Plants A Way To Grow

Gregory Grambo
The Louis Armstrong Middle School
32-02 Junction Blvd., East Elmhurst, NY 11369
(718) 335-7500
www.armstrong227q.com

Plants A Way to Grow

We take plants for granted and do not really notice how they grow and develop. In this project we cut up, bend and manipulate plants to watch what happens to them as we force changes.

Project A – Plants Have Leaves

In this project we remove leaves from one plant and compare its growth pattern to a similar plant with leaves over a two week period. In this section we also grind up leaves, remove the pigment and find out about the coloring through a process called chromatography.

Project B – Phototropism

Plants bend towards light and need light to grow. In this section, students experiment with phototropism, having plants bend through a maze to follow light.

Project C – Color Of Light

Will plants grow better with white, red or blue light. Over a three week period, students will experiment, collect data and graph the growth of plants placed under different color lights.

Project D – Roots

Over a two week period, students will draw detailed images of the roots of growing plants that they started from seed.

Project E – Food Transportation

This experiment takes two days. Plants pull liquids upward against the forces of gravity to bring water up to the leaves and flowers at the top of the plant. Using celery (or carnations) we see how capillary

action pulls color liquid up into the plant and into the leaves and flowers.

Project F – Transpiration – How Plants Breathe

After a bag is put over a plant, the bag will begin to fog up. The plant gives off water as vapor which will fog up the bag. This process is called transpiration. Plants take in Carbon Dioxide and give off Oxygen.

Project G – Carrying Capacity

How many can fit into one area? Can 100 people fit into your school elevator? Why or why not? In this experiment we try growing few and many seeds in cups. Will too many seeds in a cup stop the plants from growing?

These projects/experiments all need to be started and worked on at the same time. You need to work on all parts simultaneously. You do not start Project B when you finish Project A. You need to do this because each section requires a few minutes for observations and note taking, however, plants take a long time to grow and you do not want to wait between projects, it will take too long to complete this unit.

These pages include labels for plants and planting instructions.

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plants: a way to grow

name _____ class _____

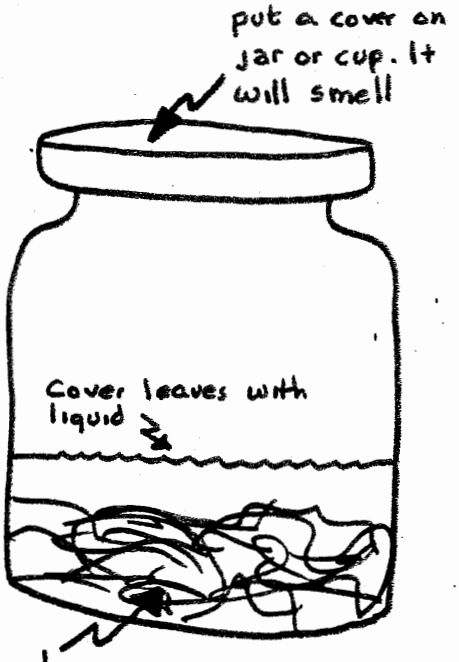
why do plants have leaves? A

1. Take a few leaves from a tree, plant or spinach leaves from a grocer. Rip them up and soak them in nail polish remover or alcohol for a few days.

Date started _____

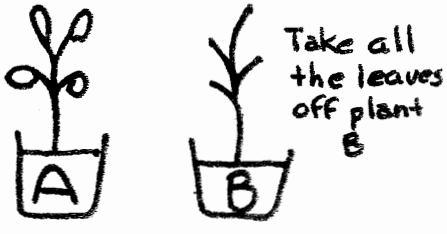
Date finished _____

Alcohol ☐ nail polish remover ☐



2. Take two (2) plants from part II of the planting instructions.

Do This:

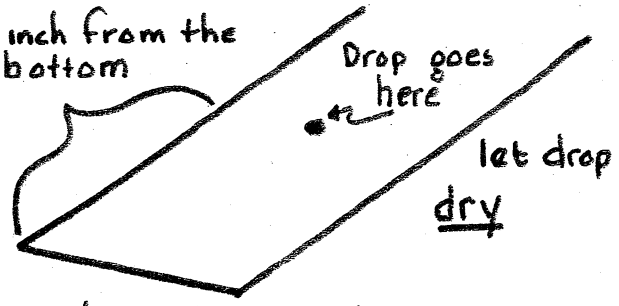


Mark them and **Date** them. Water them 2-3 times per week

3. Keep a record of what happens

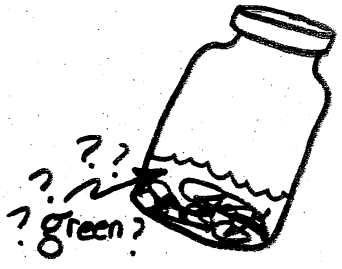
	A	B
date started		
observations after 1 day		
after 3 days		
after 7 days		
after 14 days		

4. Place a drop of liquid from step one (1) of this experiment on blotter paper or on strips of paper towel



How does the liquid look to you?

5. Why is the liquid green



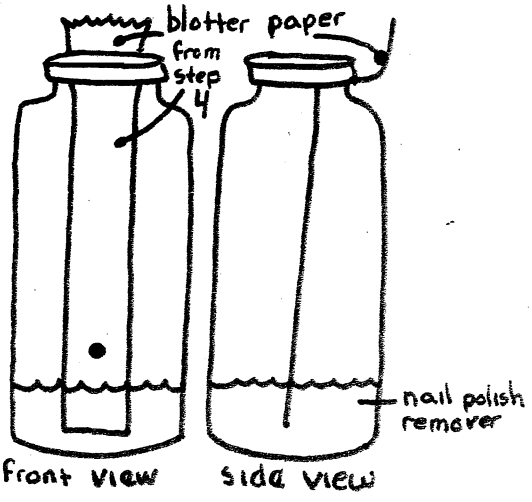
6. How do the leaves look?

7. Why did their color fade out?

Pour out the remaining liquid and leaves

this is called chromatography

8. set this up



A- Place paper in a jar so that it hangs

B- Put alcohol on nail polish remover in the bottom of the jar so that it touches the paper.

Describe what happens in one (1) hour?

the colors are the pigments and chemicals that are found in the leaves.

plants: a way to grow

why do plants have leaves?

A

One pigment is called chlorophyll. It has a green color. Through a process called photosynthesis, a green plant takes light, water, air and some nutrients from the soil and turn them into food, all with a little help from chlorophyll.

9 How were the plants in this experiment affected when you removed its leaves?

10 How do leaves HELP a plant?

11 What can a green plant do that no other living thing can do?

extra credit report

check if you do report ☐

look up chlorophyll and explain how green plants use it to make food.

Staple report to back

Plants: a way to grow

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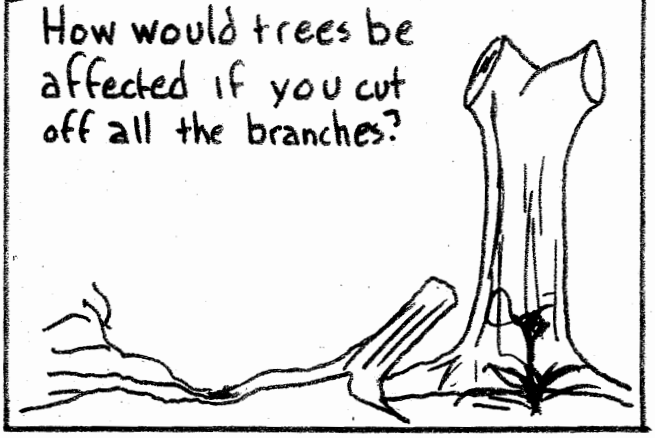
name _____ class _____

why do plants need light?

B

1. Why do plants need their leaves?

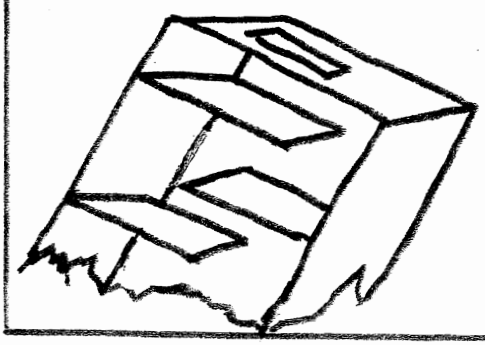
2. How would trees be affected if you cut off all the branches?



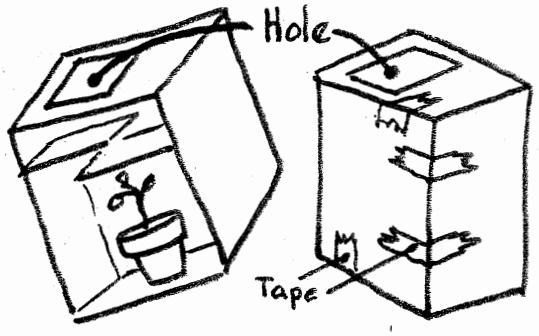
3. Why must you be very careful not to cut too many branches off trees and plants?

4. Why do they tar over the area where a branch was cut off a tree?

5. Take out the box you made in class that looks like this.



6. Put a plant from part one (1) of the planting instructions inside the box and <u>seal</u> the box closed



Date Started _____

7. How can light get into the box?

It should only get in through the top left hand side. <u>Seal</u> <u>all</u> <u>other</u> <u>openings</u>.

8. Look at your plant every day for <u>10</u> <u>days</u>

Data you began this part

1 (put in dates)		6	
2		7	
3		8	
4		9	
5		10	

9. What happened to the plant?

This is why trees bend to the sunlight.

10. Why did the plant do this?

plants: a way to grow

name _____ class _____

colored light

C

1) Why do plants need light?

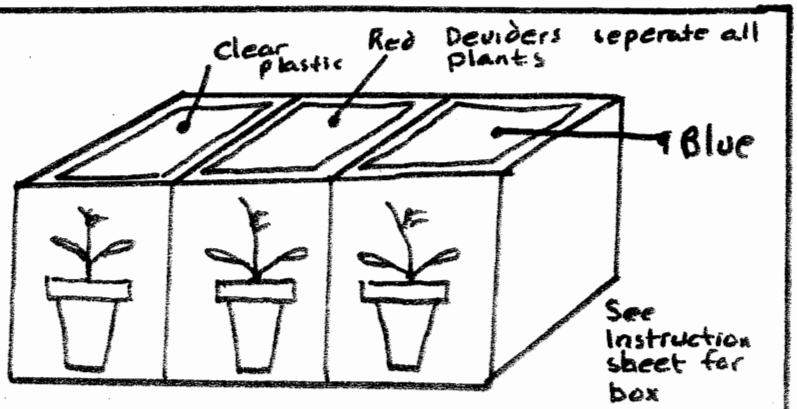
2) Place ONE(1) of the plants from part 2 of the planting instructions into a dark closet. Water it but do not give it any light.

3) How does the plant in the closet compare to the ones in the sunlight?

4) Why do you think this is happening to the plant in the closet?

5) Set this up

Water them regularly



6

check plants on days indicated

give height, color and appearence of plants

date started / /	clear	red	blue
date started			
after 7 days			
after 10 days			
after 15 days			
after 20 days			

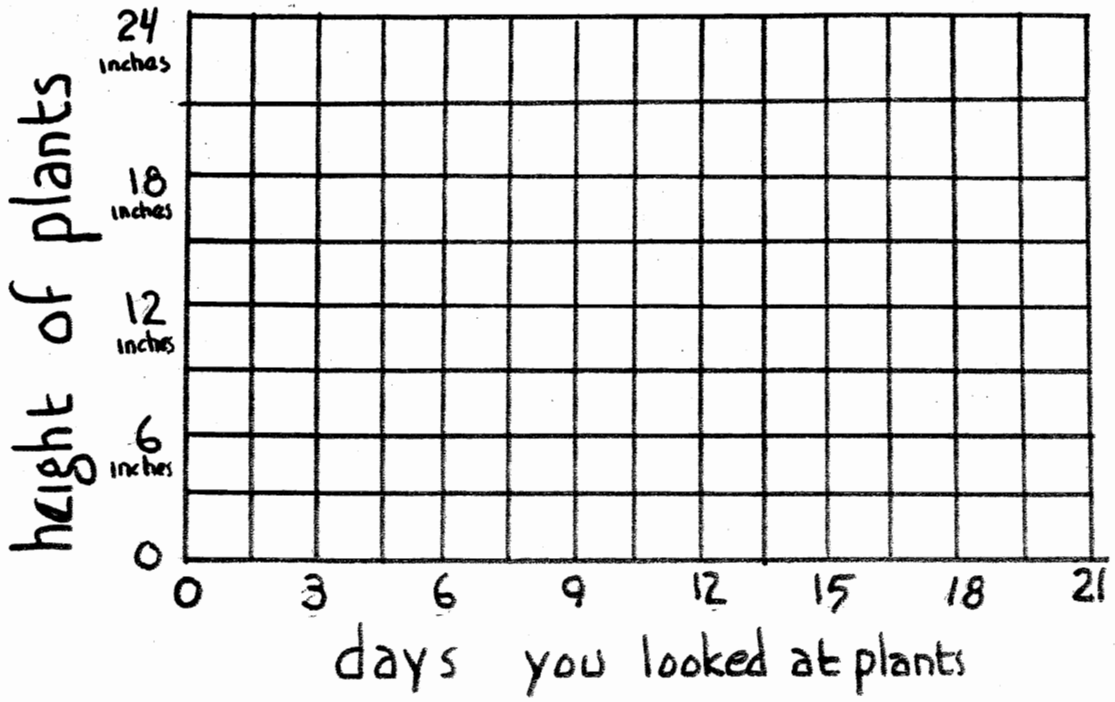
7

graph results

growth rate

uses these colors

red = red line or bar
blue = blue line or bar
clear = black line or bar



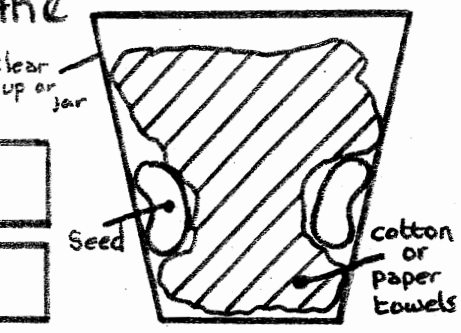
Plants: a way to grow

name _____ class _____

D

roots and the developing seed

Use when you begin part 3 of the planting instructions.



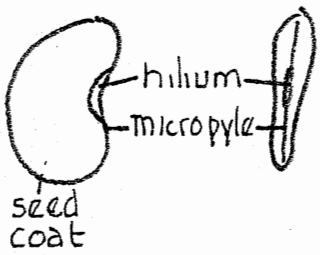
date you planted seeds _____

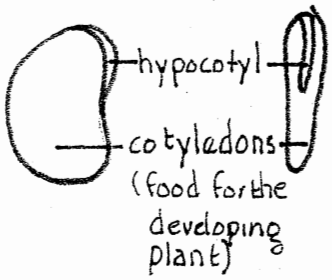
date seeds sprouted _____

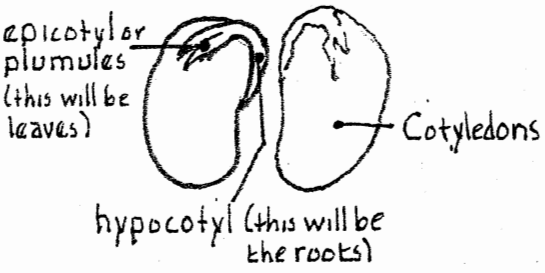
Draw detailed pictures of one of these plants after:

2 days	5 days
10 days	14 days

Structure of a growing seed







Describe	Draw
What do the roots look like?	
How does the seed open up?	
How do the leaves get out of the seed?	
What direction do the leaves and roots go in?	

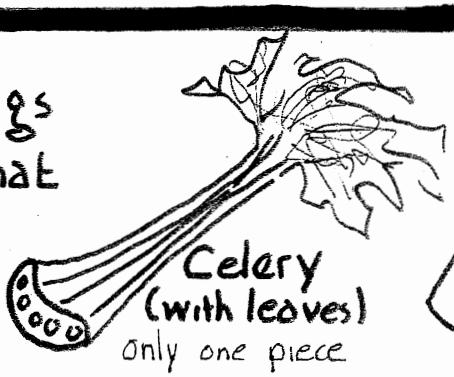
plants: a way to grow

name _____ class _____

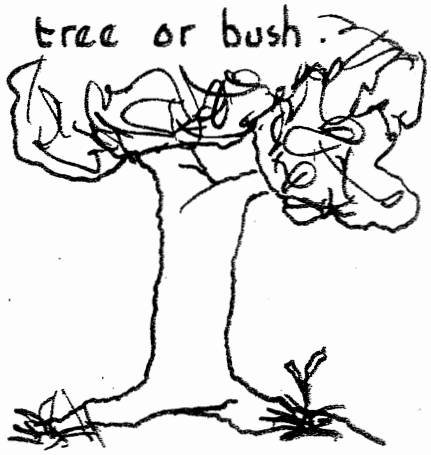
how do plants transport food?

W

You will need 2 things for this experiment that you may have to buy in the grocery store



1 look outside at a tree or bush.



How does water get from the roots up to the leaves?

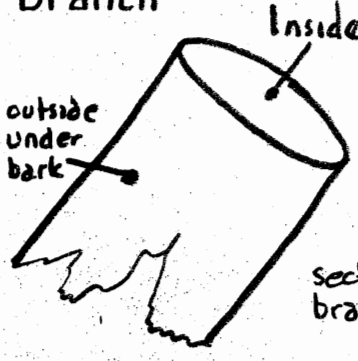
2 Take a small branch from a tree.

Peel off the bark

How does the wood under the bark feel?

3

Peeled tree branch



Section of a branch with bark removed

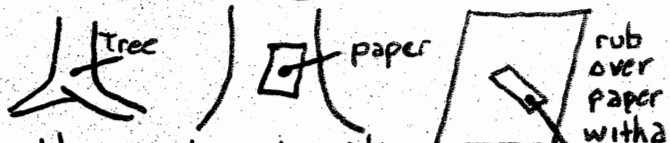
Show with arrows which part feels wet.

4

How does bark HELP a tree?

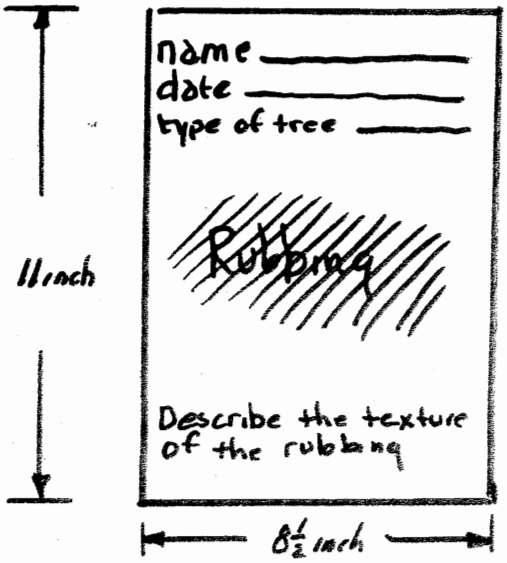
5

make rubbings of tree bark



this is how to make a rubbing

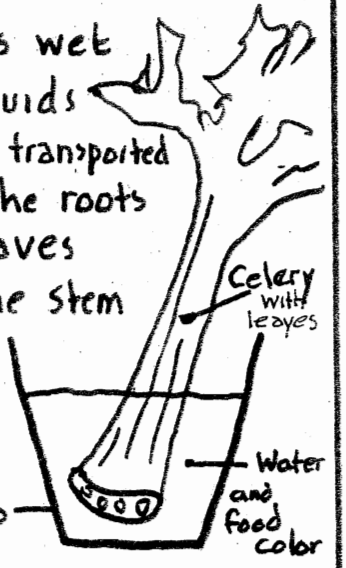
make rubbings from 5 different kinds of trees. label the rubbings and staple them to this experiment.



Use 8½ inch X 11 inch paper

6

The tree is wet because liquids are being transported up from the roots to the leaves through the stem or trunk



Set This Up

Time	What Happens?
started	
after 30 min	
after 2 hrs	
overnight	

7

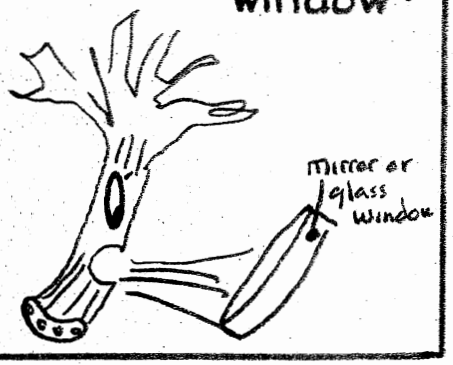
Why do the celery leaves turn color?

Plants: a way to grow

name _____ class _____

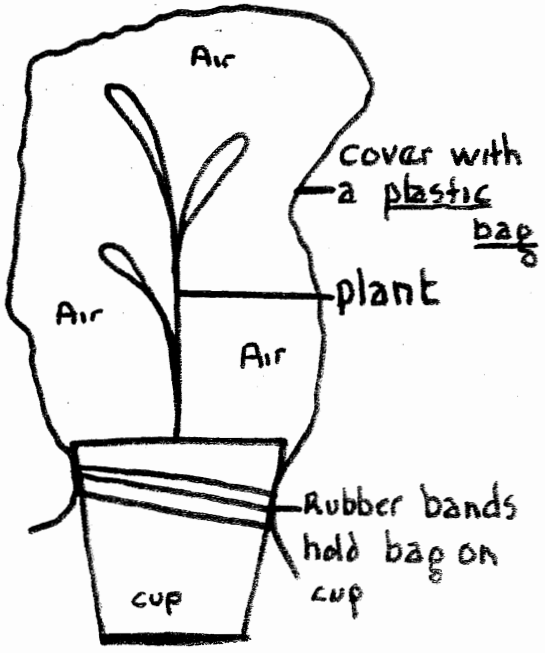
what is transpiration?

1 Breath out onto a mirror or glass window.



2 Why does the mirror or glass FOG up?

3 Take a plant from part 2 of the planting instructions. Set up as follows



make sure air does not get into the bag.

Date started _____

What happens:

after a few hours:

after a few days:

4) Why does the plastic bag fog up?

The mirror fogged up because there was water vapor in our exhaled air (breath out). This process is called respiration. Through another process called transpiration, plants give off excess or unused water through their leaves.

Look up transpiration and write a paragraph about how it works

Plants: a way to grow

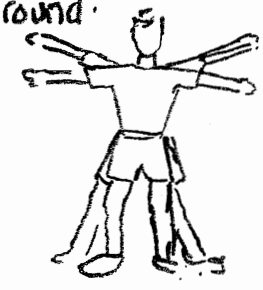
name _____ class _____

carrying capacity of plants (being over crowded)

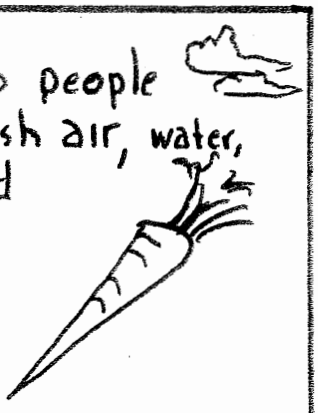
1. How many people would fit comfortably in this room?

2. How come 100 people could not live in this room forever?

3. Why do people need room to move around?

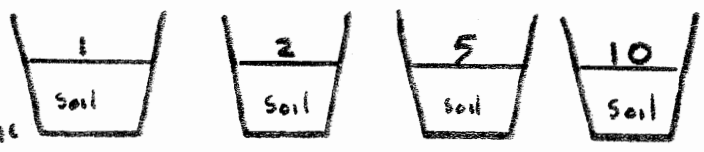


4. Why do people need fresh air, water, and food



In some countries, such as China, overcrowding has become a major problem. You may wish to do an <u>extra credit</u> report on this problem and how the Chinese people are handling this problem.

5. Take a look at the plants you set up in part 4 of the planting instructions



6. Tell how the plants are doing.

7. Which are doing best?

Why?

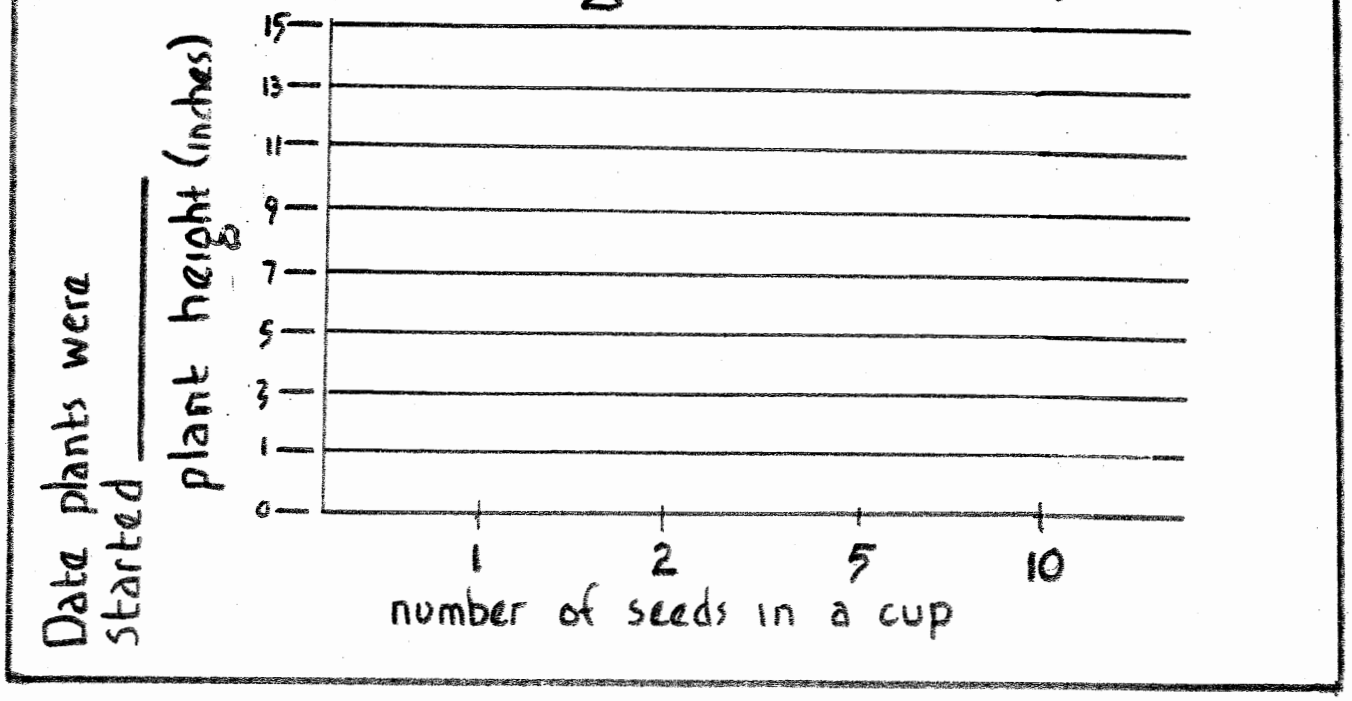
8. Which are doing worse?

Why?

9. How does the number of seeds in an area affect the height and health ness of the plants in that area?

Finish this Graph

10. Overall Plant Height (use crayons)



name _____ class _____

Plants: a way to grow

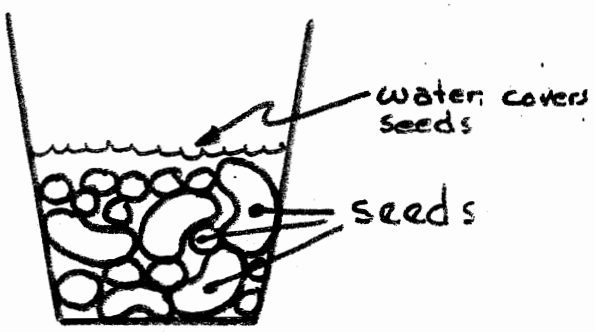
planting instructions

Part I- (one)
To Begin

Place seeds into a cup. Put water into the cup of seeds until all seeds are covered with water

this allows dry seeds to absorb water

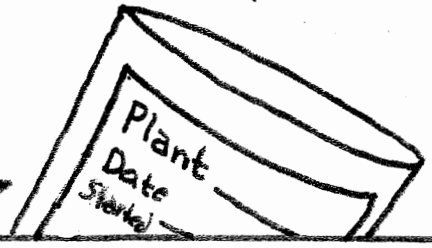
Let seeds soak 10 hours



Part II- (two)
Now set up the following

Set up 10 of these.

Mark all cups with name of plant and date →

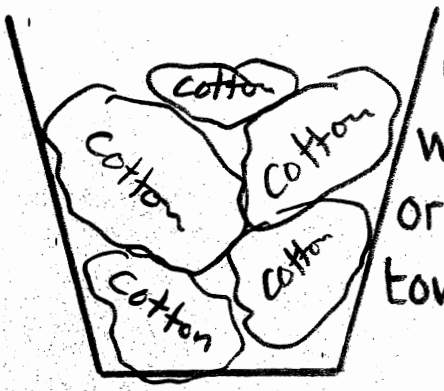


If you can, punch holes in the bottom of all cups. This allows unused water to leave the cup.

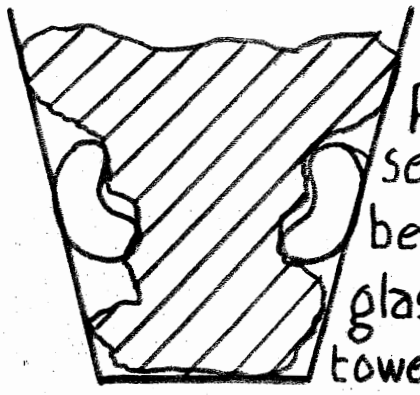
Part III - (three)

Next — Set up then water

Use clear glasses or cups [so you can see inside]



Fill a cup with cotton or paper towels



place seeds between glass and towels

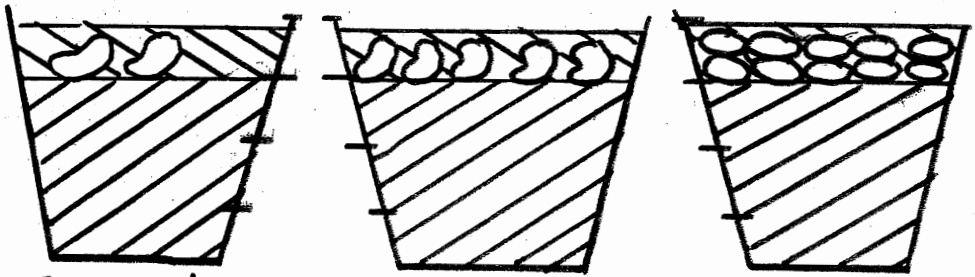
Set up 3 of these

Jars work well

Part IV - (four)

Then

Use soil, seeds and cups

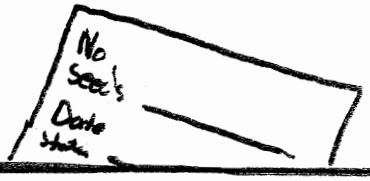


2 seeds

5 seeds

10 seeds

Label and date all cups



Water all cups. Put something under them to catch the water.

When plants sprout (poke out of the soil) Put plants into sunlight and water 2 times a week

plants: a way to grow labels

cut out labels and tape onto cups

plant _____
date started _____

Seeds in soil
one seed per cup

part 2

plant _____
date started _____

plant _____
date started _____

plant _____
date started _____

plant _____
date started _____

plant _____
date started _____

plant _____
date started _____

Seeds in clear cup

part 3

plant _____
date started _____

plant _____
date started _____

plant _____
date started _____

plant _____
date started _____
number of seeds _____

Overcrowded seeds
in an area

part 4

plant _____
date started _____
number of seeds _____

plant _____
date started _____
number of seeds _____

plant _____
date started _____
number of seeds _____

plants: a way to grow

seeds

Follow planting instructions given to you by your teacher

seed	identification
small green -	mung beans
large green -	pea
large red -	kidney beans
large white -	lima beans

class ☐

name ☐