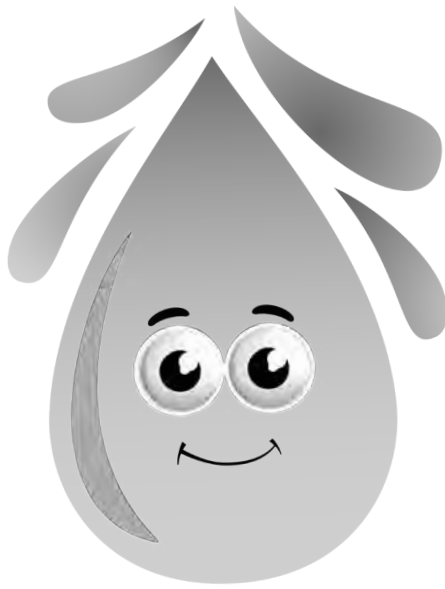


STEM



EXPLORATION



Hi. I'M SPLASHY!

*I'll be your guide to InFARMation
STEM Exploration!*

*Teachers: scan the QR Codes
throughout the book to access
corresponding lesson materials.*

Around the world there are many different kinds of agricultural regions. The Skagit Valley is a very special region in part because it is so far north of the equator - it has more hours of daylight than darkness during the summer. On the longest days of summer, the valley gets over 17 hours of daylight, which plants need. The Skagit Valley is also located near the Pacific Ocean. This large body of water helps keep the Skagit Valley's climate moderate and mild, creating perfect growing conditions for over 80 different agricultural crops.



Because the Skagit Valley is between both the Cascade Mountain range on the east and the Olympic Mountain range on the west, it receives very little rain in the summer, which helps crops stay dry and creates perfect growing conditions for growing seed crops like beets, spinach and cabbage. Did you know that Skagit Valley is the world's single largest supplier of beet and spinach seed and a major grower of seed for cabbage and other brassica crops?

The Skagit Valley is also home to the second largest river in Washington State. Because the river is so large, providing over 30% of the fresh water to Puget Sound, it is able to keep the water table high, so Skagit Valley farmers don't have to irrigate as much as other farmers do.

PART 1

WHERE DOES WATER COME FROM?

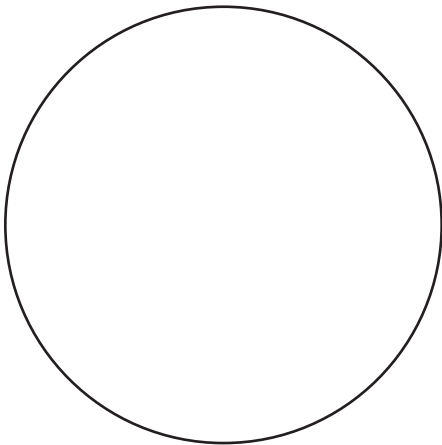


Draw the particles in the circle to represent each of the three states of water.



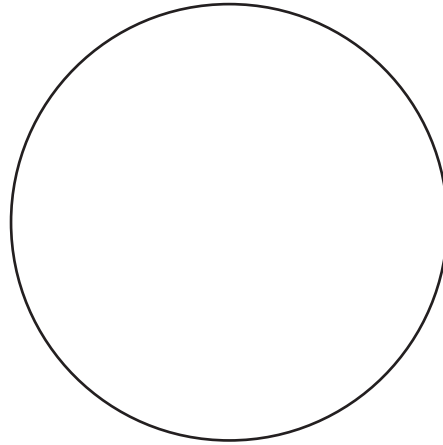
Scan here for lesson slide deck.

SOLID



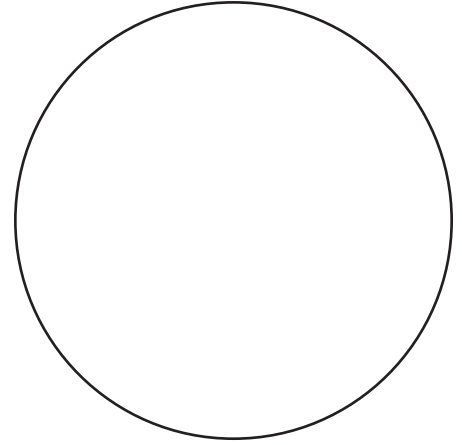
Particles are tightly together and don't move much at all.

LIQUID



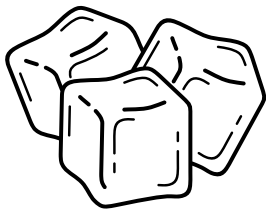
Particles are close together and move a little.

GAS



Particles are very far apart and move all around.

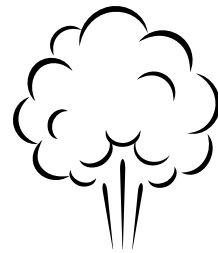
Can you identify other solids, liquids and gases? Draw or write examples of each in the space provided below.



Retains own shape



Takes on shape of container



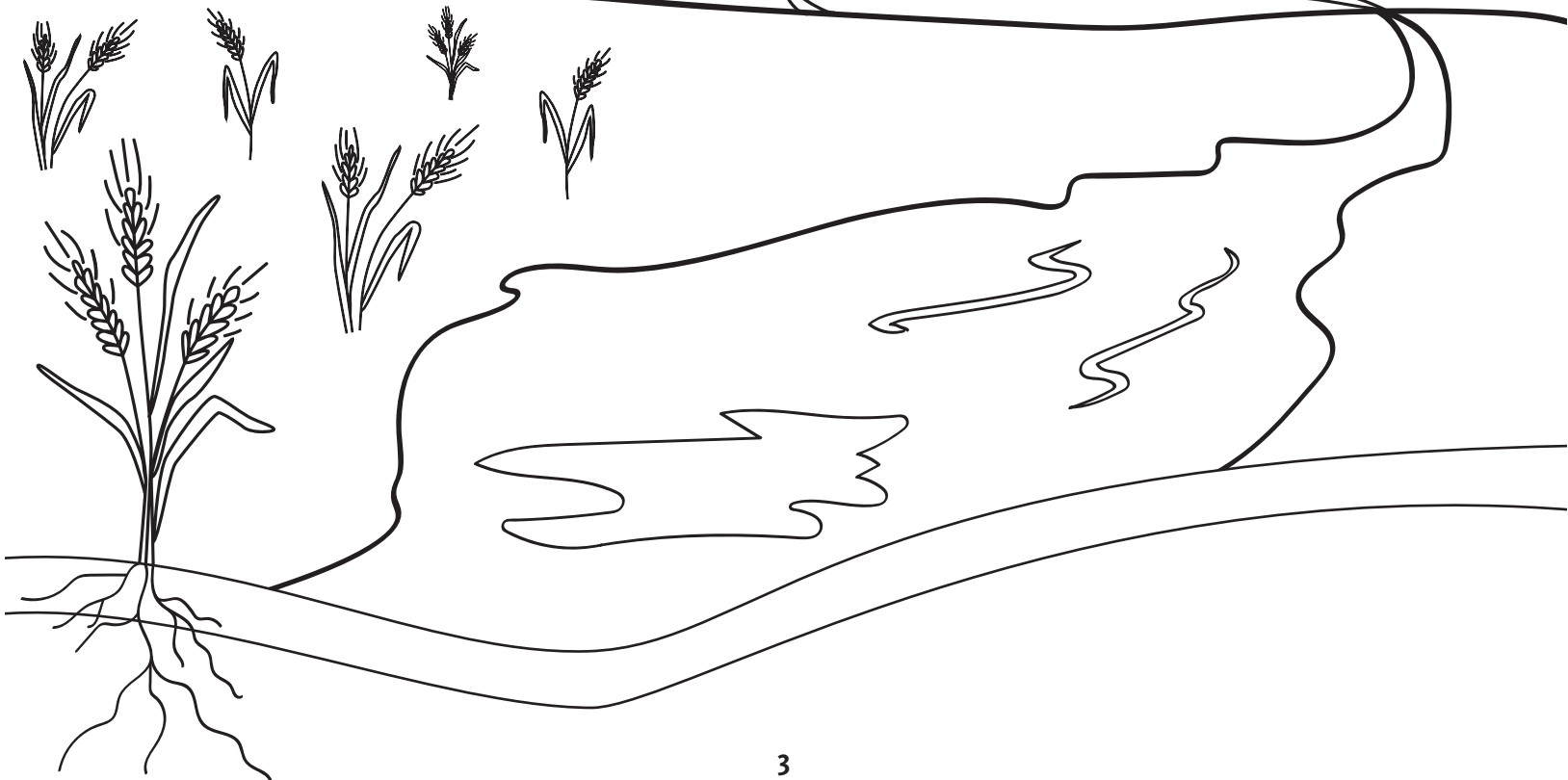
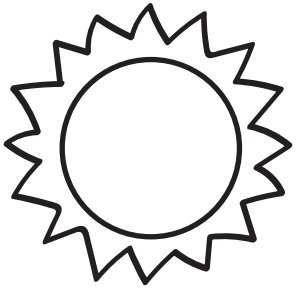
No defined shape



PARTS OF THE WATER CYCLE



*Fill in the blanks to identify the parts of the water cycle.
Draw and label the parts of the water cycle.*



WATER CYCLE IN A BAG

STEM KIT PROJECT #1



Where does rain come from? Test it! Use a zip lock-style bag to make a working model of the water cycle.

Materials

- 1 Plastic zip lock-style bag – STEM Kit
- 1 Permanent marker – Teacher’s Kit
- Blue food coloring – Teacher’s Kit
- 2 Pieces of clear tape – Teacher’s Kit
- 1 Cup of water – STEM Kit



Directions

1. Use the permanent marker to draw clouds and a sun on the upper half of the outside of the bag.
2. Add 1 drop of food coloring to the cup of water and stir.
3. Pour the water into the bag while carefully holding it upright. Seal the bag.
4. Place two long pieces of tape (one on each corner) on the bag, and tape it to a window. If possible, choose a window that receives a high amount of sunlight.
5. Check on the bag throughout the day (or even over several days) and observe the changes.

Describe what happened in the bag.

BUILD A WATER GAUGE

BONUS ACTIVITY



How much rain falls in a day, a week, or a month? Test it!

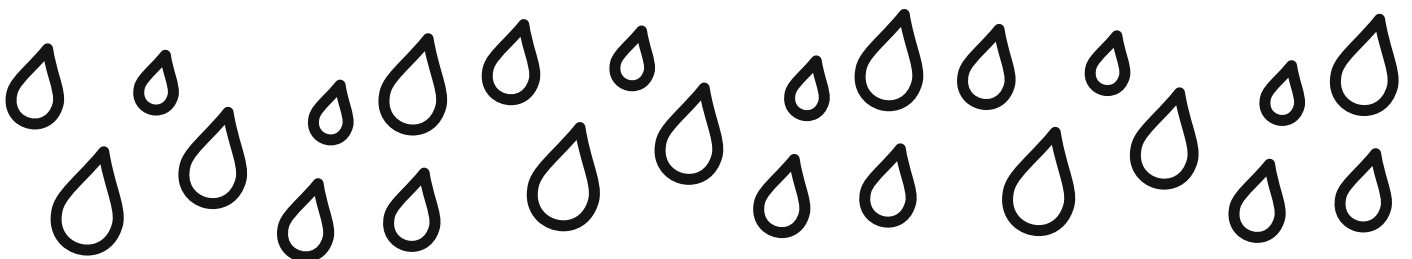
Adult supervision required – sharp objects utilized in one step.

Materials

- 1 Clear 1- or 2-liter plastic bottle (label and cap removed)
- Rocks or marbles
- Scissors
- Permanent marker
- Masking, duct, or painter's tape
- Ruler

Directions

1. Have **AN ADULT** carefully cut the top off the bottle, starting where the bottle starts to narrow toward the cap. ***Handle with care as the edge may be sharp!***
2. Place some rocks or marbles in the bottom of the bottle to weigh it down when it is outside.
3. Place the top upside down inside the bottle and have **AN ADULT** help you cover the edges with tape.
4. Pour a small amount of water into the bottle, until it just covers the top of the stones or marbles.
5. Hold a ruler to the side of your gauge, ***making sure that the zero point lines up with the top of the water.*** You have just calibrated your gauge to measure all rainfall beginning at the top of the water (versus at the bottom of the bottle).
6. Use a permanent marker to make a mark every 1/2 centimeter from zero (the top of the water) to the bottom of the funnel. Draw a line at every full centimeter and a dot at every half-centimeter.
7. Place your gauge in a secure location outside with no overhead obstructions, and where it is not likely to be disturbed.



PART 2

HOW DO FARMERS MOVE WATER?



Scan here for lesson
slide deck.

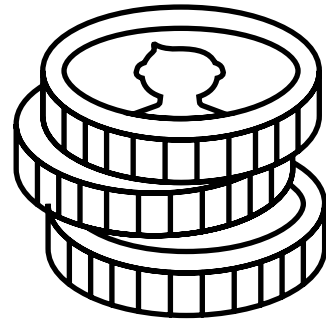
SURFACE TENSION - STEM KIT PROJECT #2



How many drops of water can fit on the front of a penny without spilling off the sides? Test it!

Materials

- 1 Eye dropper – STEM Kit
- 1 Penny– STEM Kit
- 1 Liquid dish soap – Teacher’s Kit
- 1 Cup of water – STEM Kit



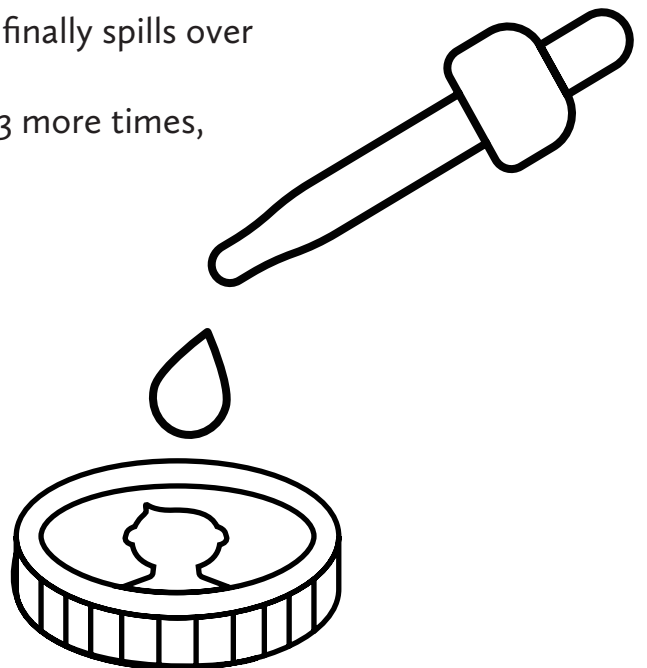
Directions

1. Place your penny on a flat surface.
2. Add a tablespoon of dish soap to your glass of water. Stir gently, but don’t make too many bubbles.
3. Fill the eye dropper with soapy water from the cup.
4. Hold the dropper directly above the penny (not touching it), and add one drop of water at a time.
5. Count each drop, and keep adding drops until it finally spills over the edge.
6. Completely dry the penny and do the process 2-3 more times, recording your results after each time below.

Result 1 _____

Result 2 _____

Result 3 _____



ANCIENT ENGINEERING

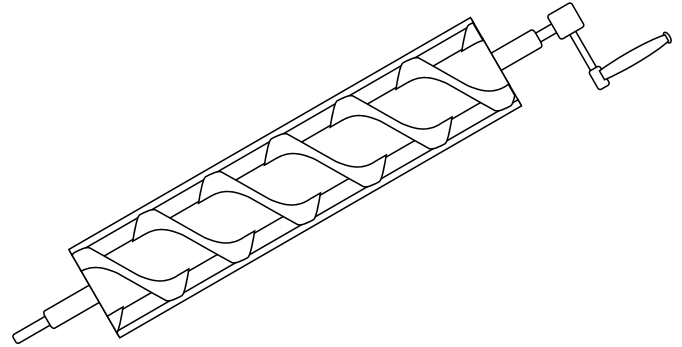
STEM KIT PROJECT #3



*How do farmers lift water from one location to another?
Test it! Build an Archimedes Screw.*

Materials

- 1 PVC pipe - STEM Kit
- 1 Clear vinyl tubing – STEM Kit
- 2 Pieces of waterproof tape – Teacher’s Kit
- Scissors
- 2 Containers for water – STEM Kit
- Something to elevate one of the containers
- Food coloring – Teacher’s Kit



Directions

1. Attach one end of the vinyl tubing to one end of the PVC pipe with one piece of tape.
2. Tightly wrap the tubing around the pipe in a spiral and attach the tubing to the other end of the pipe with the second piece of tape. Use scissors to cut off any extra tubing.
3. Fill one of your containers with water and add a drop of food coloring.
4. Elevate the second (empty) container so it is higher than the first container.
5. Place one end of your Archimedes screw in the lower container of water, and align the other end over the upper container.
6. Rotate the screw so the bottom end of the tubing “scoops” water with each rotation. It should go underwater and then come back above the surface with each revolution, not remain completely submerged the entire time. If you do not see your tubing start to fill with water after a few rotations, you might be spinning the screw the wrong way.
7. Keep spinning and watch as the water moves up into the higher container!

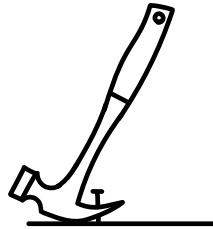
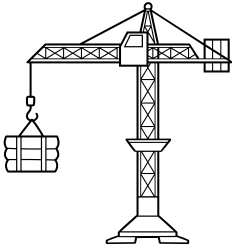
What do you observe happening to the screw?

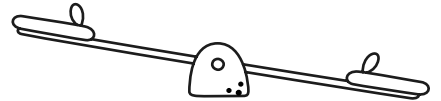
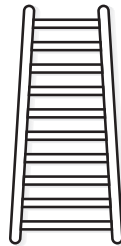
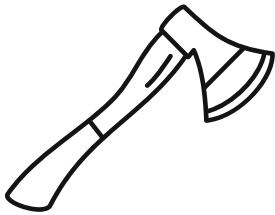
What else could farmers use the Archimedes Screw to move?

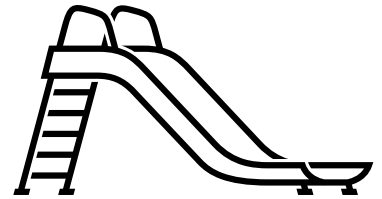
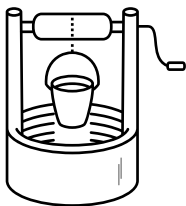


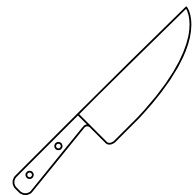
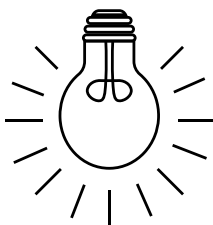
SIMPLE MACHINES GAME

Can you identify these examples of simple machines? In the blank below each picture write which of the following simple machines it is: pulley, lever, wheel and axle, wedge, inclined plane, or screw.









PART 3

HOW DO PLANTS AND ANIMALS USE WATER?

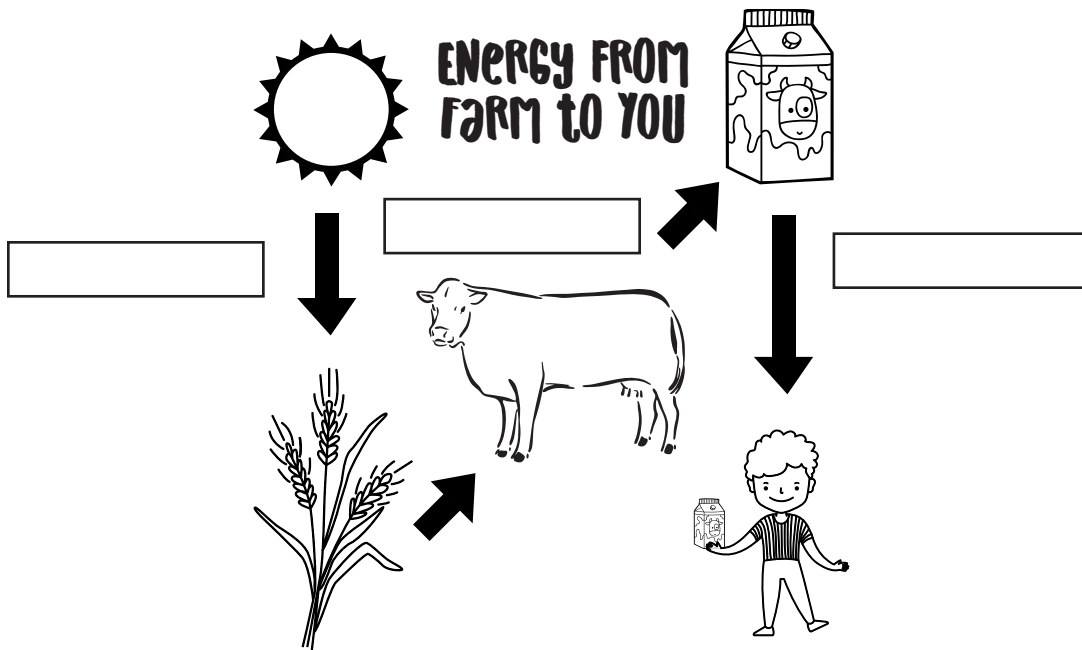
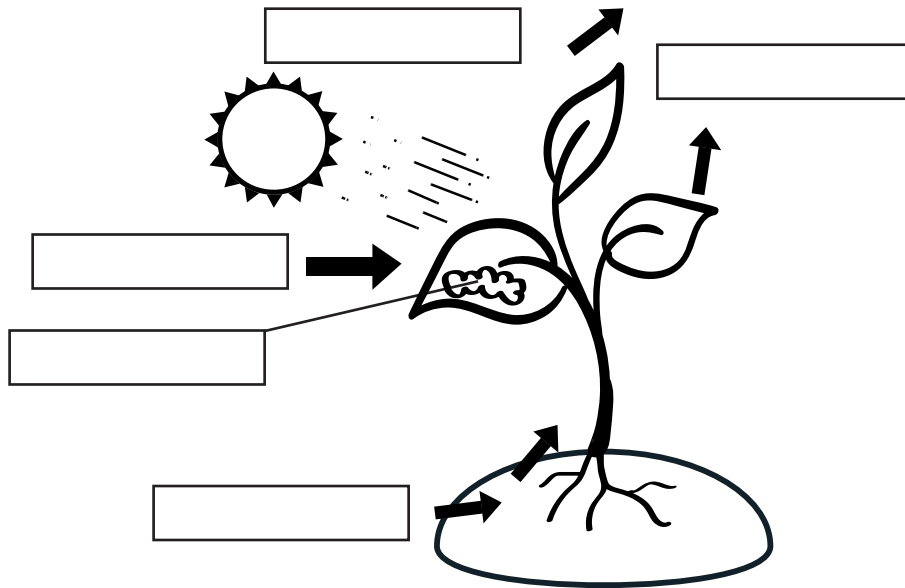


Scan here for lesson slide deck.



TURNING ENERGY INTO OUR FOOD

How do plants and animals turn the sun (energy), with the help of water, into our food? Identify the parts of the plant and animal energy cycles below.

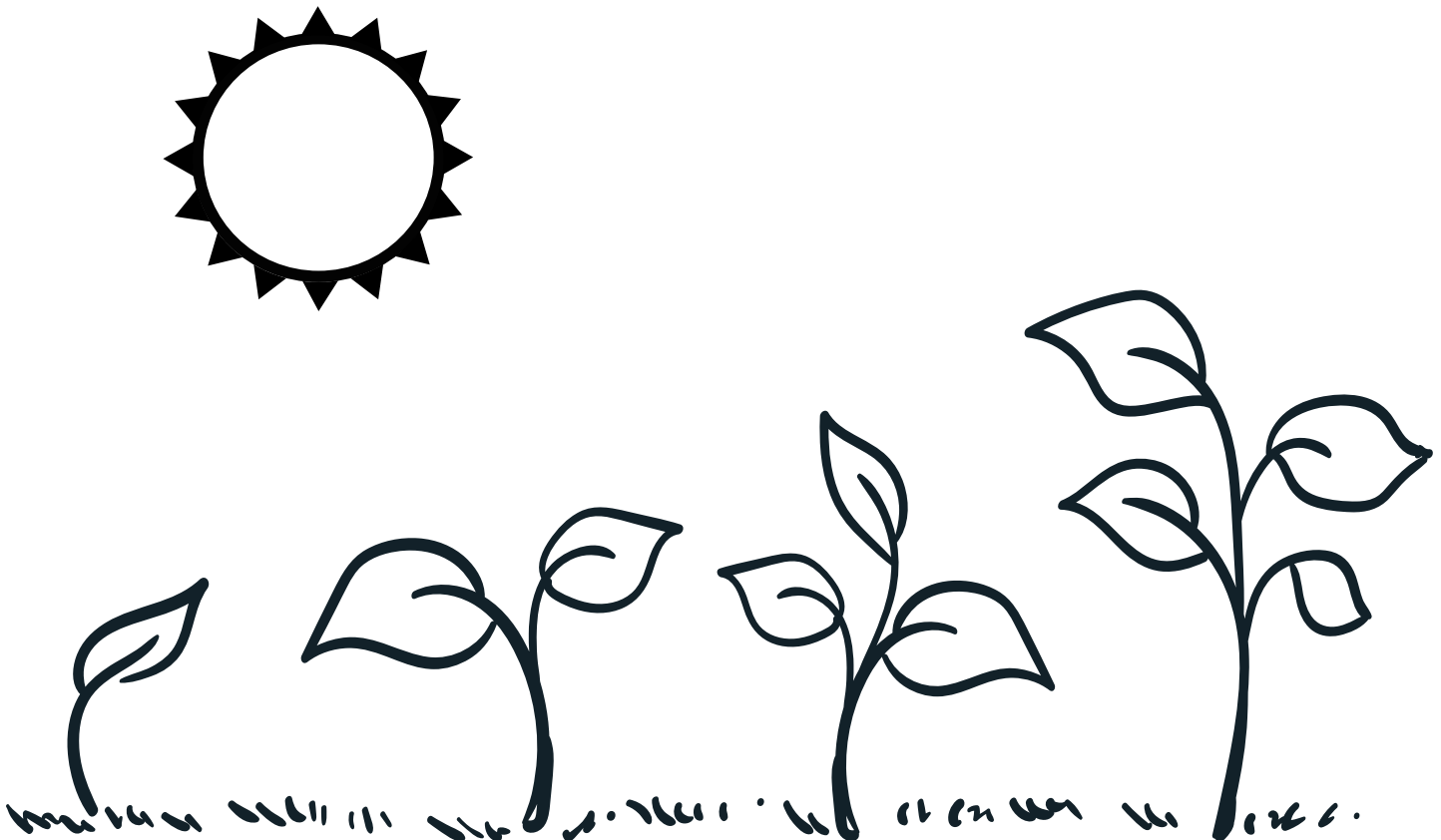




Fill in the blanks to complete the explanation of the two processes.

Plants absorb _____ in the form of _____ through their leaves. The sunlight is used in combination with _____ and _____ to make food in the form of _____. Then plants release their waste product, _____, through their leaves.

Plants provide us with the _____ we eat. Farmers use _____ from the sun to grow plants to feed us and their livestock. Vegetables, fruits, and grains all come from _____, and even livestock need to eat plants to give us _____ and _____ products.



LET'S GROW A PLANT

STEM KIT PROJECT #4



What do plants need to grow? Test it!



Materials

- 1 Pot – STEM Kit
- 1 Bag of potting soil – STEM Kit
- 3-4 Seeds – STEM Kit

Directions

1. Place some soil in the bottom of the pot. Sprinkle seeds on the soil and put more soil on top of the seeds.
2. Make sure the soil is moist but not too wet. Put your plant some place where it will get sunlight, but not too hot.
3. Check your plant daily and add water as needed to keep the soil moist. Watch as it starts to grow and become a plant. After it has grown leaves and starts to get too big for the pot you can plant it outside. See what type of plant it turns into.
4. Record the story of your plant by drawing its progress in the pots below.

Record the story of your plant by drawing its progress in the pots below.





CAPILLARY ACTION

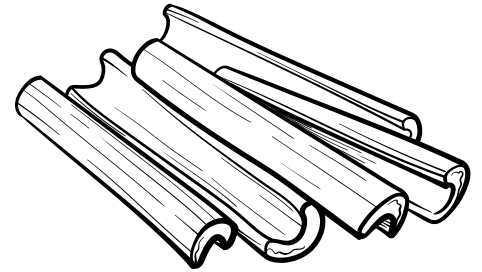
BONUS ACTIVITY

How does water travel from a plant's roots to its leaves? Test it!

Adult supervision required – sharp objects utilized in one step.

Materials

- Clear glass jars, cups or small clear vase
- Celery stalks with leaves - preferably the lighter, center stalks
- Water
- Food coloring
- Kitchen knife

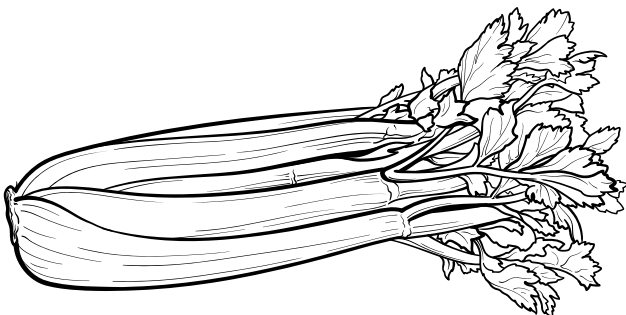


Directions

1. Have **AN ADULT** cut about a quarter inch off the bottom of the celery stalk.
2. Put about 8 ounces of water into a glass or jar, and add 3-4 drops of food coloring.
3. Place stalks into the water and using stalk stir very gently until food coloring is dispersed evenly.
4. Check the celery at intervals over 2 days to see what happens.
5. After 2 days have **AN ADULT** cut the bottom of the celery to see what has happened inside the stem.

What do you think will happen? Write down your predictions.

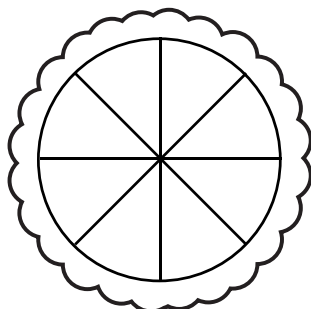
What were the results? Write down your observations.



COMPARING AND ORDERING FRACTIONS

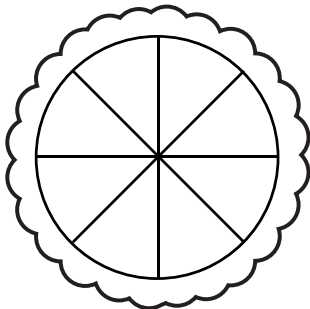


Color in the pie pieces to make the fraction written below it.
Then write $>$ or $<$ or $=$ between them.

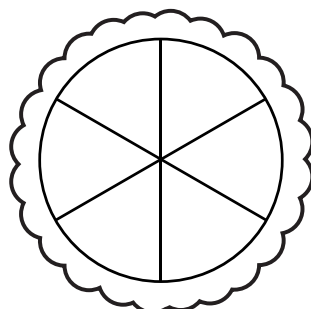


$\frac{1}{2}$

—

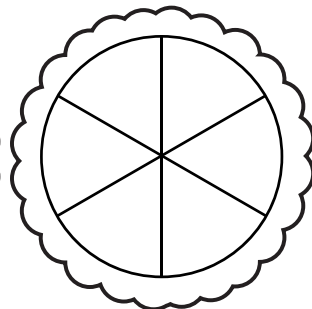


$\frac{2}{8}$

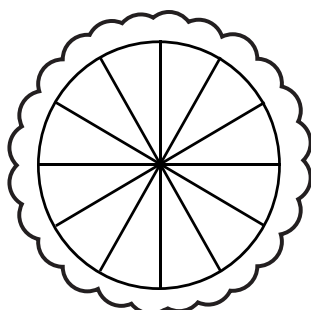


$\frac{3}{6}$

—

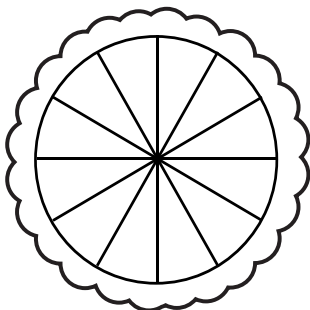


$\frac{1}{2}$

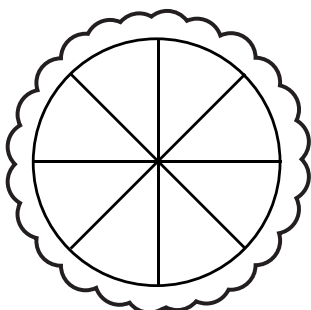


$\frac{3}{4}$

—

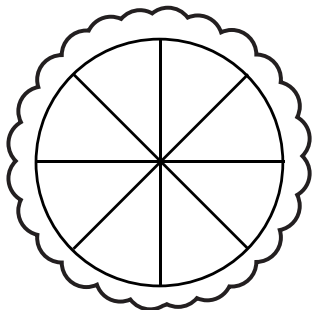


$\frac{2}{12}$



$\frac{2}{8}$

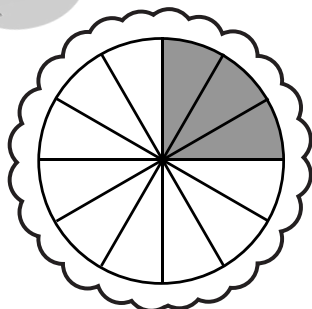
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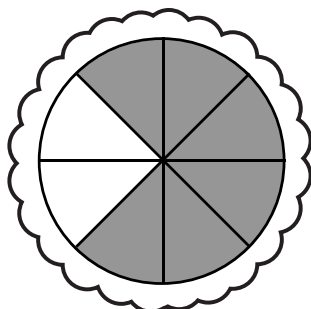
$\frac{1}{4}$



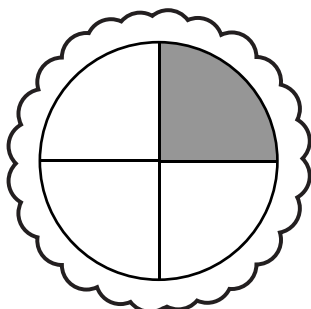
Write in each blank what fraction of the pie has been eaten.



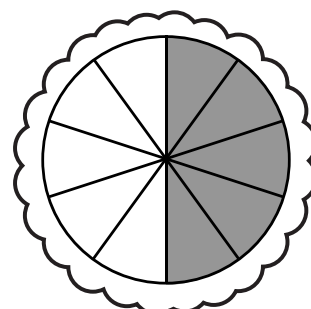
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Write the fractions in order from smallest to largest.

—

—

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WORD SEARCH



Look for the terms you learned throughout this book in the word search!

Evaporation

Runoff

Liquid

Photosynthesis

Cloud

Particles

Lever

Pulley

Oxygen

Screw

Wedge

Axle

Archimedes

Water

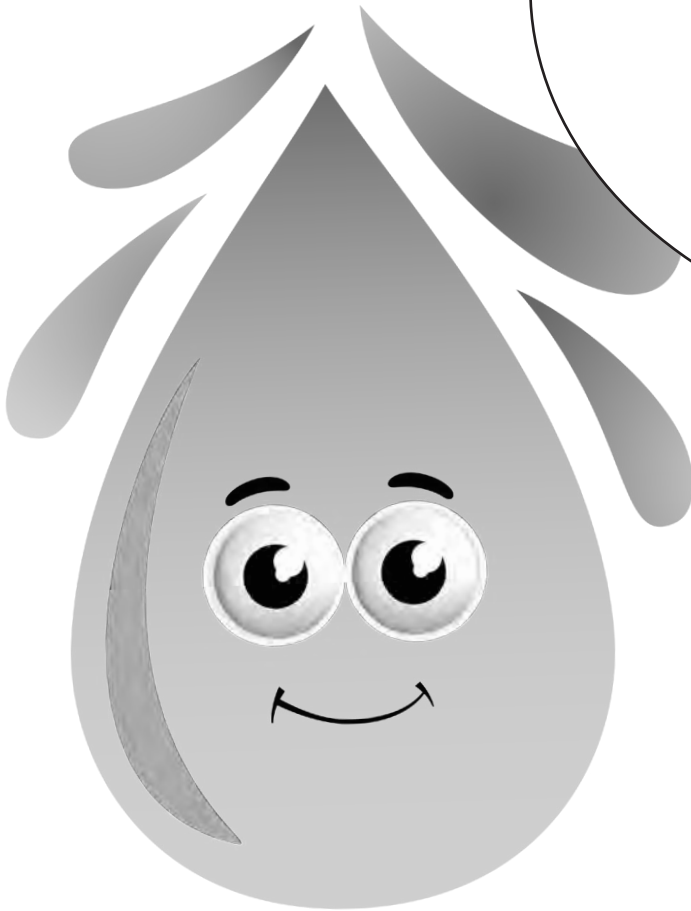
Pump

Irrigation

N	O	X	K	S	G	W	E	D	G	E	Y
P	P	E	Q	T	R	U	N	O	F	F	W
A	U	A	C	P	S	L	P	I	X	S	A
R	L	R	L	H	X	Y	Z	R	I	B	T
T	L	C	O	O	K	A	E	R	L	O	E
I	E	H	U	T	R	X	B	I	E	F	R
C	Y	I	D	O	X	L	N	G	V	Y	C
L	O	M	W	S	A	E	E	A	A	Q	F
E	H	E	X	Y	P	I	Z	T	P	Z	S
S	H	D	P	N	K	P	L	I	O	T	Z
R	K	E	O	T	F	S	I	O	F	Q	I
B	L	S	X	H	D	C	Q	N	A	P	F
Z	E	L	Y	E	C	R	U	G	T	U	K
H	V	K	G	S	D	E	I	S	I	M	R
L	E	C	E	I	J	W	D	H	O	P	I
Y	R	V	N	S	A	Z	P	C	N	Z	X

SCAN THE CODE

*to take a short survey and get a final
STEM activity!*





SKAGITONIANS

TO PRESERVE FARMLAND

Program supported in part by



THE ALLISON
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