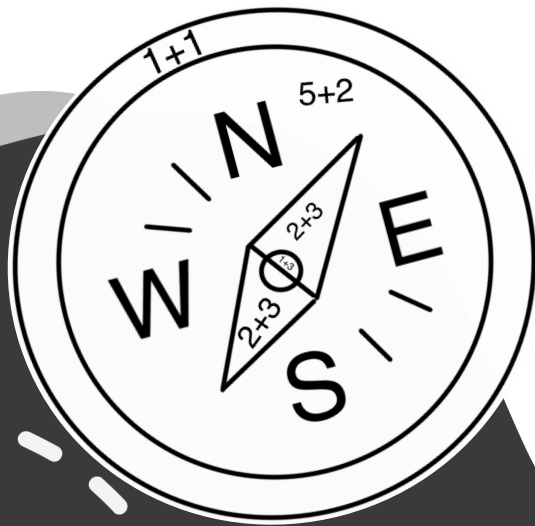


WISE Activity Booklets

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



University
of Manitoba

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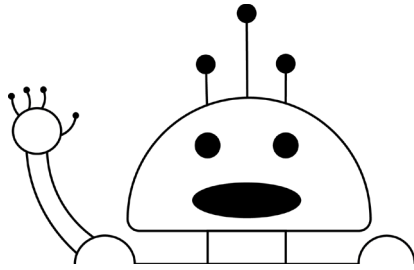
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DIY Activities
Puzzles
Challenges
... and more!

Grade 3
MAY 2020

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



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 last 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.

If a link is listed at the bottom of the page, and you have access to the Internet, follow it to check out a video of the activity our instructors have created just for you.

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!

Alora is currently attending the University of Winnipeg where she is working towards her bachelor of Science degree with a major in Neuroscience and a minor in French. She aspires to become a high school science teacher and a guidance counsellor. In her spare time, she enjoys reading, writing, and playing the ukelele.

Alora

Amelia

Amelia just completed her first year of the two-year after-degree program in early years education. When she isn't reading, she loves writing lists, running, having quality conversations with friends, knitting and singing show-tunes.

Habiba is a second year computer engineering student. In her free time, Habiba loves to learn about everything computer and internet related, but in her free time she likes to draw, go outside as well as cook.

Habiba

Shannon

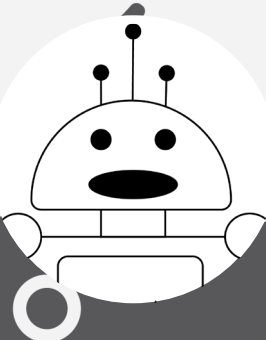
Shannon is finishing up her first year of Engineering. In her spare time she enjoys drawing, exercising, being outdoors, and trying new things. She is super pumped to be apart of WISE this summer!

Zoe is in her first year of Engineering, and is planning on going into the Civil Engineering department. She loves math, and in her free time enjoys walking her dog, as well as playing volleyball and ultimate frisbee.

Zoe

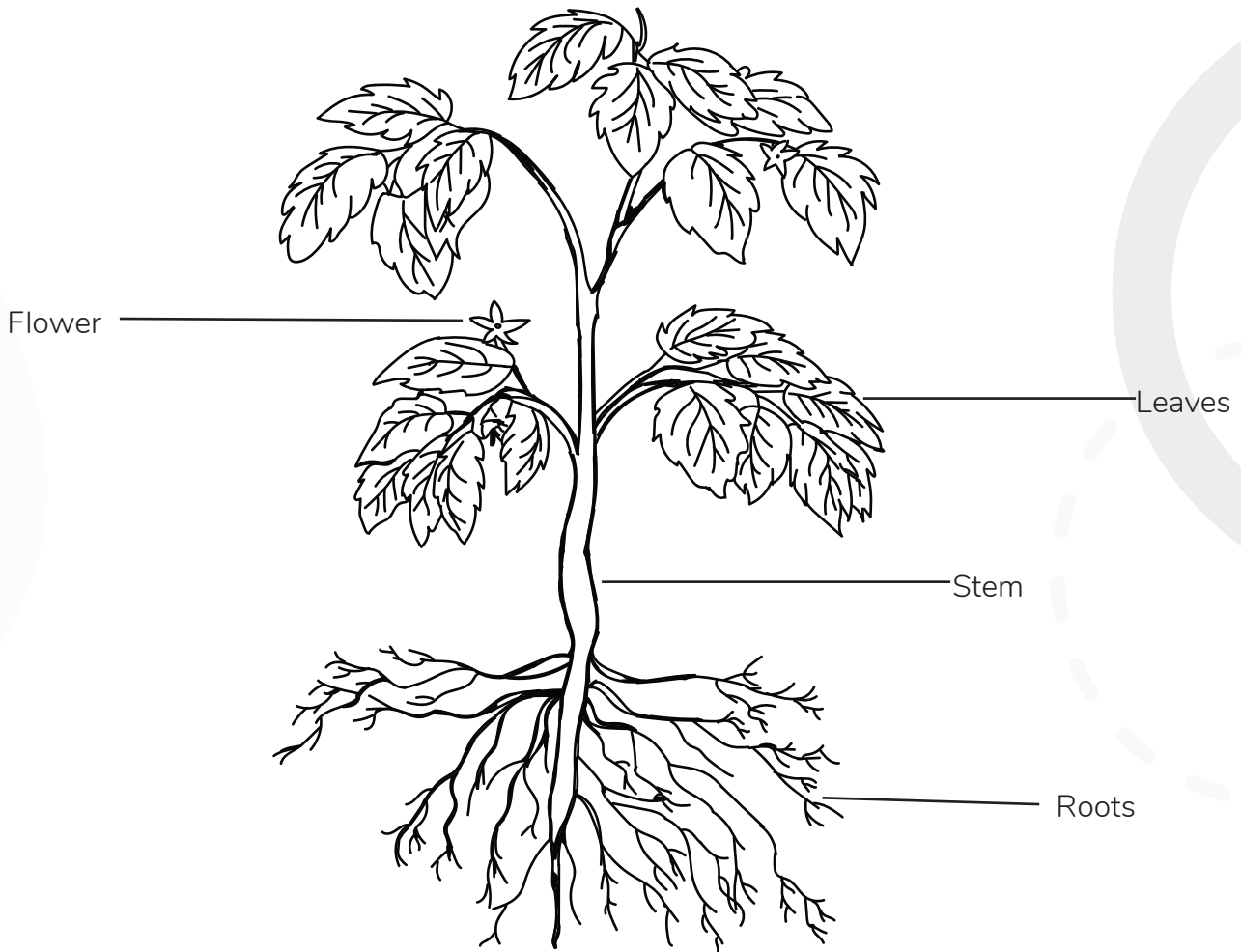
Esiw the Robot

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!



Plants, what parts do they have?

Humans and plants are very similar. We are both living things, and we both need food and water to survive and to grow. However, you'll notice plants don't have mouths like we do. So, how does a plant get their food? To do this, all the parts of a plant have to work together at once.



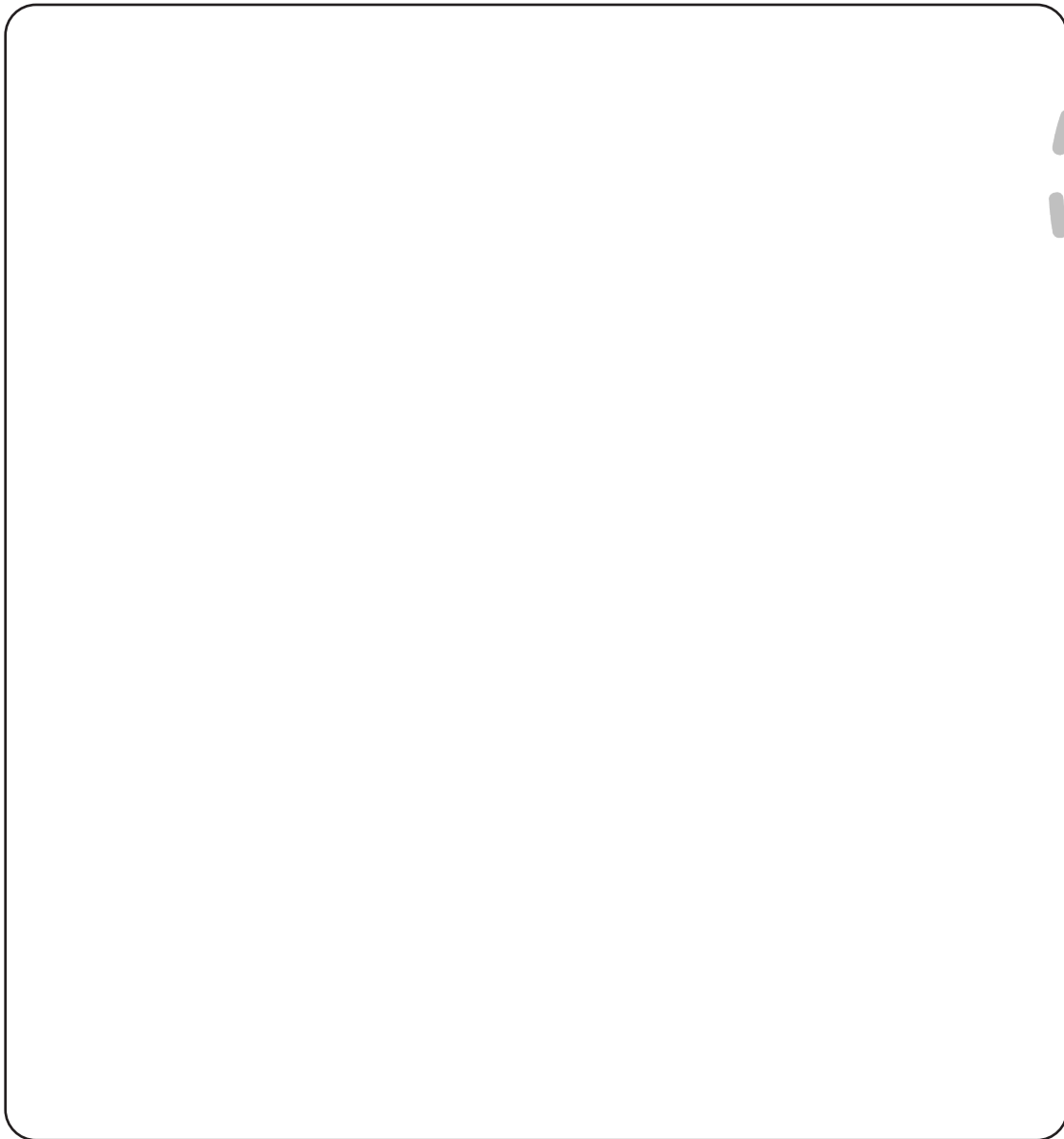
The basic parts of a plant are:

- the **roots**: absorbs water and minerals from the soil.
- the **stem**: supports the plant so it can stand up above ground. It also carries the water and minerals to the leaves.
- the **leaves**: collects energy from the sun and makes food for the plant during a process called photosynthesis. Through this, plants also make oxygen, the air that we breath.
- the **flowers**: make the seeds so that more plants can be grown.

Your turn!

Now it's your turn to explore plants! Your mission is to go and find a plant to describe. We encourage you to go outside to your backyard or to the park to find a plant. If this is not an option, you can use a plant inside your home. Only pick the plant if you know you are allowed to pull it out of the ground.

Draw a picture of your plant, making sure to label all the basic parts of it, use the words from the word bank below!



Word Bank: Roots, Stem, Leaves, Flowers

Note: if you are not allowed to pull your plant out of the ground, draw what you imagine the roots look like.

What plant did you find in your home or outside?

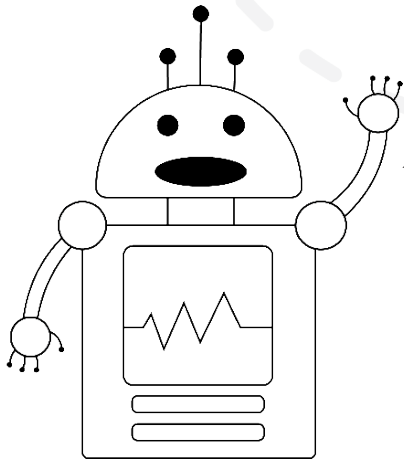
1. The plant's name (if you do not know, ask your parents, friends or family):

2. Location of the plant (where did you find it?):

3. What does it look like? (examples: tall, green, spikey leaves ...)

4. Plants come in all different shapes and sizes. Three other plants that I know the name of are:

Let's test your knowledge of plants



Hi! I'm Esiw, we have encountered a computer error and need your help to sort the words to their correct definition. They are not in the proper order, can you help us?

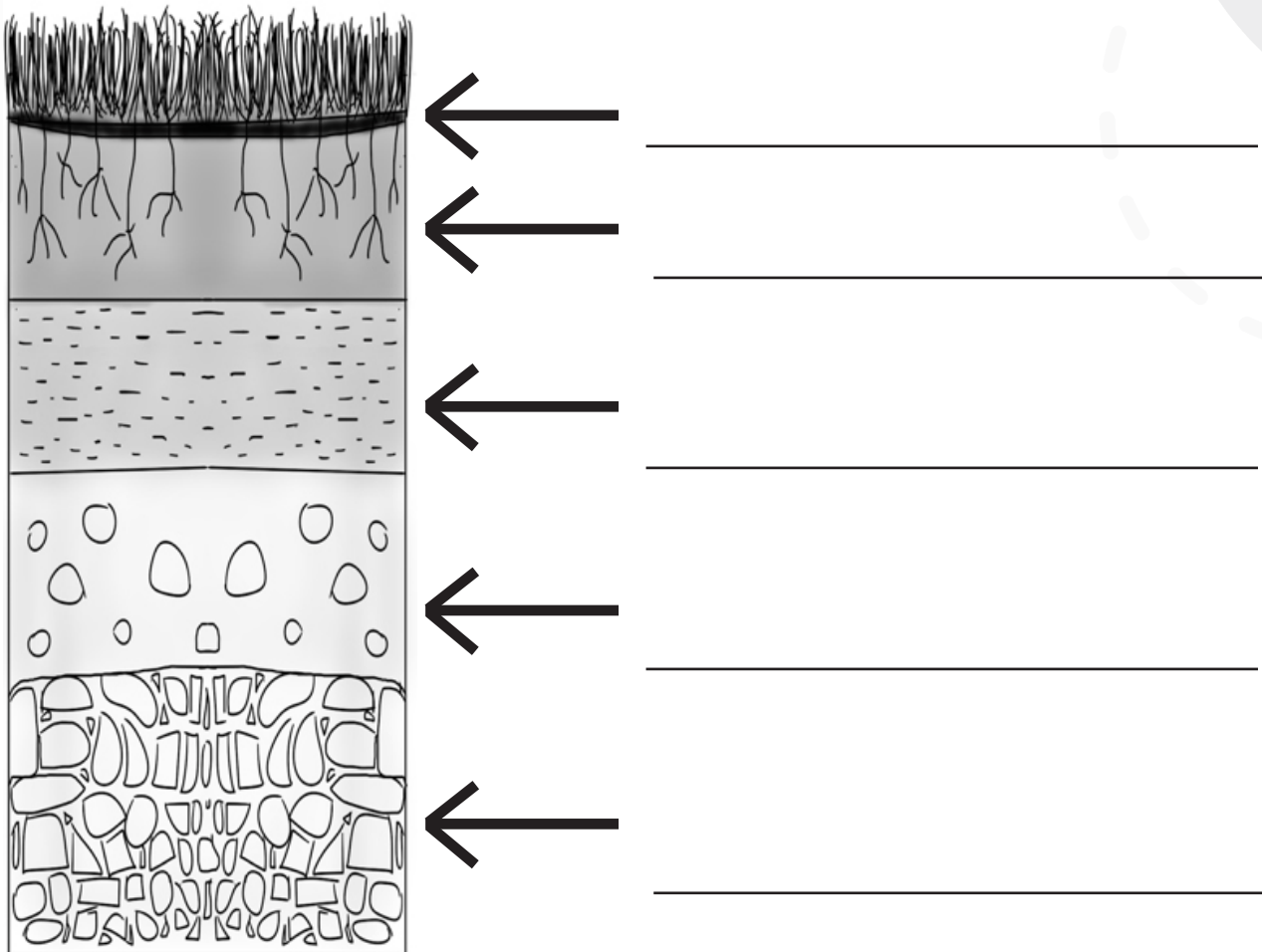
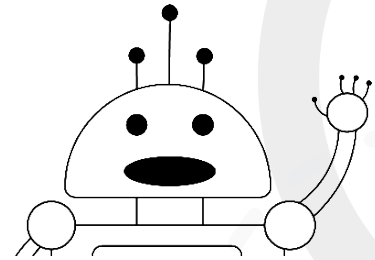
- | | | | |
|------------|-----------------------|-----------------------|--------------------------------------------------------------|
| 1. Roots | <input type="radio"/> | <input type="radio"/> | A. Collects energy from the sun and makes food for the plant |
| 2. Stem | <input type="radio"/> | <input type="radio"/> | B. Absorbs water and minerals from the soil |
| 3. Leaves | <input type="radio"/> | <input type="radio"/> | C. Makes the seeds so that more plants can grow |
| 4. Flowers | <input type="radio"/> | <input type="radio"/> | D. Supports the plant so it can stand up above the ground |

What do plants grow in? Soil!

Soil is made up of solids, liquids and gases. The solid part of soil contains pieces of different minerals and organic or living matter, which are called particles. Particles can vary in size, texture and composition.

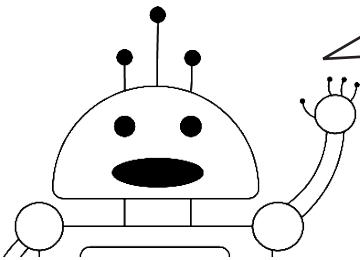
The different layers of soil are: Bedrock, the lowest layer of soil, it's made up of solid rock; Humus, is the top layer of soil where a lot of living materials such as plants, and animals live, it's a thin dark layer; Parent Material is mostly rock that has been slightly broken down, no living things are found here except for tree roots; Top Soil is made of mostly minerals, and plant roots, it's also dark in colour; Subsoil is made up of sand, silt and clay that have not be broken down, it is light in colour.

Can you help me sort which layer of soil goes where? Use the following words: **Bedrock**, **Humus**, **Parent Material**, **Top Soil**, and **Subsoil**.



How do you use a compass?

Compasses were first used by sailors to navigate the open seas, and by people who travelled across large areas of land. They are used to find out which direction you are travelling. A compass works because of magnets. The Earth's surface is one gigantic magnet. The magnet in the compass is attracted to the North Pole, the beginning of the magnetic field. This is called opposite polarity and explains why a compass will always show which way is North.



Looks like we need to do some math to figure out how to colour in this compass. Ask for help or use a calculator (a mini computer) to decode which colour to use.

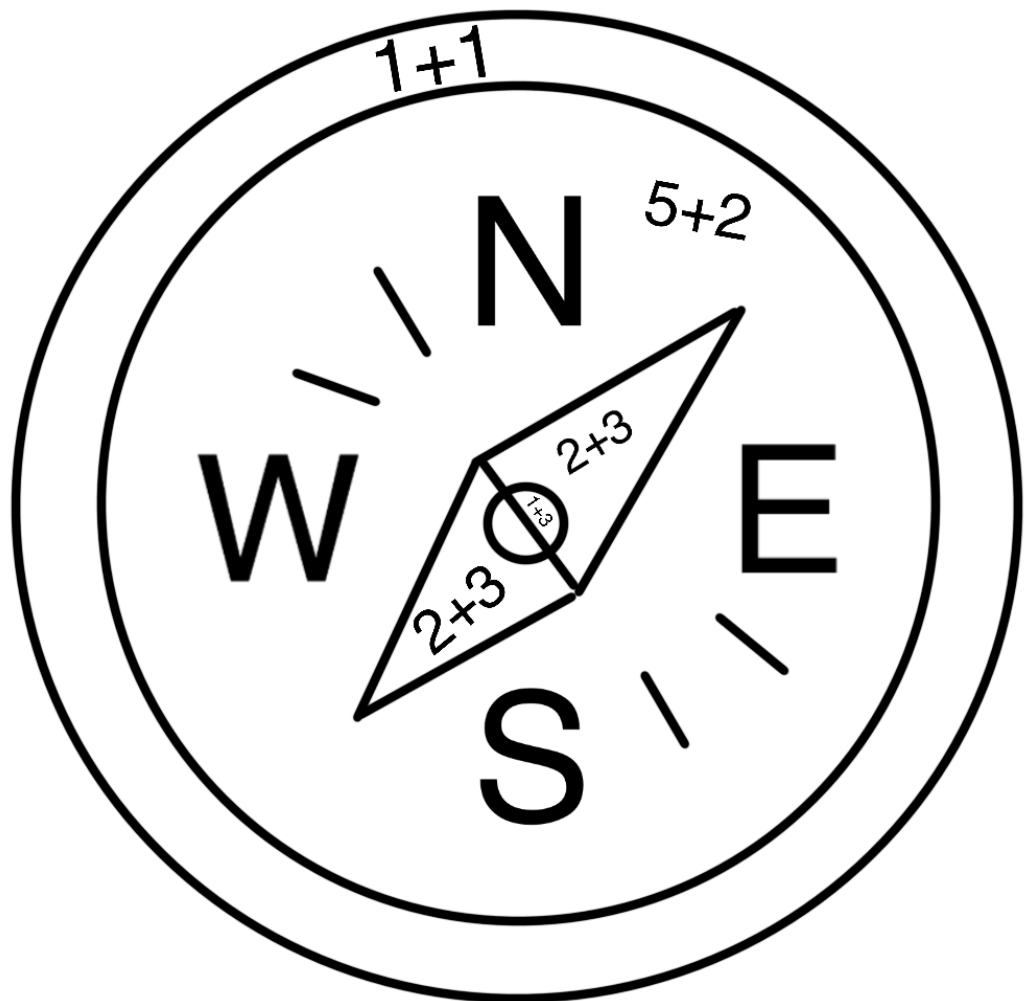
Legend:

2 = Blue

4 = Black

5 = Yellow

7 = Grey



Fun Fact: There are magnetic rocks in the ground that confuse the compass and make the needle spin around. Stories of people getting lost in a forest is caused by this. If you can see where the Sun rises and sets, you can identify where East and West are to find your way.

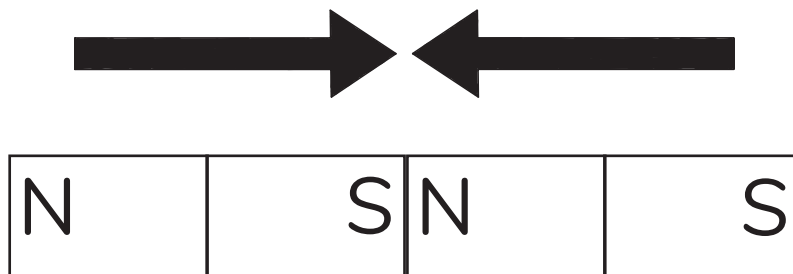
How does a magnet work? What is Attraction and Repulsion?

An easy way of thinking about attractive and repulsive forces is to think about them as “push and pull” forces. Like forces repel one another, whereas opposite forces attract one another.

If you think about two magnets that both have a North and South end, and you put both south ends together, they push away and repel each other.



So, if you put one South end and one North end together, what would happen?



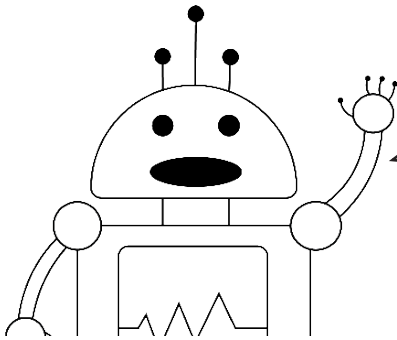
They would pull and attract to each other.
The two opposite ends on a magnet are called poles.

Attraction and Repulsion of Magnetic Fields ... Continued

Think about it this way:

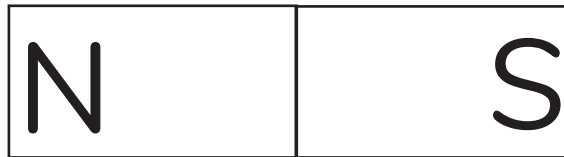
Let's say pizza is your favorite food. If your friend puts a plate of broccoli in front of you, you will most likely push it away from you. However, if your friend puts a slice of pizza in front of you, you will most likely pull the pizza towards you to eat it.

This is just like what is happening with the attraction and repulsion of a magnet. These forces create a magnetic field surrounding each magnet. The field lines come out of the North end and flow into the South end.

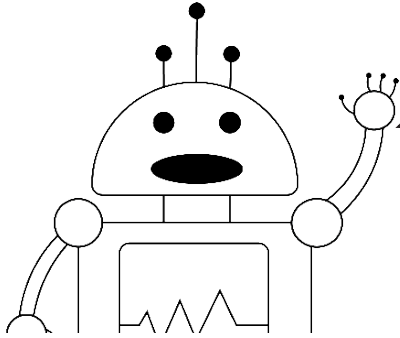


Hello! I need some help, which way do the poles on the magnet attract? Magnets are used in robots like me and machines to read code and do an action.

(There is a hint above)



Do the Magnets Attract or Repel?



Looks like we need to decode a problem.
Will the magnets below attract "1" or repel "0"?
Circle the correct answer!

1.



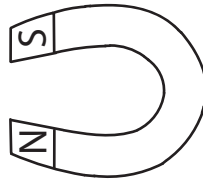
Attract "1" or Repel "0"

2.



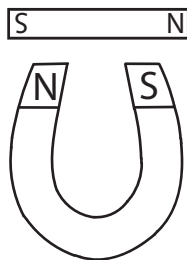
Attract "1" or Repel "0"

3.



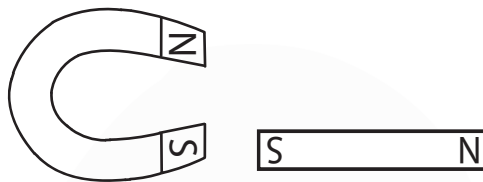
Attract "1" or Repel "0"

4.



Attract "1" or Repel "0"

5.



Attract "1" or Repel "0"

The Balloon Experiment

In the air, we have positive and negative charge, when they come together we can experience a shock from static electricity that we had gathered.

The rubbing of certain materials against one another can transfer negative charges of electrons. For example, when you rub a balloon against your hair, it will lead to your hair standing up!

Since objects with the same charges repel, your hair now has the same charge.

Let's do an experiment!

What you need:

1. Balloon
2. Dry Weather

Experiment:

Step 1: Blow up the balloon (get someone to help you tie the end of the balloon).

Step 2: Wave the balloon over your head.

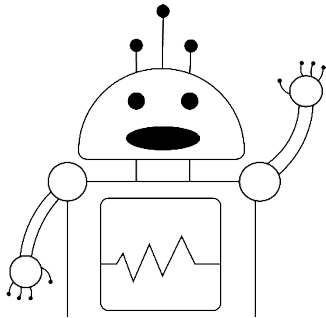
Step 3: Observe what happens! (Did your hair follow the balloon or stay in place?)

Step 4: Rub the balloon onto your head and knock off some electrons!

Step 5: Observe what happens when you wave the balloon near your hair!

Step 6: Now hold the balloon against a wall and observe what happens!





Can you help me find the words about Forces that Attract and Repel from the word list below in this word search? They are hidden in the ball of letters!

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

Word List

MAGNETIC FIELD
 NORTH POLE
 SOUTH POLE
 MAGNET

REPEL
 ATTRACT
 COMPASS
 GRAVITY

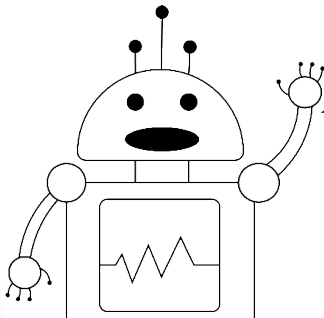
FORCE
 CHARGE
 MAGNETIZE
 POSITIVE CHARGE

NEGATIVE CHARGE
 PUSH
 PULL
 STATIC ELECTRICITY

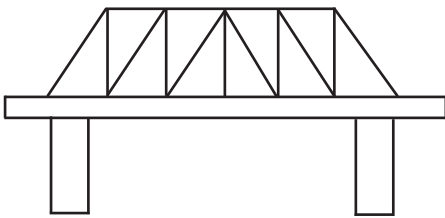
Was it built by nature or by humans?

Structures can be made by nature, or by humans. Different materials are used to create different types of structures, and when humans plan to make a new structure, they think about how will it be used? How many people can fit in it? How tall or wide will it be? What climate will the structure be used in?

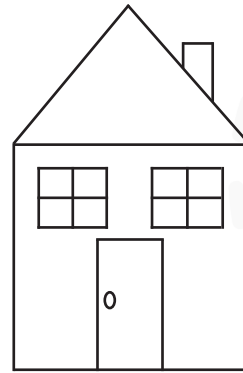
When it is built by nature, it either grows on its own, or is made by insects or animals.



Hello! Can you help me sort these structures into human built or natural?



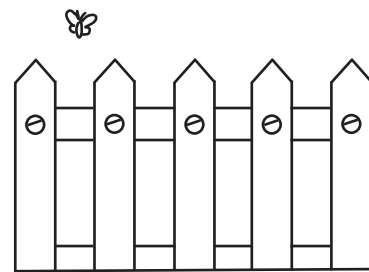
1. Bridge _____



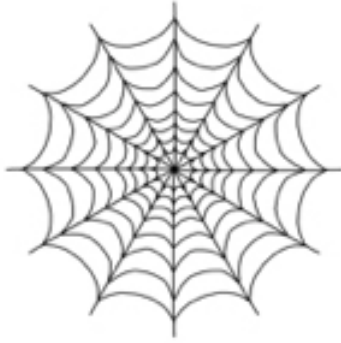
2. House _____



3. Tree _____



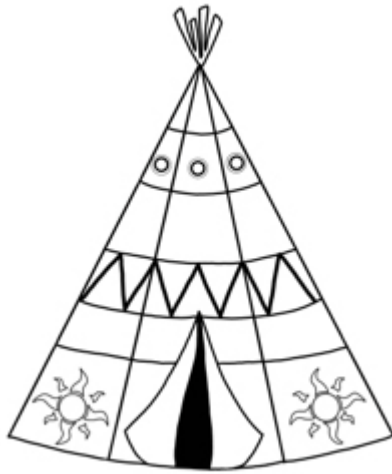
4. Wooden Fence _____



5. Spider Web _____



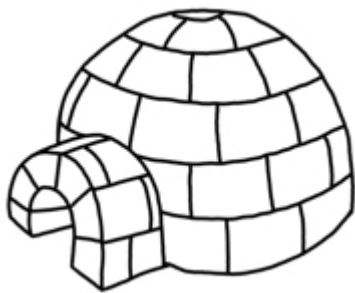
6. Beehive _____



7. Tipi/Teepee _____



8. Bird's Nest _____



9. Igloo _____

Build your own structure!

Many structures on Earth are built using common materials such as wood, metal, plastic, glass, cement and clay.

In this activity, you will learn the design process of structures and design your own dream pool and cabin.

When building a structure, it is important to remember a few things:

1. Different materials can be combined to make a structure stronger and last a long time.
2. A certain material can be more useful than another when building different structures.
For example, concrete is sturdy and strong so it is good for building houses, but wouldn't be useful for making a cup.
3. The shapes you use in your structure are important, because some shapes are stronger than others.
For example, a triangle is much stronger than a square, but it can still be used inside of your square shape to strengthen it.
4. Make your structure as strong and as sturdy as possible. Will it fall over by a strong wind? Will rain or snow on top of it make it crumble/collapse?

Before you start building, think about the types of materials that are used in structures and what similar materials you can use around your home and outside.

Sketch a drawing of what you want your dream pool and cabin to look like. Try to add details on the drawing such as what materials you will use for each structure.

Engineers and Architects create a lot of drawings for a structure before building it and use it as a plan on how it should look like after it's completed.

Sketch your pool here!

Sketch your cabin here!

It's time to build!

Build your pool, think about if it will be above the ground, have a water slide or even a diving board and how you will construct it.

Next, build your cabin, you can have as many walls you want and don't forget about a roof. You can add in windows, a door, steps, chimney or more if you would like to. It can be as big as you want it to be and in what ever shape you want.

Materials we suggest for your structure:

(Use what you have around the house. It does not have to be on this list and ask an adult first if you can use it)

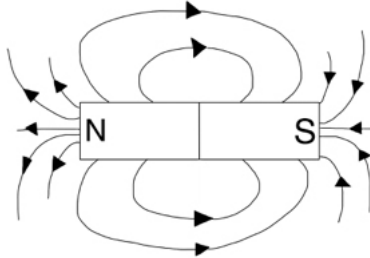
- Popsicle sticks (use the sticks from your popsicles or ice cream treats!)
- Glue
- Cardboard
- Lego or other types of building blocks
- Sticks
- Toilet paper rolls or paper towel rolls
- Plastic Bottles
- Tape
- Straws
- Clay
- Long strands of grass to tie things together
- Bottle caps
- Spaghetti noodles (ask for permission to use this)
- Rocks

Answer Key

Page 7: 1-B, 2-D, 3-A, 4-C

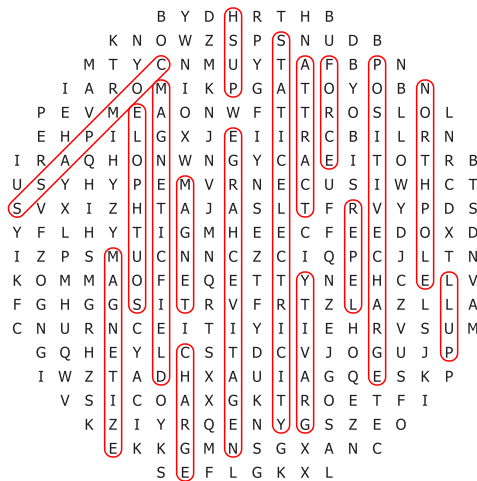
Page 8: From top to bottom: Humus -> Top Soil -> Sub Soil -> Parent Material -> Bedrock

Page 11:



Page 12: 1 - Attract "1"; 2 - Repel "0"; 3 - Attract "1"; 4 - Attract "1"; 5 - Repel "0"

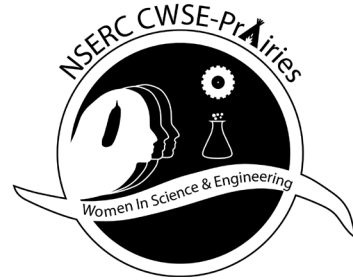
Page 14:



Page 15: 1 - Human built; 2 - Human built; 3 - Natural; 4 - Human built

Page 16: 5 - Natural; 6 - Natural; 7 - Human built; 8 - Natural; 9 - Human built

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