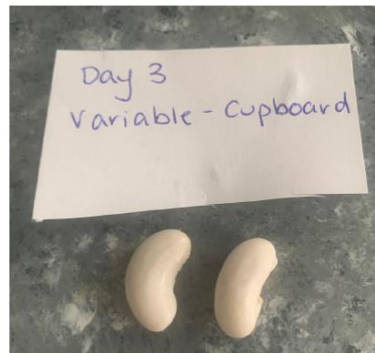
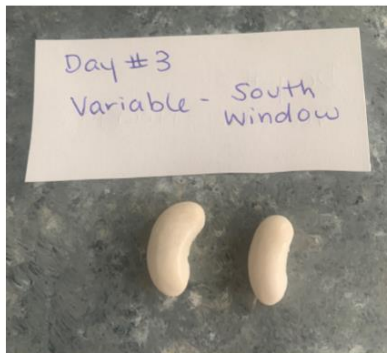
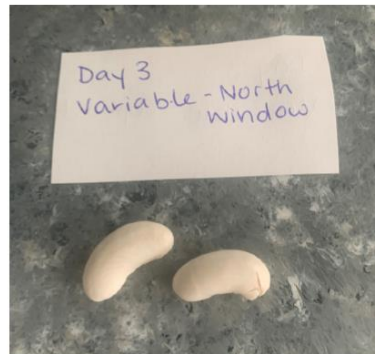
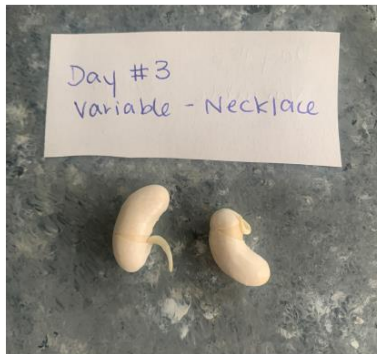
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Example of a filled in Experiment Observation Chart

Type of Seed:	VARIABLE 1	VARIABLE 2	VARIABLE 3	VARIABLE 4
Green Bean for garden (seed looks white)	Necklace	North Window	South Window	Closed Cupboard
Day 1 1:30 pm	-Condensation in the bag -Cotton still wet -Same size	-Condensation in the bag -Cotton still wet -Same size	-Condensation in the bag -Cotton still wet -Same size	- Condensation in the bag -Cotton still wet -Same size
Day 2 1:00 pm	-Condensation in the bag -Cotton still wet -Same size	-Condensation in the bag -Cotton still wet -Same size	-Condensation in the bag -Cotton still wet -Same size	-Condensation in the bag -Cotton still wet -Same size
Day 3 11:30 am	-Condensation in bag -Cotton slightly dry -Larger in size - 1 cm sprout emerged	-Condensation in bag -Cotton still wet -Larger in size - one seed is split, no sprout yet	- Condensation in the bag - Cotton still wet - Larger in size - No sprout yet	- Condensation in the bag - Cotton still wet - Larger in size - No sprout yet



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Conclusion

1. Which of your samples gave the biggest sprout?
2. Why do you think it grew the biggest? How do you think VARIABLE factor increased its growth?
3. Did that sample also sprout the quickest?
4. If yes, how do you think your VARIABLE factor increased the speed of growth?
5. If no, why do you think the biggest sprout did not grow the quickest?

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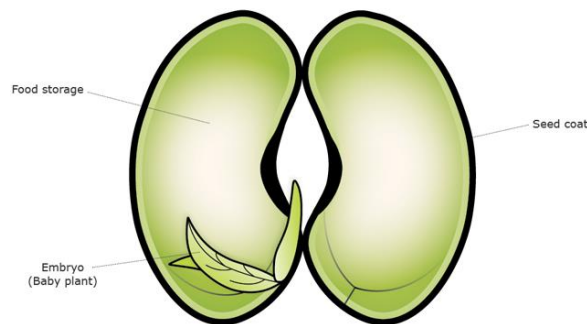
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Complimentary Resources

- What do you do now that you finished?
 - Do the experiment again! This time change your CONSTANT and VARIABLE factors. Here are some suggestions:
 - Use different seeds in each baggie (Variable), but store it in the same environment (Constant), using one type of material to moisten the seed
 - Use different materials to moisten the seed such as paper towel, cotton balls, cotton pads, a rag, (Variable), but store it in the same environment and use the same type of seed
 - Plant your sprouted seeds in some soil in a small container and monitor how they grow into plants. Eventually plant in a garden or larger pot. Plant them with the sprout towards the side. It will eventually sprout into a plant.
 - When your seeds have sprouted, slice them in half and see if you can identify the growing structures. This is called a cross section
 - You should be able to see:



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- The seed coat is the outer layer of the seed. It protects the seed from harm. When dry, it is extremely hard. When seeds are wet (we did that by soaking the cotton pad/ball/paper towel), the seed coat softens, eventually allowing the plant to emerge.
 - The food storage also called endosperm is a carbohydrate rich part of the seed that gives the embryo food to grow
 - The Embryo sometimes called the germ is where the plant begins growing from.
- Additional fun facts
 - The seeds used to grow food are often food themselves! Think of beans, peas, or wheat! These seeds can be eaten on their own (or be turned into food) but also can be planted to create more plants!

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- Pulses (beans, peas, chickpeas and lentils) are excellent for you! Check out some of the cool stats below:



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- Food and Nutrition Literacy's *The Three Sisters: Indigenous Ingenuity in Planting and Nutrition*. Free download at: <https://bit.ly/2zyGu9b>
- Agriculture in the Classroom Manitoba's *Alex's First Seed* storybook. Free download at: <https://bit.ly/2zyGu9b>
- Why not take the learning into the kitchen! After growing your beans or peas, make a delicious and nutritious dinner from Manitoba Pulse and Soybean Growers Association recipe page: <https://www.manitobapulse.ca/recipes/>

Check out our other resources available at:
<https://bit.ly/2zyGu9b>

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