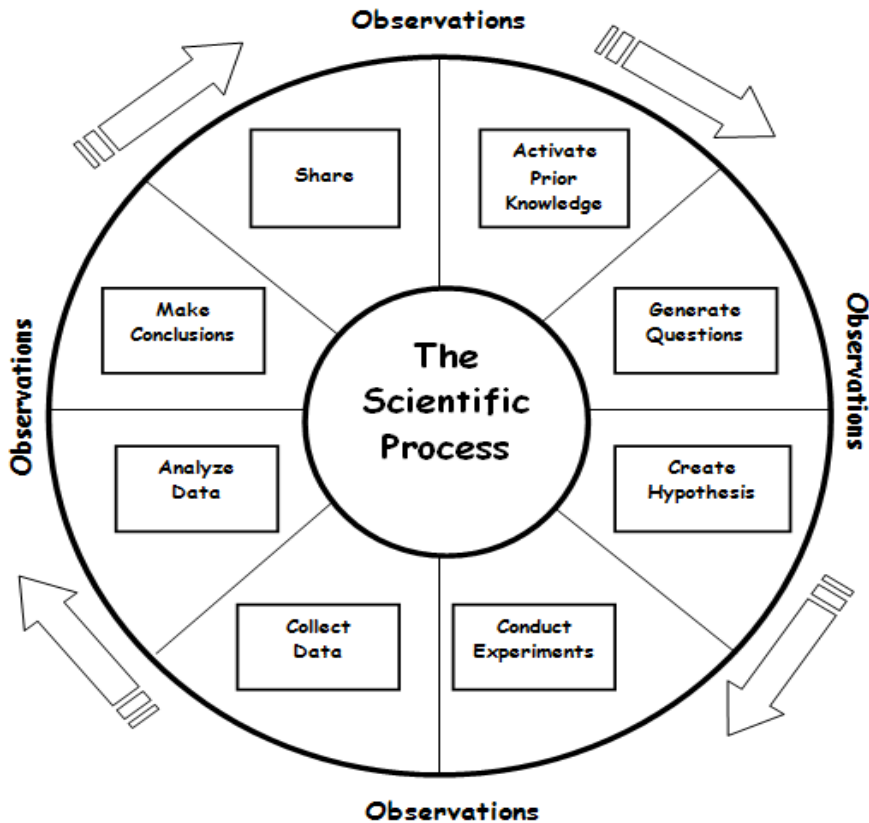


NEEDS OF SEEDS LAB SETUP



THE NEEDS OF SEEDS

All living things have certain needs in order to live and grow. For example, we need certain abiotic factors like oxygen, water, and nutrients such as carbohydrates, protein, and fats. We breathe oxygen from the air and get water and nutrients when we eat. We also need certain temperatures to live and grow even though our bodies can make their own heat by using the energy from food. Luckily we are able to move around and get these things for ourselves everyday so we survive.

Plants are also living things like us that have certain needs to live and grow. Plants are a very diverse group ranging from small moss that carpets our forests to giant Redwood trees. The abiotic factors needed by plants are water, carbon dioxide, and nutrients. They need the same nutrients we do, they just get these chemicals from the soil. Plants also need the right temperature and light to survive.

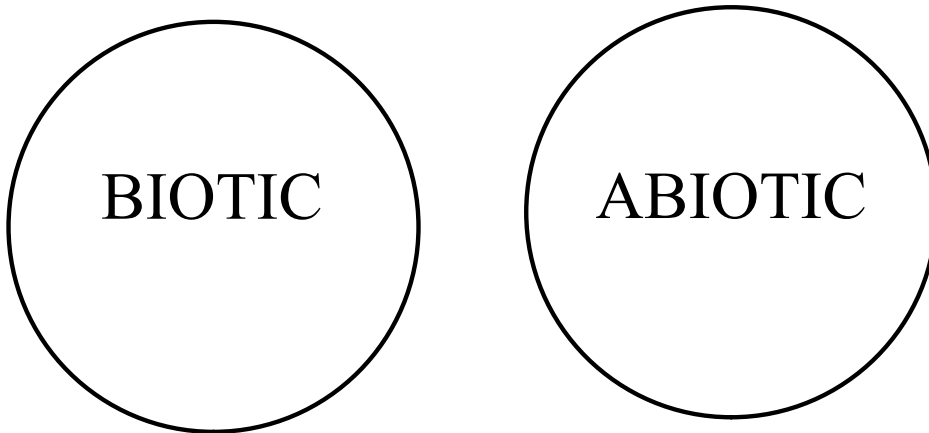
If a plant is getting all of its needs met it will produce seeds. Seeds are actually a baby plant inside of a protective seed coat. The seed will hopefully fall in soil where it gets the right amount of water, carbon dioxide, nutrients, warmth, and sunlight. When the baby plant gets these things, it will begin to push its roots and leaves out of the seed coat. This process of the baby plant sprouting is called germination. As long as the plant gets the abiotic factors it needs it will continue to grow and develop.

You are going to design, conduct, and communicate the results of a scientific investigation about these Needs of Seeds. All seeds need many things to sprout, but one thing is the most important. **Which abiotic factor is most important for seeds to germinate?**



Bio = life; living

A = away; not



BIOTIC FACTORS

Biotic, meaning of or related to life, are living factors.

Disease, food availability, predation, competition, human interactions are all BIOTIC factors

ABIOTIC FACTORS

Abiotic, meaning not alive, are nonliving factors that affect living organisms. Environmental factors like habitat, weather, earthquakes, floods are ABIOTIC factors.

NEEDS OF SEEDS LAB SETUP

BIOTIC	ABIOTIC
seeds	H ₂ O
	Soil
plant	CO ₂
	Sunlight
	temperature

STUFF I HAVE FOR EXPERIMENTATION

soil
cotton balls
pipettes
water
egg cartons
cups
seeds
greenhouse
grow lamps
boxes
aluminum foil

spoons
balance
tape
thermometer
rulers
sharpie
refrigerator
sand
forceps
ziplocs
saran wrap

NEEDS OF SEEDS LAB SETUP

Results:

DAY	DATE	OBSERVATIONS
1	10/9	
2	10/10	
3	10/11	
4	10/12	NO SCHOOL - no observation
5	10/13	NO SCHOOL - no observation
6	10/14	
7	10/15	
8	10/16	
9	10/17	No School NO OBS...
10	10/18	No School NO OBS...
11	10/19	"
12	10/20	"
13	10/21	

	PERIOD 2	PERIOD 3	PERIOD 4	PERIOD 5	PERIOD 7
<u>WATER</u>	90%+ zero w/o H ₂ O	83% w/H ₂ O 0% w/no H ₂ O	78% w/H ₂ O 0% w/no H ₂ O	90% 0% w/no H ₂ O	90% 0% No H ₂ O
SOIL (food)	4/4 1/3 grew 2/3	73% w/9 soil 86% w/soil	Sand some rather w/s soil w/s		cotton + soil + sand (not so good)
COLD TEMP		2/3 grew	100% warm grew 16% no grew	warm + cold +	
SUNLIGHT	3/3 - no sun 0/3 - sun	3/3 grew spindly 2/3		w/sun + w/sun + spindly	w/sun + w/sun + sickly
CO ₂		80%! grew.	100% w/no CO ₂ 67% w/CO ₂	no CO ₂ + 2/3 w/CO ₂	
Germination Rate	93%	(100%) 83%	87%	90+%	+ 96%

NEEDS OF SEEDS LAB SETUP

	FINAL RESULTS
WATER	with H ₂ O- more than 85% grew without H ₂ O- NONE grew
SOIL	growth in all: best soil, next cotton, next sand
COLD TEMP	warmer grew better / cold still grew
SUNLIGHT	no sun sprouted 1 st ; all grew sun or no sun (grew spindly)
CO ₂	seeds w/o CO ₂ - grew great! also -didn't need much H ₂ O...
Germination Rate	90% of seeds overall grew

NEEDS OF SEEDS ANALYSIS QUESTIONS

- 1) Based on our class results from the lab what is the **most important** NEED of seeds to germinate? Explain your reasoning.
- 2) Would the needs be different for a plant to grow to maturity? Explain how.
- 3) Explain and discuss the results for each variable we tested: water, soil (nutrients), CO₂, temperature, and light.
- 4) Explain why you planted two cups (one with an experimental variable and one without). Explain why we collected all of the classes' data to analyze (not just use our own individual results).
food →
- 5) What flaws were there in our lab design? (what should we have done differently in our lab and how did these flaws affect our results...)
- 6) What new question might you ask based on the results of this lab?