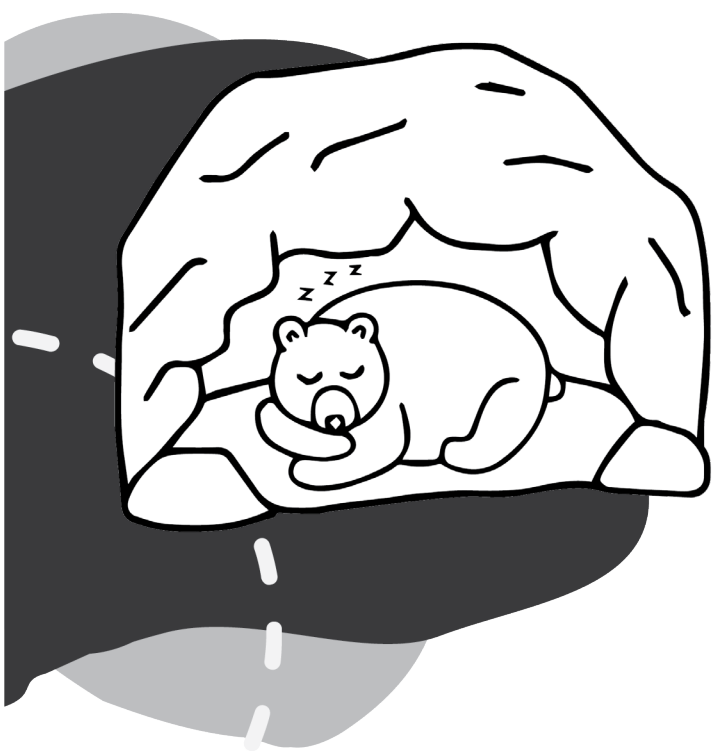
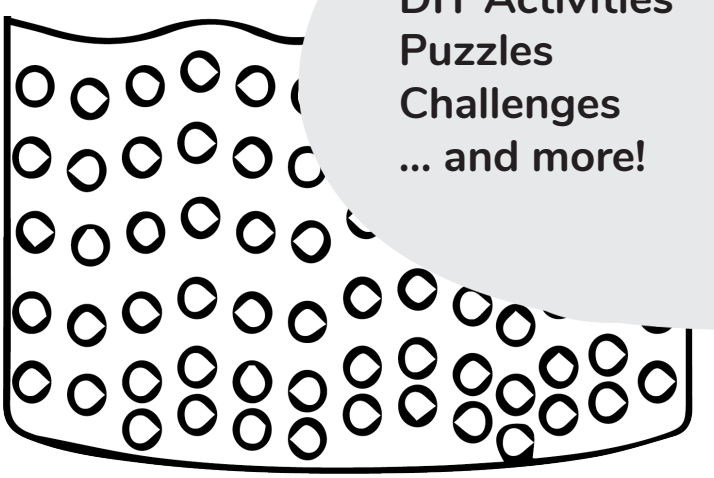
WISE Activity Booklets

A STEM activity booklet for fun on-the-go learning!

Made by WISE Kid-Netic Energy





DIY Activities
Puzzles
Challenges
... and more!

Grade 5
JUNE 2020

Forces & Simple Machines - Maintaining a Healthy Body - Changing Substances - Weather

University of Manitoba

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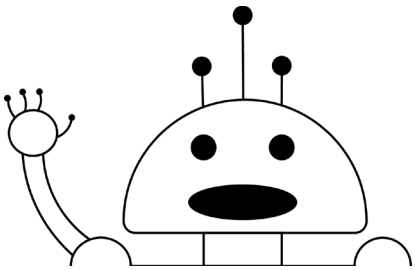


Hello there!

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 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 5 booklet the science topics you will be exploring are: forces and simple machines, maintaining a healthy body, properties of and changes in substances and weather!

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

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

Amaris

Amaris just finished her first year in sciences at the University of Winnipeg and plans on majoring in biology. In her free time, Amaris likes reading, playing piano and baking.

Huda

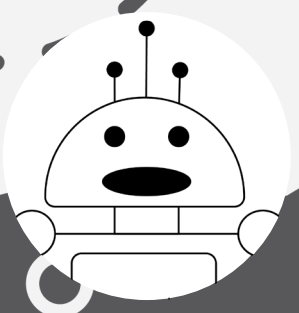
Huda is in her first year taking general science courses and she's trying to decide between a degree in Microbiology or Genetics. She enjoys baking and cooking and her favorite activity is watching videos on YouTube!

Reem

Reem is in her first-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

Shannon

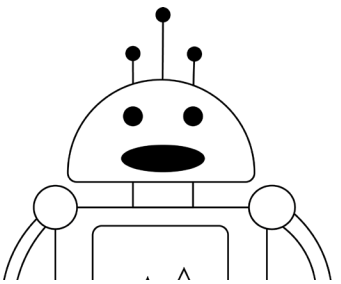
Shannon is finishing up her first year of Engineering. In her spare time she enjoys drawing, exercising, being outdoors, and trying new things. She is super pumped to be apart of WISE this summer!



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!

Let's Code Healthy Habits!



Guide the kid through the maze on the following page to reach the "Healthy Body" square by creating a 'Code for a Healthy Body' so the kid knows where to go! Make sure the kid picks up the healthy habits and avoid the unhealthy ones along the way,

The Rules

>>> The kid must collect Healthy Habits such as fruit and veggies, water, sleep, and exercise.
>>> The kid must avoid things such as junk food (burgers and fries), and soda.
>>> The kid can't enter the same square more than once.

Now that you know the rules, you can write your 'Code for a Healthy Body' below. Your code will be made up of directions so that the kid knows where to go; the syntax (the format for your code) for each direction is: `DIRECTION #;` (for example, `RIGHT 2;` will tell the kid to go right 2 spaces). To help you out, we've started the code for you! Write the next part of the code on Line 2 and keep adding code until the kid gets their "Healthy Body"!

Line 1: `RIGHT 2;`

Line 2:

Line 3:

Line 4:

Line 5:

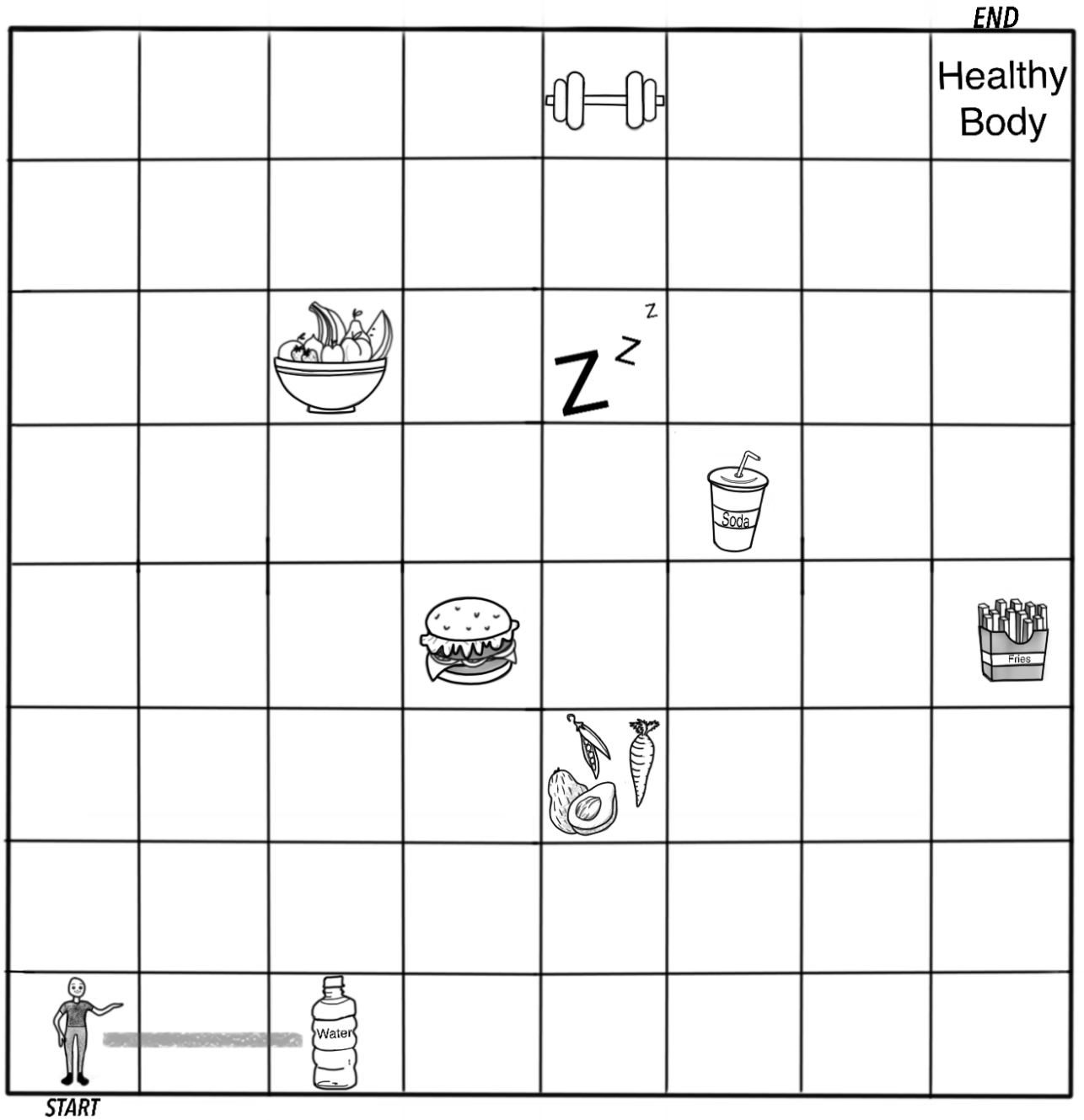
Line 6:

Line 7:

Line 8:

Let's Code Healthy Habits! (continued)

Using your healthy body code from the previous page, guide the kid through the maze to the "Healthy Body" square by drawing arrows that match up with each line of code. (The first line of code is drawn for you!) Do not draw any arrows that are not part of your original code. You may have to go back and re-write code to get the kid to the right places.

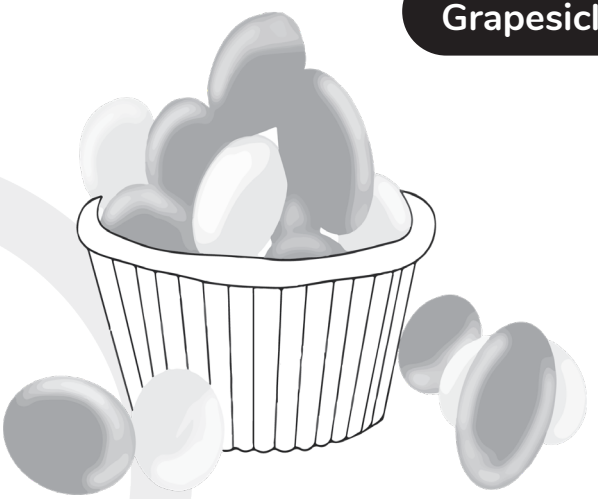


Do you think you could re-write the code to have fewer lines/directions? What would your code look like if we told you the kid had to eat a fruit bowl first before having water?

Quick & Healthy Snacks! (Part 1)

Try these quick, easy and healthy snacks at home!
Ask an adult for help and always wash your hands before making any food. Note: each recipe is good for one serving!

Grapesicles



What you'll Need:

- Grapes
- Ziploc Freezer Bag

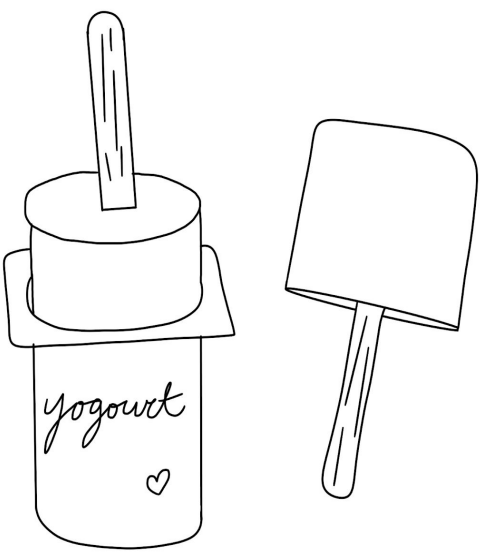
Instructions

1. Wash the grapes for 30 seconds with cold water while rubbing them gently.
2. Put the grapes into a plastic ziplock bag into the freezer.
3. Freeze the grapes for 8 hours and enjoy!

Frozen Yogurt Pops

What you'll Need:

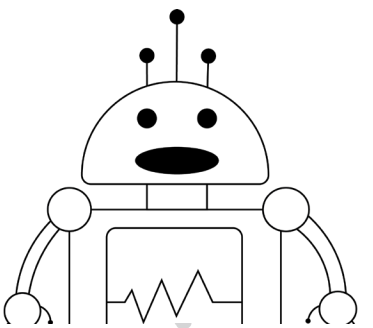
- Individual Yogurt Cup
- A knife
- Popsicle sticks or small teaspoons



Instructions

1. Ask an adult to puncture a small slit into the top of the yogurt cup using the knife.
2. Stick the popsicle stick or a small teaspoon into the cup
3. Place the yogurt cup in a freezer and freeze it for at least 3 hours.
4. Take off the plastic cover and slowly pull out your yogurt pop using the popsicle stick or small teaspoon and enjoy!

I am really good at following instructions. I have special instructions called "code" that tell me what to do. Are you good at following instructions? Can you follow these recipes like I follow code?



SLO : 5-1-05

Quick & Healthy Snacks! (Part 2)

PB & Apple Snack

What you'll Need:

- Apples
- Peanut Butter
- A Knife
- A Plate
- Optional: Cinnamon

Instructions

1. Wash an apple well with water.
2. Ask an adult to help you cut an apple into slices with the knife and place the slices on the plate.
3. Add a spoonful of peanut butter to the plate and enjoy dipping your apple slices into the peanut butter!
4. Optional: Sprinkle some cinnamon on the apple slices for more flavour!

Sweet Chili Popcorn Seasoning

What you'll Need:

- Pre-made popcorn bag
- Small bowl
- 1 tablespoon chili powder
- 3 tablespoon sugar
- 1 teaspoon paprika
- 1 teaspoon garlic powder
- 1 teaspoon onion powder
- Salt

Instructions

1. In the small bowl, mix together the chili powder, sugar, paprika, garlic powder and onion powder. Add salt to taste.
2. Add the seasoning you mixed to the pre-made popcorn bag.
3. Shake the bag to mix the seasoning into the popcorn and enjoy!

Natural and Human-made Disasters

Climates around the world are constantly changing. There are many natural and human-made disasters that alter the climate we live in.

Match the disaster on the left side to its definition and/or cause on the right side by writing the appropriate letter in the blank.

1. _____ **Volcanic Eruptions**

2. _____ **Ozone Depletion**

3. _____ **Greenhouse Effect**

4. _____ **Deforestation**

5. _____ **Wildfires**

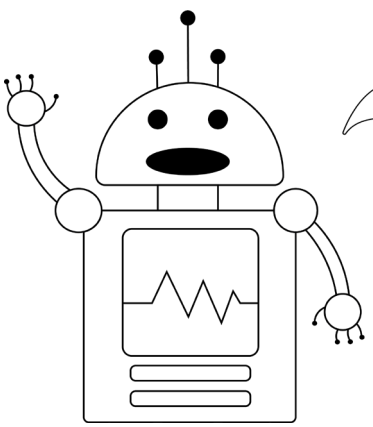
A The thinning of a protective layer. Caused by a release of human-made chemicals.

B Caused by a lack of rain (dryness), or lighting, or human-made fires.

C Molten rock called magma rises to the surface and builds pressure until it explodes.

D Earth traps the sun's heat. Caused by gasses either from livestock or burning fossil fuels.

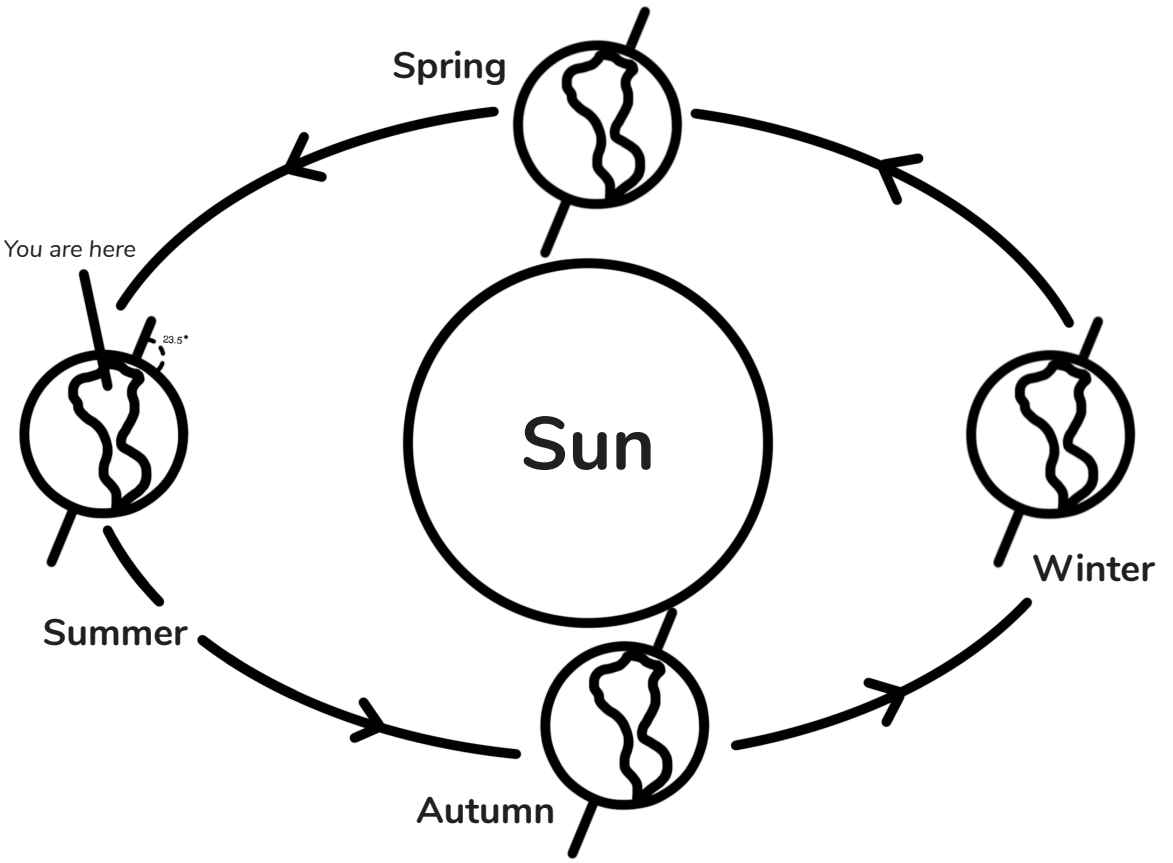
E Cutting down and clearing trees from an area of land.



Inputs and **outputs** refer to the way a computer like me receives data (**inputs**) and sends data (**outputs**). In this activity, you can think of the causes as either natural or human-made **inputs** and the climate changes and disasters as the **outputs**!

An Intro to the Seasons and Weather!

Here in Canada, the year has four distinct seasons: winter, spring, summer and autumn because Earth's axis is tilted at a 23.4° angle. As the Earth rotates around the sun, the sun's rays shine down on Earth at different intensities at different times of the year. This means that Canada may get lots of sun in the summer but Australia, on the other side of the globe, may get less sun because it's tilted away from the sun. Each season has its own characteristics.



In winter, the days are the shortest and by far the coldest. Its weather is characterized by heavy snowfall, strong winds and occasional blizzards. Many animals hibernate, or go into a deep sleep, to conserve their energy in the months where food is scarce.

In spring, the weather is temperate, neither too hot nor too cold. Precipitation is heavier and more frequent to help plants and grow after the long months of rest under the snow. Trees begin budding and return from the south.

In summer, the days are longest and hottest and flowers and trees are in full bloom. There's less precipitation and the days are generally dryer.

In autumn, the days get shorter and colder which results in blooms closing and trees shedding their leaves. Plants and animals prepare for the cold of winter and birds migrate to warmer climates.

Match the Weather Characteristics to the Seasons

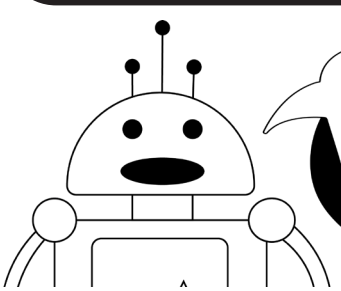
Colour the different pictures on Page 11 then cut and paste them into the season below that represents them best!

Winter

Spring

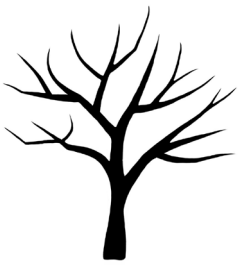
Summer

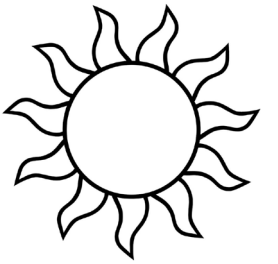
Autumn

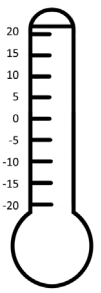


Did you know that sorting helps computers like me store and retrieve information? We need human help to figure out how to sort things though. So as you sort each object into a season, think about what steps you are taking to make each decision. That's what I call a **sorting algorithm**!

SLO : 5-4-06



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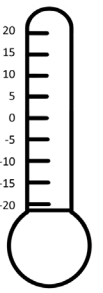
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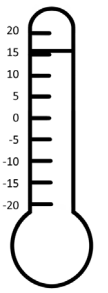
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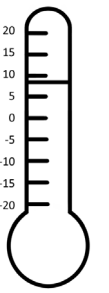
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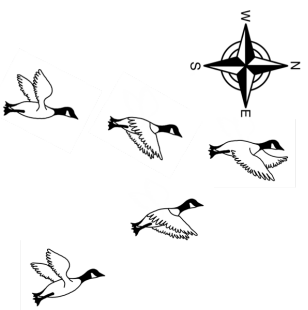
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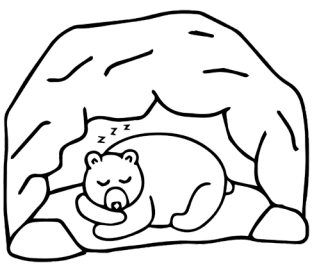

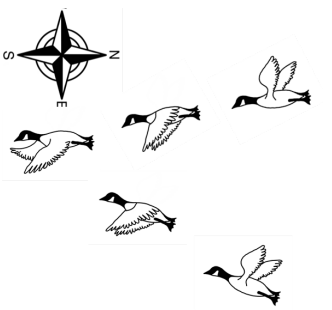
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Oobleck at Home! - An Introduction

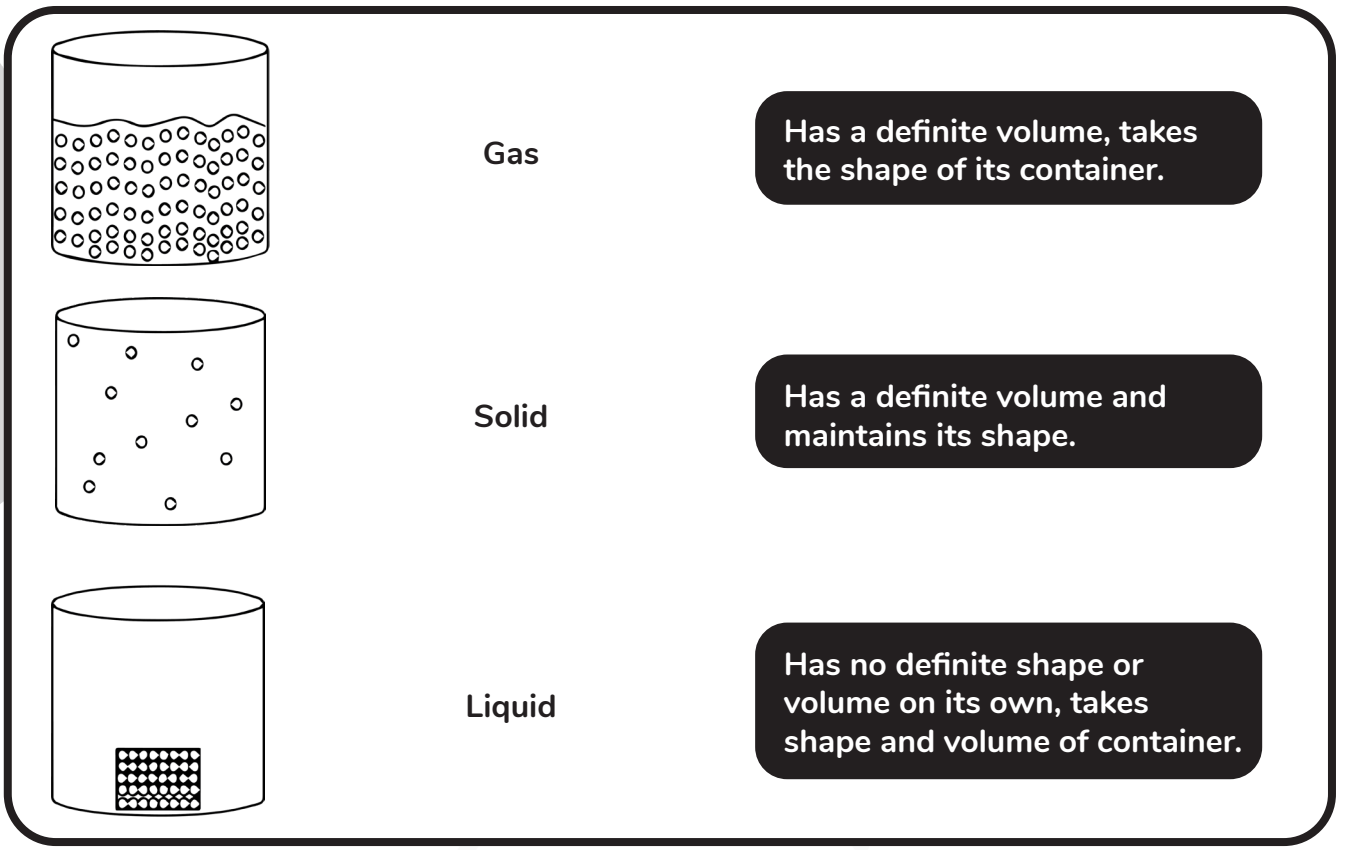
Oobleck is a fun (and messy) activity you can do at home with just two ingredients and a bowl! It is also a very special substance because of the way it behaves when you interact with it. Oobleck is something called a **non-Newtonian fluid**. This means that it doesn't follow typical properties of everyday solid, liquid, and gas.

For example, we can compare it to water: when we pour water, it is a very easy and smooth task to do, as well as running our hand through a bucket of water. No matter how fast or slow we move our hands through water, it behaves the same way, like any other typical liquid. We can also compare it to a solid: we can't pour a solid because it keeps its shape. A solid does not take the shape of the container it's poured into unless it's something granular like sugar or salt. A solid also has a definite size and shape. Oobleck is an interesting substance because it can act as both a solid or a liquid depending on how you handle it and this is because of its unique viscosity.

Viscosity is a word used to describe the rate at which a substance flows. A low rate of viscosity means that a fluid will flow very quickly, which can include things like water. A high rate of viscosity means that a fluid will flow slowly, or is super difficult to pass through, which would be something like honey. Either way, a fluid should flow at a consistent rate unless it is a non-Newtonian substance.

Once you create your own oobleck at home, you will see that it flows at a different rate depending on the pressure applied to it.

In the image below, match the state of matter in the middle with its molecular representation on the left and its properties on the right by drawing lines.



SLO : 5-2-01, 5-2-02, 5-2-03

This activity continues on the next page!

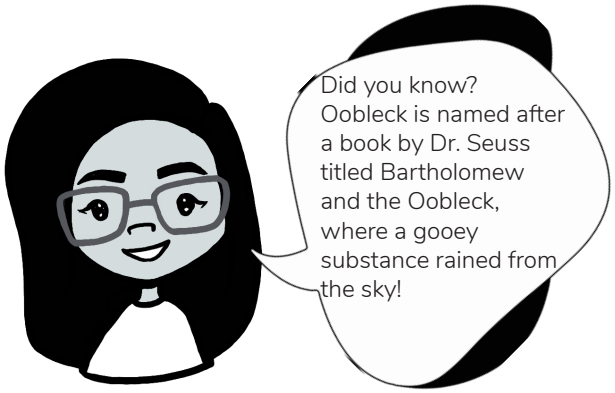
Oobleck at Home! - Let's Make It!

Ingredients
- 1 1/2 - 2 cups cornstarch
- 1 cup water
- Optional: Food colouring

Materials
- Large bowl
- Spoon

Instructions

1. Find a space where you can get a little messy!
2. Take your cornstarch and water to combine in the large bowl, mix with the spoon.
3. Add food colouring if desired.
4. You should be done mixing once it becomes quite difficult to mix, similar to mixing honey.
5. Once the consistency feels right, jump in with your hands! Play around with the oobleck and answer the questions listed to the right when you're all cleaned up.

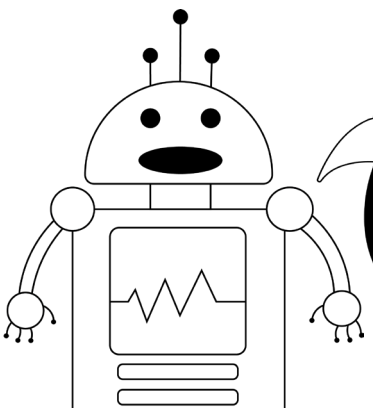


What happens when you run your fingers slowly through the oobleck? Is it more similar to a liquid or a solid?

What happens when you take some oobleck in your hand and squeeze it? What about when you let go? When does it feel more liquid? When does it feel more solid?

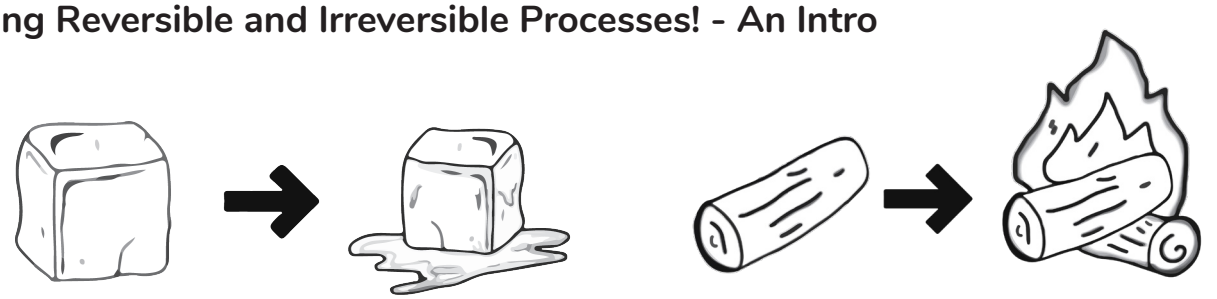
Be sure someone is holding the bowl for this next question! Try punching the oobleck! Does it feel like punching a liquid or like punching a solid?

Anything else super cool you noticed?



Coding challenge: Follow the instructions again, but pretend you're a robot following an **algorithm**! Are the instructions clear enough that you know exactly what to do? Machines need instructions to be super detailed to know exactly what humans want them to do! How would you rewrite the instructions to make it clearer?

Coding Reversible and Irreversible Processes! - An Intro



Reversible

Irreversible

Background

Everywhere you look, things are constantly changing. These changes can be defined as either ***reversible*** or ***irreversible***.

- A change is ***reversible*** if the change can be undone and you can get back the original substances you started with. The substance might look or feel different, but during the process no new materials are created.
  >>> Example: Melting ice forms water, but water can be frozen to form ice.
- A change is ***irreversible*** if it cannot be changed back to how it was before. In an irreversible change, new materials are always formed.
  >>> Example: When you burn a piece of wood, it turns to ash and smoke. You can never get the wood back.

Let's define whether the following processes are reversible or irreversible. To do this, we're going to use Boolean Logic and create some conditional statements. It may sound scary, but all you have to do is state whether the change is reversible or irreversible!

Take a look at our example below: the **variable** is the *substance* that we are looking at, and the **function** (in_the_brackets) is the change that is happening. In the scenarios on page 16, record whether the change on the substance is reversible or irreversible on the line provided.

Example Scenario:

```
Variable = iron

>>> if iron is (melted)
        then    ____________Reversible_____________


>>> else if iron is (rusted)
        then    ____________Irreversible___________
```


This activity continues on the next page!

Coding Reversible and Irreversible Processes! (continued)

Scenario 1: Let's Bake a Cake!

```
Variables = butter, egg, batter, cake

>>> if butter is (melted)
        then   _____________________________________

>>> if egg is (cooked)
        then   _____________________________________

>>> if batter is (placed_in_the_oven)
        then   _____________________________________

>>> if cake is (frozen_for_later)
        then   _____________________________________
```

Scenario 2: Piece it all Together

```
Variable = paper

>>> if paper is (cut)
        then   _____________________________________

>>> else if paper is (folded)
        then   _____________________________________

>>> else if paper is (burned)
        then   _____________________________________

>>> else if paper is (drawn_on_with_markers)
        then   _____________________________________
```

Mass & Weight Crossword - Part 1

Using the definitions below, solve the crossword on Page 18! To help you out, we've provided a word bank at the bottom of this page, but try to see how well you do without using it!

ACROSS

1 Where astronauts go.

5 Push or pull on an object.

8 It keeps you grounded.

9 The stuff around you is made of this.

11 Tiny bits of matter.

13 If I want a birthday party to go well, then should probably

14 A tendency to do nothing or to remain unchanged.

DOWN

2 It means the world to me.

3 The amount of space taken up by matter.

4 Force of gravity on an object.

6 Used to measure weight.

7 Unit of mass.

9 Amount of matter an object takes up.

10 Used to measure mass.

11 Force over a given area.

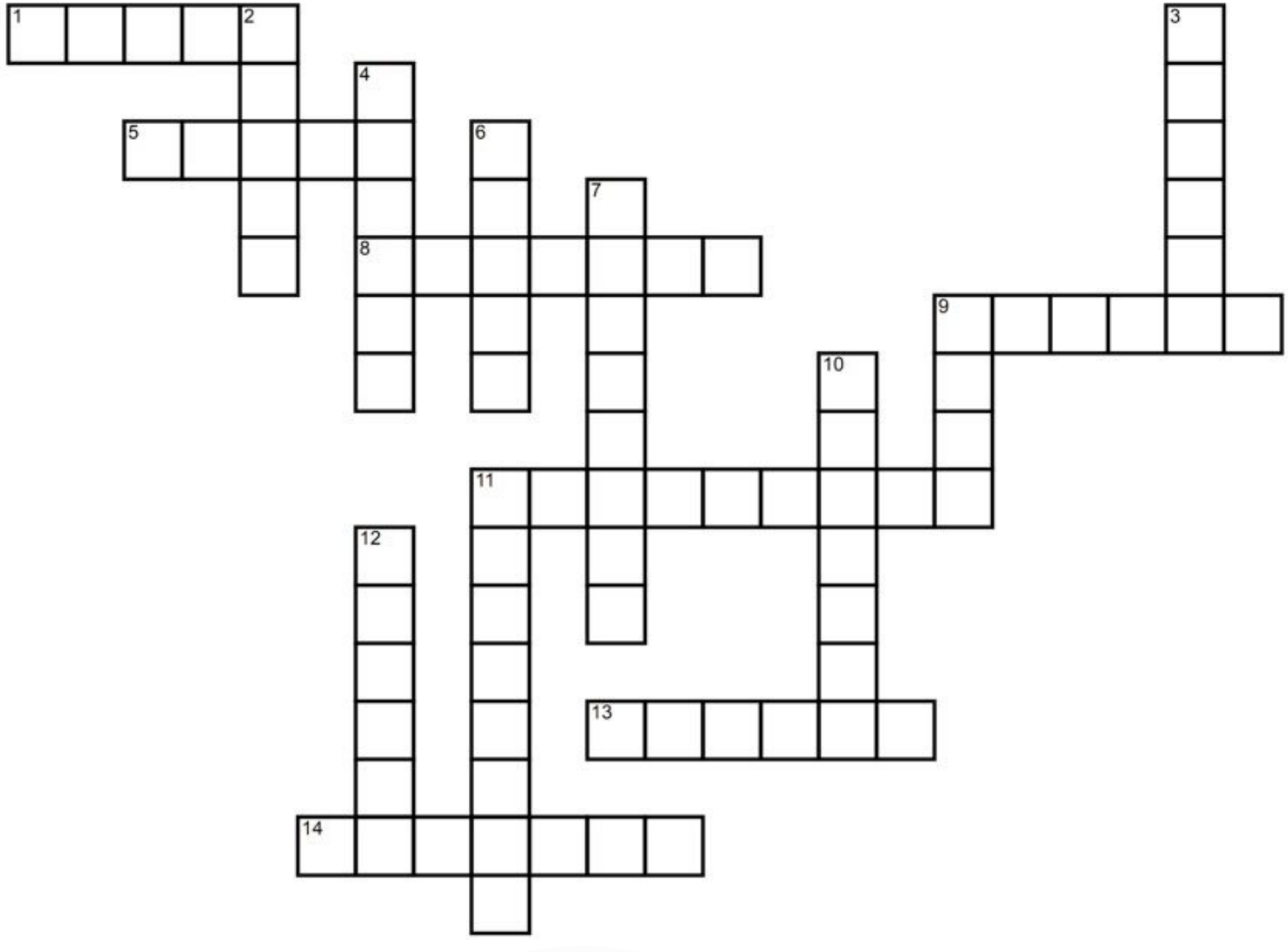
12 Unit of force.

Word Bank

EARTH	SPACE	GRAVITY
NEWTON	PLANET	VOLUME
WEIGHT	PRESSURE	FORCE
SCALE	BALANCE	KILOGRAM
PARTICLES	INERTIA	
MASS	MATTER	

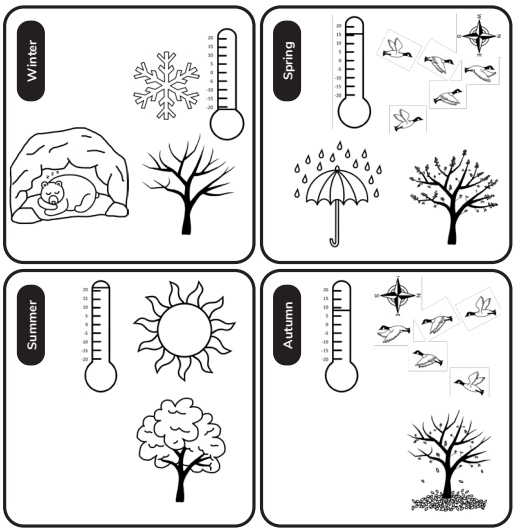
This activity continues on the next page!

Mass & Weight Crossword - Part 2

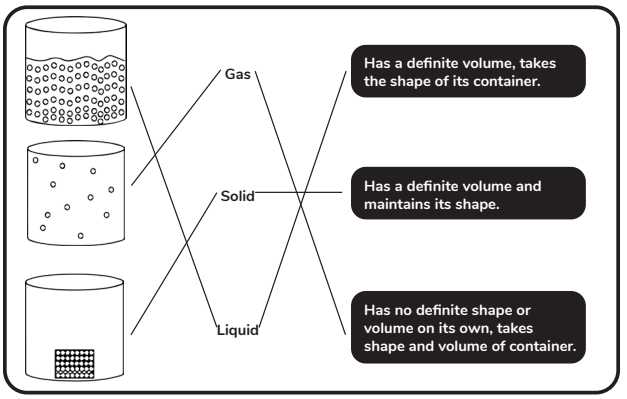


Answer Key

Matching Weather to Seasons (Page 10)



Oobleck at Home! (Page 13)



Coding Processes! (Page 15-16)

```
Variables = butter, egg, batter, cake

>>> if butter is (melted)
        then    _________Reversible_____________

>>> if egg is (cooked)
        then    _________Irreversible___________

>>> if batter is (placed_in_the_oven)
        then    _________Irreversible___________

>>> if cake is (frozen_for_later)
       then     _________Reversible_____________
```

```
Variable = paper

>>> if paper is (cut)
        then    _________Irreversible___________

>>> else if paper is (folded)
        then    _________Reversible_____________

>>> else if paper is (burned)
        then    _________Irreversible___________

>>> else if paper is (drawn_on_with_markers)
        then    _________Irreversible___________
```

Mass & Weight Crossword (Page 17-18)

1. SPACE
2. EARTH
5. FORCE
3. VOLUME
8. GRAVITY
4. WEIGHT
9. MATTER
6. SCALE
11. PARTICLES
7. KILOGRAM
13. PLANET
9. MASS
14. INERTIA
10. BALANCE
11. PRESSURE
12. NEWTON

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