WISE Activity Booklets

A STEM activity booklet for fun on-the-go learning!
Made by WISE Kid-Netic Energy

DIY Activities
Puzzles
Challenges
... and more!

Grade 3
VOLUME 5 - 2020

Growth and changes in plants - Soils in the environment - Forces that attract and repel - Materials and structures

University of Manitoba

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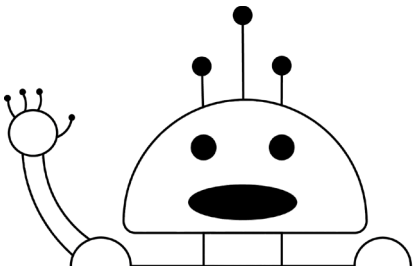


Hello there!

WISE Kid-Netic Energy is a not for profit STEM (Science, Technology, Engineering, and Math) outreach organization at the University of Manitoba. Our organization offers science and engineering workshops, clubs, camps and events to youth from Kindergarten to Grade 12 throughout the province of Manitoba. We reach on average 25 000 to 50 000 youth depending on funding levels. Our approach is simple – present STEM in messy, memorable and engaging ways so Manitoba youth feel motivated to learn more and more. We reach all Manitoba youth, and we particularly target underrepresented youth like girls, indigenous youth and youth facing socio-economic challenges.

All of us at WISE Kid-Netic Energy have been working hard to create these booklets to continue to bring our fun and educational STEM activities to Manitoba youth during these unprecedented times. We are disappointed that we cannot see you in person, and hope that these monthly booklets bring some STEM excitement to your life.

These booklets have been created by our student instructors who are all studying engineering, science, or in another STEM-related field at university. Peek the next page of this booklet to see who created the activities, experiments and recipes within.

All the activities in this booklet are based on the Manitoba Science curriculum. For any teachers viewing this booklet, all the SLO codes are listed at the bottom of each page.

We hope that you enjoy doing the experiments and activities as much as we loved creating them for you.

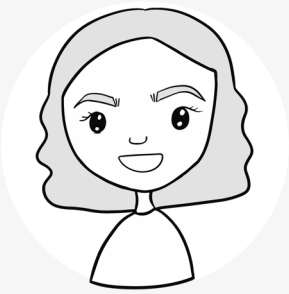
In this Grade 3 booklet, the science topics you will be exploring are: growth and changes in plants, soils in the environment, forces that attract and repel, materials and structures and more!

Best of luck, and until we see you again,

the WISE Kid-Netic Energy Crew

P.S. If you have any suggestions for activities or experiments you would like us to try, contact us through our website, or social media accounts that are listed on the last page of this booklet.

Meet our Amazing Authors!

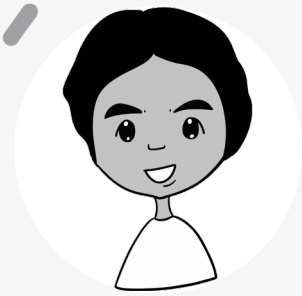


Brenna

Brenna is in her third year of mechanical engineering and loves learning about the science behind how things in our world work! In her free time she likes baking, seeing friends, and playing with her dog.

Katy

Katy is working on her third year of Biosystems Engineering at the University of Manitoba and is passionate about environmental sustainability and working with kids. In her spare time she enjoys running, painting, and spending time outside.



Olivia

Olivia is in her third year of biosystems engineering. She hopes to work in renewable energy or water treatment in the future. In her free time, she plays and refs touch football and enjoys watching cooking shows.

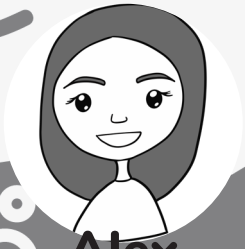
Reem

Reem is in her second-year of science at the U. of M and her favourite classes are psychology and microbiology. In her free time, she loves to watch movies and bake desserts

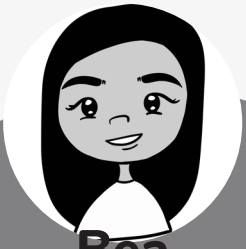
Esiw the Robot

Esiw is a friendly robot that loves to help kids learn about computers & coding! Esiw loves to do math, solve problems and make people laugh!

... and our Incredible Editors!



Alex

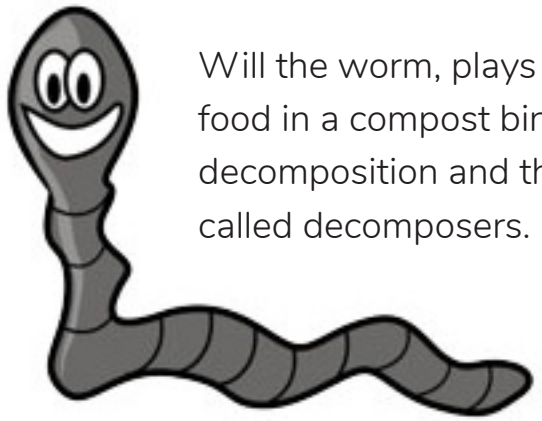


Bea

Mahalia

Michelle

Can You Compost This?

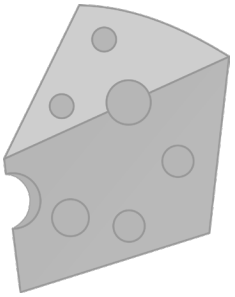


Will the worm, plays an important role in breaking down the food in a compost bin. The act of breaking down food is called decomposition and the organisms that break down the food are called decomposers. However, not all food can be decomposed.

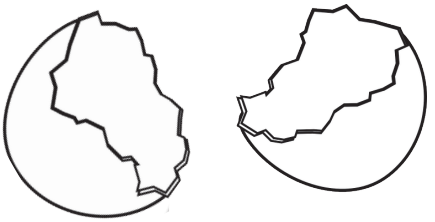
Cut out the items on the next page that can be decomposed and place them in the compost bin below!

Turn the page to continue this activity!

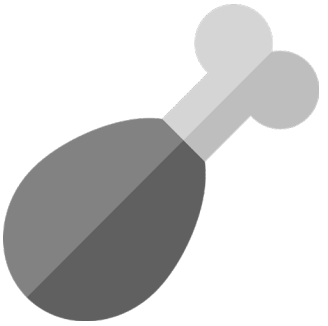
Cheese



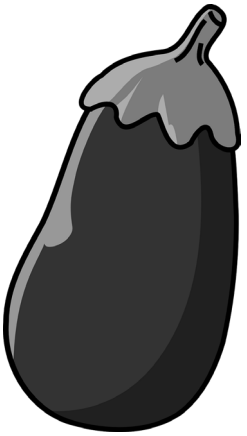
Eggshells



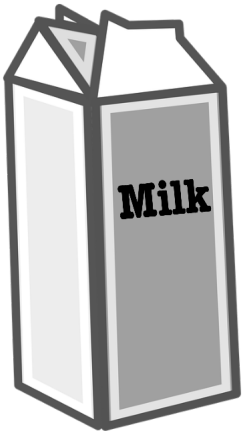
Meat



Eggplant



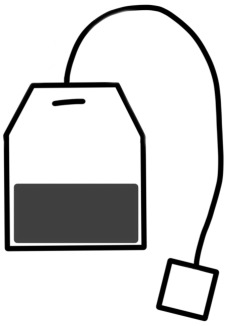
Milk



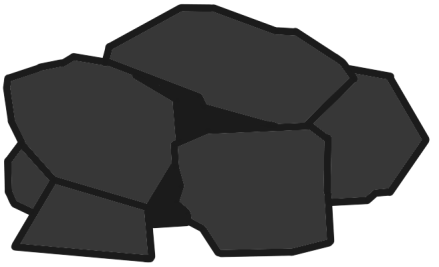
Vegetable oil

Grass clippings

Tea bag



Coal



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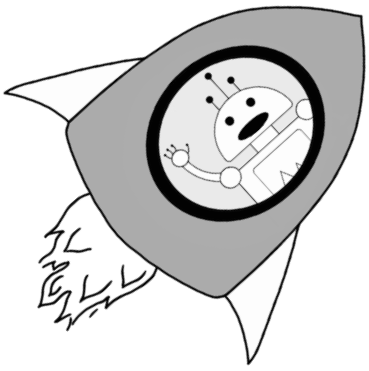
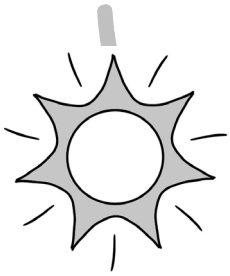
Gardening in Space



Scientists are working on how to grow plants in space, so that astronauts can have plants with them on long journeys. Plants can give the astronauts fresh food to eat, remind them of home, and help with their mental health while they are away from Earth. But growing plants in space can be tricky! Plants need certain things so that they can grow properly and be healthy.

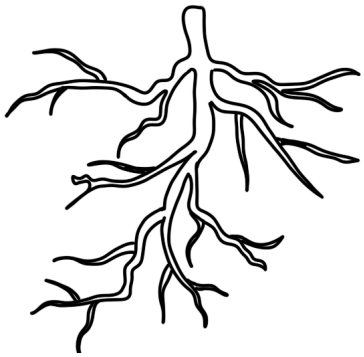
Can you unscramble the words below about what plants need?



Like all living things, plants need energy! They use **LISUGTNH** and turn it into useful energy with a process called photosynthesis.

Answer: _____

Plants get important nutrients from **LOSI** using their roots.



Answer: _____

Just like how people need to breathe, plants also need **IRA**.

Answer: _____

Plants use their roots to absorbe **AWRTE** from the ground. This is important so they don't wilt and dry out

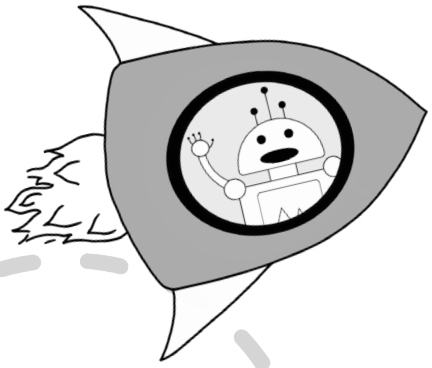
Answer: _____

Plants need to be at the right **PERTEMAUTRE**! If it is too cold or too hot they will have a hard time surviving.

Answer: _____

Amazing! Now that you know how to care for plants, can you match each invention below with how it helps plants grow in space? How might a place without gravity make it harder to grow plants?

Tubes	• Energy source for the plants. Because there is no gravity, they also help guide the plant so it grows up in the proper direction
Temperature controls and fans	• Hold the soil, water, and plant roots in place so the plant can always reach what it needs
Lights	• Help to make sure the plants have the right amount of warmth
Special bags called ‘plant pillows’	• Inject water towards the roots and makes sure the soil isn’t too wet or too dry



Space Travel

There is a force called gravity that is all around us, affecting everything that has mass! Forces can be either pushing (repulsion) or pulling (attraction). A magnet's magnetic force can be either pushing or pulling if it is near another magnet, but gravity is always a pulling force. Have you noticed that when you jump, you fall down right away? That is Earth's gravity pulling you back towards it!

Using careful calculations, scientists can use the gravity of planets to help spacecraft travel where they want it to go. As it gets closer, the planet's gravity pulls on the spacecraft. But instead landing on the planet, the spacecraft turns around the planet and changes the direction it's going! Think of when you spin something on a string around in a circle ... that's a bit like what the planet's gravity does! It pulls and turns the spacecraft, and then the spacecraft moves away and keeps on travelling through outer space. This is called a "gravity assist" or "gravity slingshot".

Player 1

Player 2

Player 3

Player 4

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Space Travel Game Instructions

Are you ready to play a game with gravity? Be careful, in this game you may get sucked into a black hole! Black holes are places in space where the gravity is so strong that nothing - not even light - can escape. This happens when matter gets squeezed together into a tiny space, and because it is so dense, it has super strong gravity that pulls everything in.

Materials

- Pair of dice (2)
- Scissors
- 2 or more players

Choose and cut out your characters on Page 9, then place them at the start.

Cut out the black holes on Page 9 and place them randomly on the game board.

Rip out the game board on Pages 12 and 13 from the staple, tape the middle together to form a complete game board. Take turns rolling the dice and moving your character forward the same number of spaces as shown on the dice.

If your character lands on the end of an arrow, follow the path around the planet to wherever the arrow points.

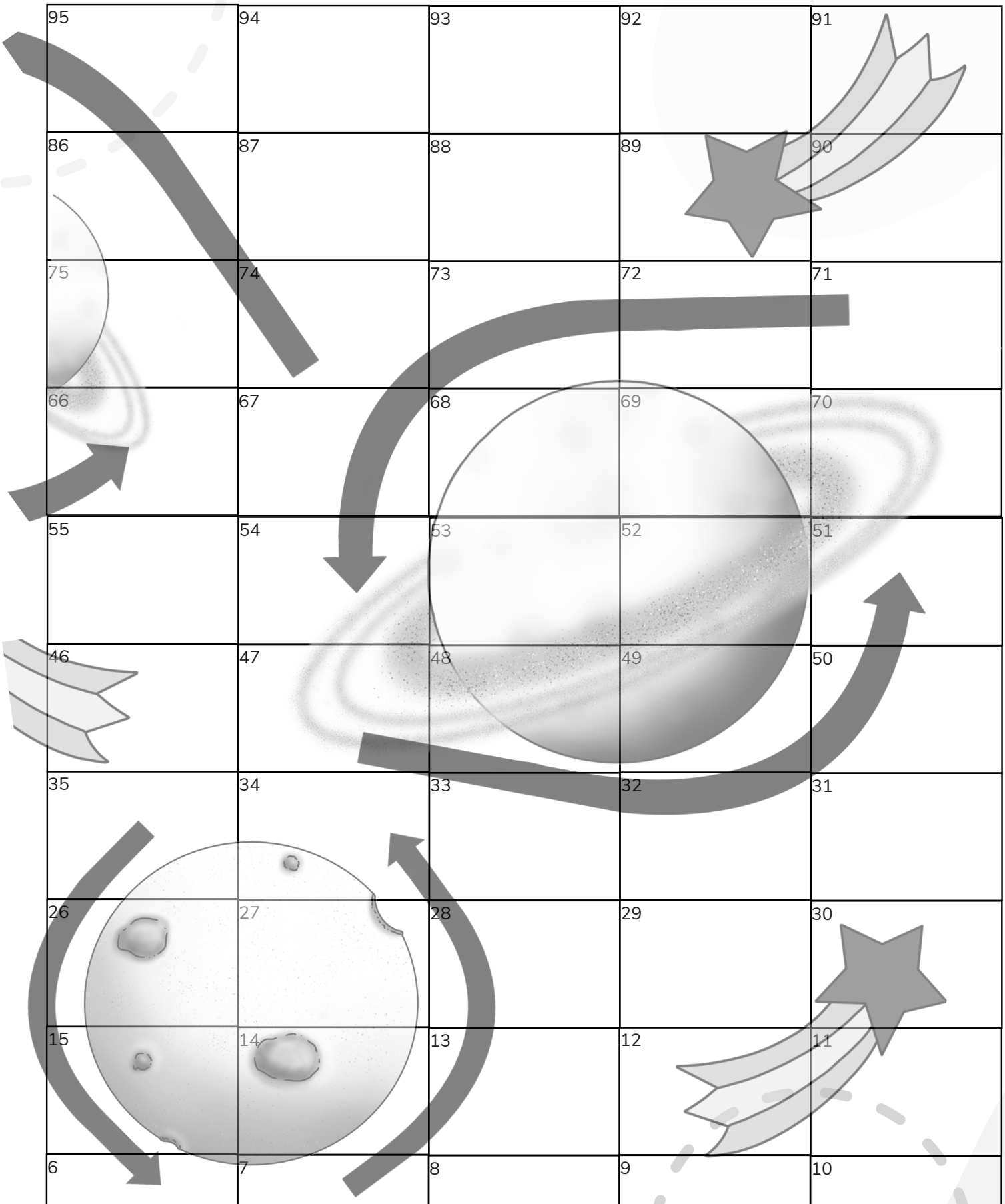
If your character lands on the tail of the shooting star, you can move up to the top of the star.

If your character lands on a black hole, move all the way back to the start.

The first player to reach the end wins!

Turn the page to continue this activity!

100 **FINISH**	99	98	97	96
81	82	83	84	85
80	79	78	77	76
61	62	63	64	65
60	59	58	57	56
41	42	43	44	45
40	39	38	37	36
21	22	23	24	25
20	19	18	17	16
1 **START**	2	3	4	5


95 94 93 92 91
86 87 88 89 90
75 74 73 72 71
66 67 68 69 70
55 54 53 52 51
46 47 48 49 50
35 34 33 32 31
26 27 28 29 30
15 14 13 12 11
6 7 8 9 10

Forces in Water

Water Tension Experiment

Surface tension works as a “skin” on the surface of the water and also causes the water to stick together in drops.

Let’s try an experiment to test out surface tension.

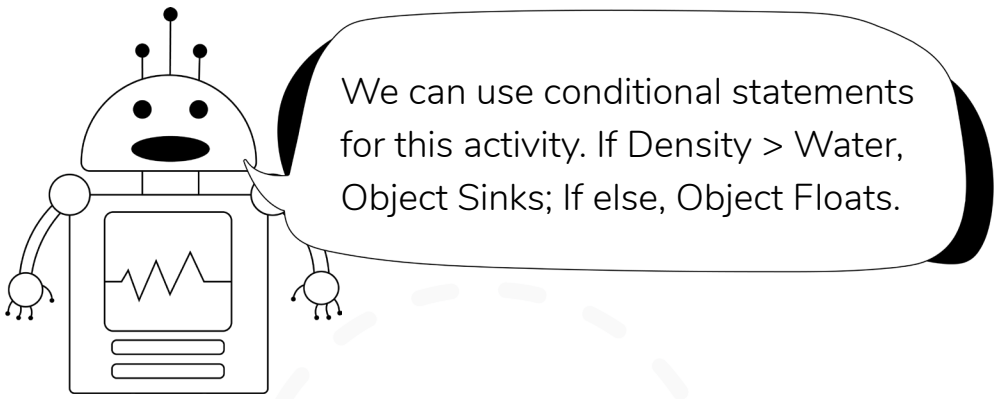
Materials

- Cup or glass
- Water
- Paperclips
- Paper towel
- Dish soap

Fill a cup with water, drop one paperclip into the cup. Does it float? The paperclip is denser then the water, which means it will sink.

Try to place the paperclip gently on the surface of the water. This might be very difficult, so what you can do is take a piece of paper towel that is slightly bigger than the paperclip and set it on the surface of the water. Gently place the paperclip on top and see what happens. The paper will sink but the paperclip should stay on the surface. Even though the clip is still denser than water, the surface of the water forms a tight “skin” which is strong enough to keep the clip afloat.

Now, put a drop of dish soap in the water. The soap will interrupt the surface tension and the paperclip will sink because the “skin” will break.



Turn the page to continue this activity!

SLO : 3-3-07, 3-3-11, 3-3-12

Bend Water with Static Electricity Experiment

Static electricity works a little bit like a magnet. It creates a positive or negative charge that attracts or repels other objects. This activity will show you how the negative charge of the balloon or cup attracts the positive charge of the water.

Materials

- Balloon
- Plastic comb or styrofoam cup
- Access to a sink and faucet to run water

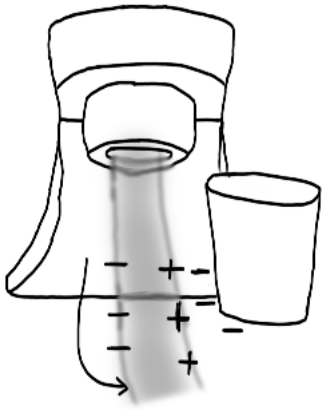
Take a balloon and blow it up, or you can also use something like a plastic comb or styrofoam cup. Rub it on your hair to build up static electricity.

Turn your sink on so the water flows slowly.

Move your charged balloon/comb/cup near the flow of water, but don't let it touch the stream.

Watch the way the flow of water bends!

Try this experiment with different flows of water, increasing and decreasing the amount that comes out.



Homemade Paper

Although the paper we are used to writing and drawing on doesn't look anything like the trees outside in our communities, we know that they are actually made from the same material. When trees fall down, they decompose and provide nutrients for other plants to grow. But what happens to our paper once we've used it? Paper can be reused, and we can actually recycle it ourselves. What are we going to make with our recycled paper? New paper that will be ready to use again! Gather the following supplies and follow the steps below to recycle and make your own paper.

Supplies

- Scrap paper to be recycled
- Water
- Blender
- Container for water (large enough for a piece of paper)
- A rectangle piece of screen/mesh (the same size as you want to make your paper)
- A sponge or paper towels

Steps to Make Homemade Paper

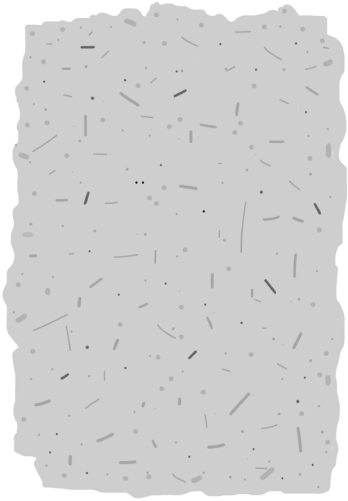
Step 1 Rip up your used paper that you want to recycle into small pieces. This can include paper written or drawn on, newspaper, construction paper, and lined paper.

Step 2 Put the paper pieces into a blender and fill it with water. Once blended, you will have a watery paper pulp material. **Ask a parent or guardian for help. using the blender**.

Step 3 Fill the bottom of your container with water so it is between 5 and 10 cm deep. Pour your paper pulp from the blender into your container of water and mix with your hands.

Turn the page to continue this activity!

Step 4 Place your rectangular piece of screen/mesh into the container by sliding it underneath the pulp mixture. The screen can be a piece of window/door screen, mesh, or hardware cloth. Just do not use a material with squares/holes larger than a half centimeter across. You want the pulp mixture to be mainly above the screen/mesh so that when you lift the screen/mesh out of the water, the pulp stays on the top of the screen. Once the pulp dries it will become your paper.



Step 5 Lift the screen out of the bin, keeping it horizontal. Place the screen with a layer of pulp on a flat surface to dry.

Step 6 Use a sponge to remove the moisture from the pulp. Gently press down on the pulp with the sponge, wringing out the sponge as needed. Otherwise use the paper towel to remove the moisture. If you want your paper to dry flat, place a book or heavy object on top as the pulp dries.

And you're done! Let the pulp dry and watch as it hardens to resemble a new thick sheet of paper. Making your own recycled paper is fun and sustainable!

Turn the page to continue this activity!

A Secret Message

Have you ever wanted to write a secret message without everyone being able to read what is written? Gather the following supplies and your recycled homemade paper, and follow the steps below. If you haven't made your own paper, you can use any blank piece of paper.

Supplies

- Paper
- Lemon juice
- Water
- Cup
- Spoon
- Cotton swab
- Lamp or other lightbulb

Steps to Make A Secret Message

Step 1 Mix 1-part lemon juice and 1-part water in a cup and mix with a spoon.

Step 2 Dip the cotton swab into the diluted lemon juice and use the cotton swab to write a secret message on your paper.

Step 3 Let it dry and watch the message disappear.

Step 4 When you are ready to read or share your message, hold it up to a lamp or lightbulb and watch as the message becomes visible. Now the secret is out!

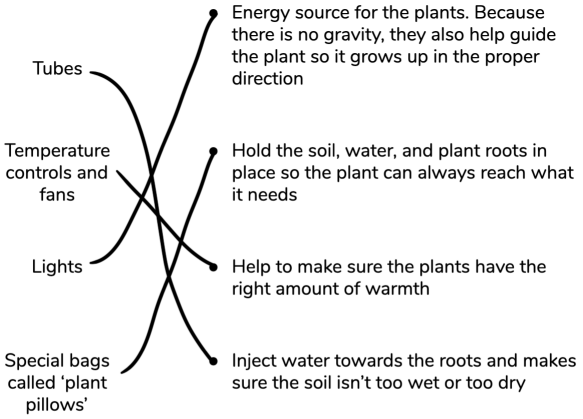
The secret message becomes visible when the lemon juice is oxidized, or exposed to oxygen. The lamp or lightblub when turned on, oxidizes the lemon juice. This chemical reaction turns the lemon juice to a darker brown colour so it can be read. Try writing a secret message for someone and giving it to them with instructions on how to read it. Were they able to receive your message?

Answer Key

Page 4: Can be composted: Eggplant, tea bags, grass trimmings, eggshells.
Can't be composted: Meat (chicken leg), dairy (cheese, milk), coal, vegetable oil.

Page 7: 1.Sunlight; 2. Soil; 3. Air; 4. Water; 5. Temperature.

Page 8:



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