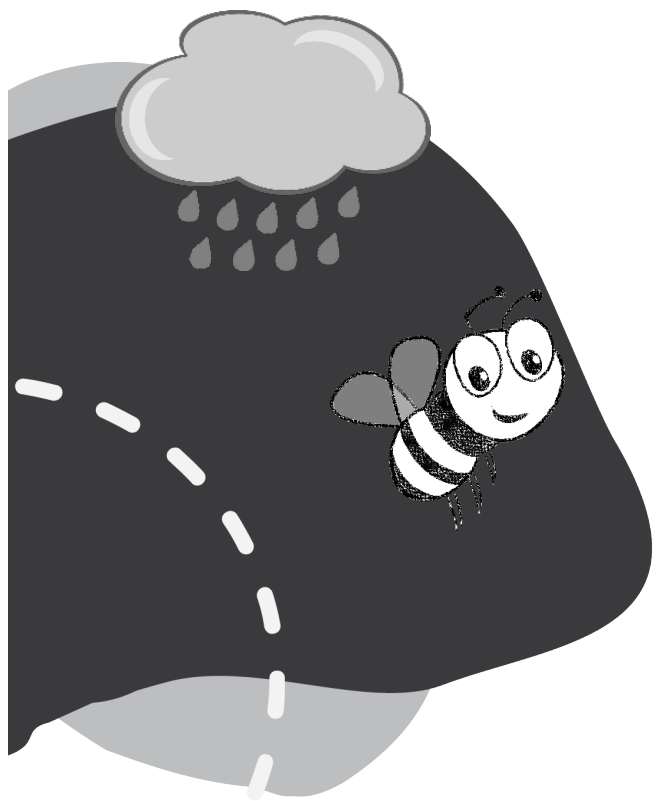


# WISE Activity Booklets

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



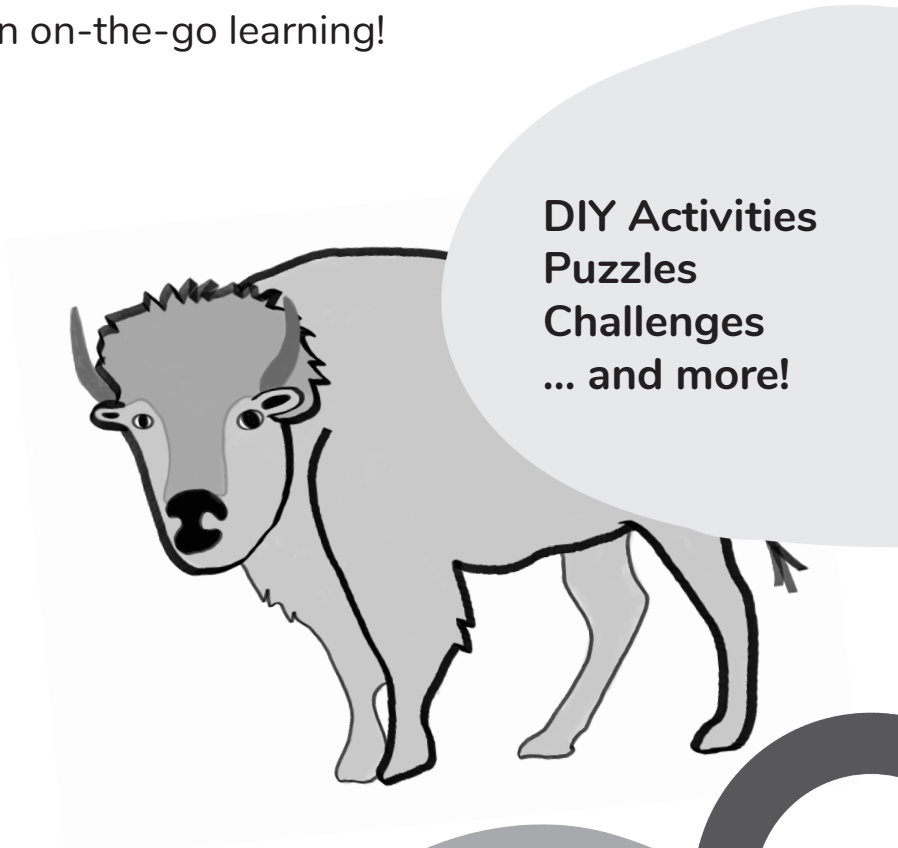
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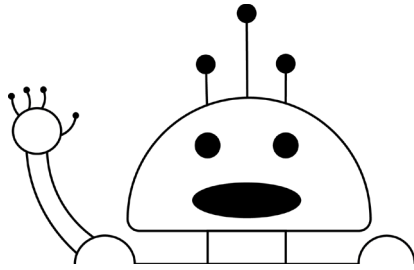
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DIY Activities  
Puzzles  
Challenges  
... and more!

**Grade 3**  
**JUNE 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!

**Katy**

**Katy** has completed her second 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**

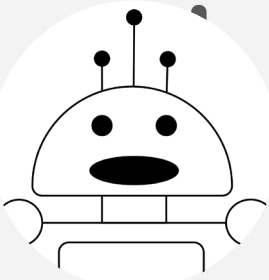
**Olivia** is going into her third year of biosystems engineering. She hopes to work in renewable energy or water treatment in the future. In her free time, she plays and refs touch football and enjoys playing the piano.

**Robyn**

**Robyn** is going into her fourth year of civil Engineering at the University of Manitoba. She enjoys riding her bike, soaking up sunshine and watching live music. Robyn also loves all things science and is pumped about a summer filled with STEM fun.

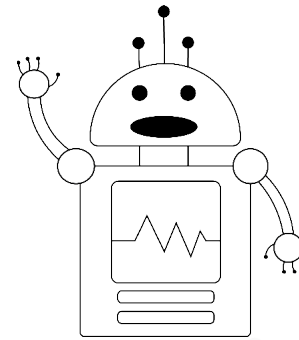
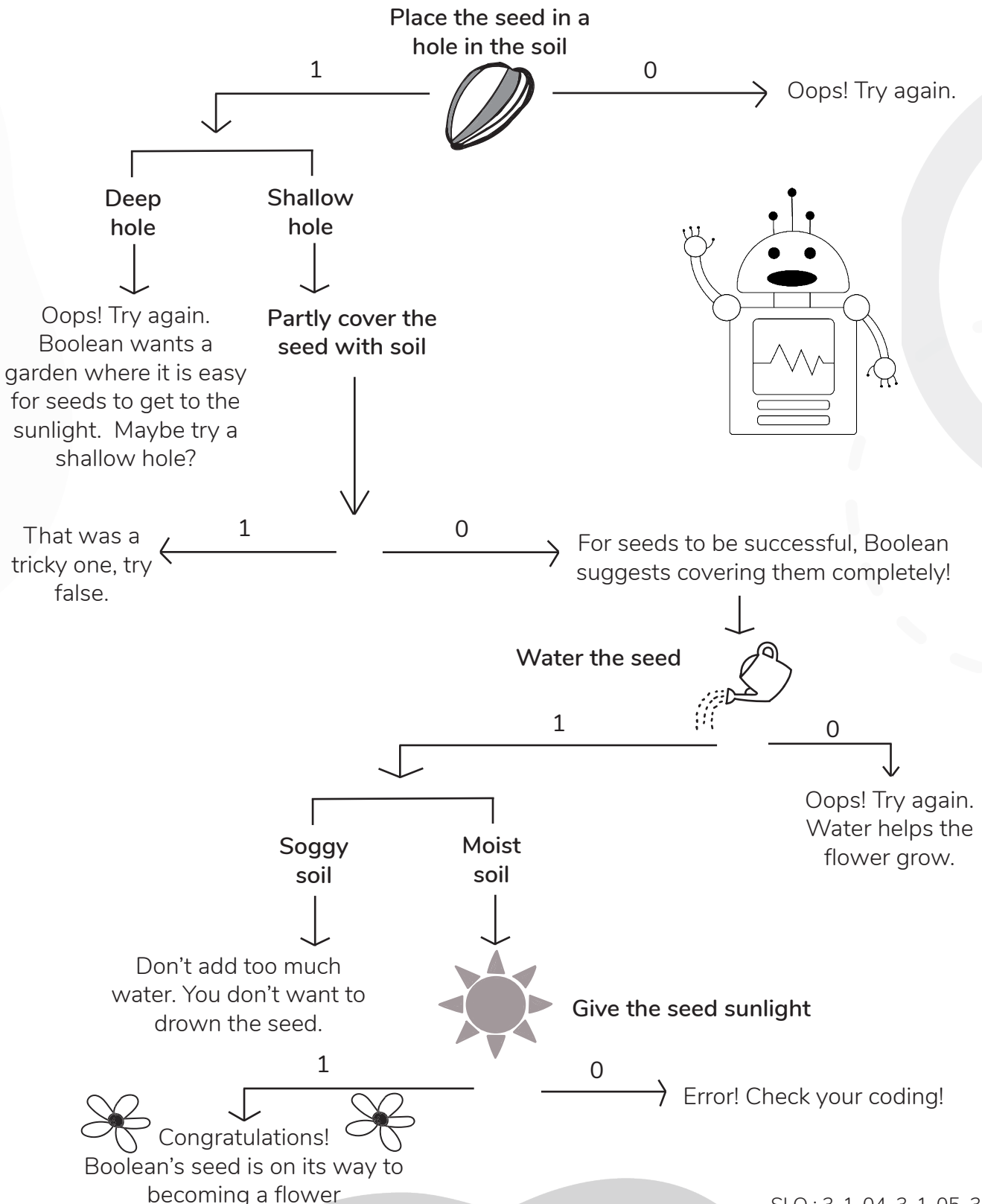
**Esiw the Robot**

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!

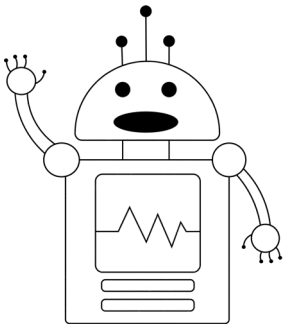


# Boolean's Garden

Help Boolean tend to their garden with a Boolean Algebra Garden Brain Buster. In Boolean's Garden "1" is true or yes, and "0" is false or no. Follow the prompts below to try and help Boolean with their garden.



## Home Terrarium



Esiw wants to learn more about plants and how to keep them healthy and alive! But before we can help Esiw, we have to learn for ourselves about terrariums. A terrarium is a tiny indoor greenhouse that can be open or closed to the environment. Open terrariums have an opening at the top, and need to be watered regularly. Closed terrariums have a lid, such as a jar, and the moisture stays inside the container. Closed terrariums do not need to be watered.

Esiw needs someone to teach them how to keep plants healthy and alive in a terrarium because robots do not have their own creativity like humans. When we give a robot information and teach them something new it's called machine learning. Can you complete the following steps to make your own terrarium and then answer the questions below to help Esiw identify different types of plants and how to care for a terrarium?

Terrariums have plants, soil, and sometimes moss inside. Remember, plants need sunlight to make energy through photosynthesis. They also need water to stay hydrated, and soil to get nutrients. To make your own terrarium you will need the supplies listed below!

### Supplies

- Clear glass or plastic container
- Soil
- Spoon or small shovel
- Small plants
- Rocks
- Optional: Moss, rocks, sand or seashells for decoration

#### STEP 1

Put a couple rocks in the bottom of your container to prevent the plant roots from getting too much water.

#### STEP 2

Add approximately 10 cm of soil to the bottom of your container.



**STEP 3**

Place plants, moss, and all living things in the soil.

**STEP 4**

Add rocks, shells, and any non-living things for decoration. Get creative and make it look beautiful!

**STEP 5**

Water the plants so their roots get wet, and spray the inside of the terrarium for moisture.



*Take good care of your terrarium by spraying the plants with water every couple of days, and watering the plant roots once a week. Water will evaporate in the air, so we need to replenish the moisture within the terrarium if it is open to the atmosphere. Put your terrarium in a window, sunny place, or under a plant light so the plants can get energy from the sun, and watch your terrarium grow!*

Answer the following questions to teach Esiw how to identify different plants and what care they need!

What type of plants are in your terrarium? \_\_\_\_\_

\_\_\_\_\_

Is there moss in your terrarium? \_\_\_\_\_

\_\_\_\_\_

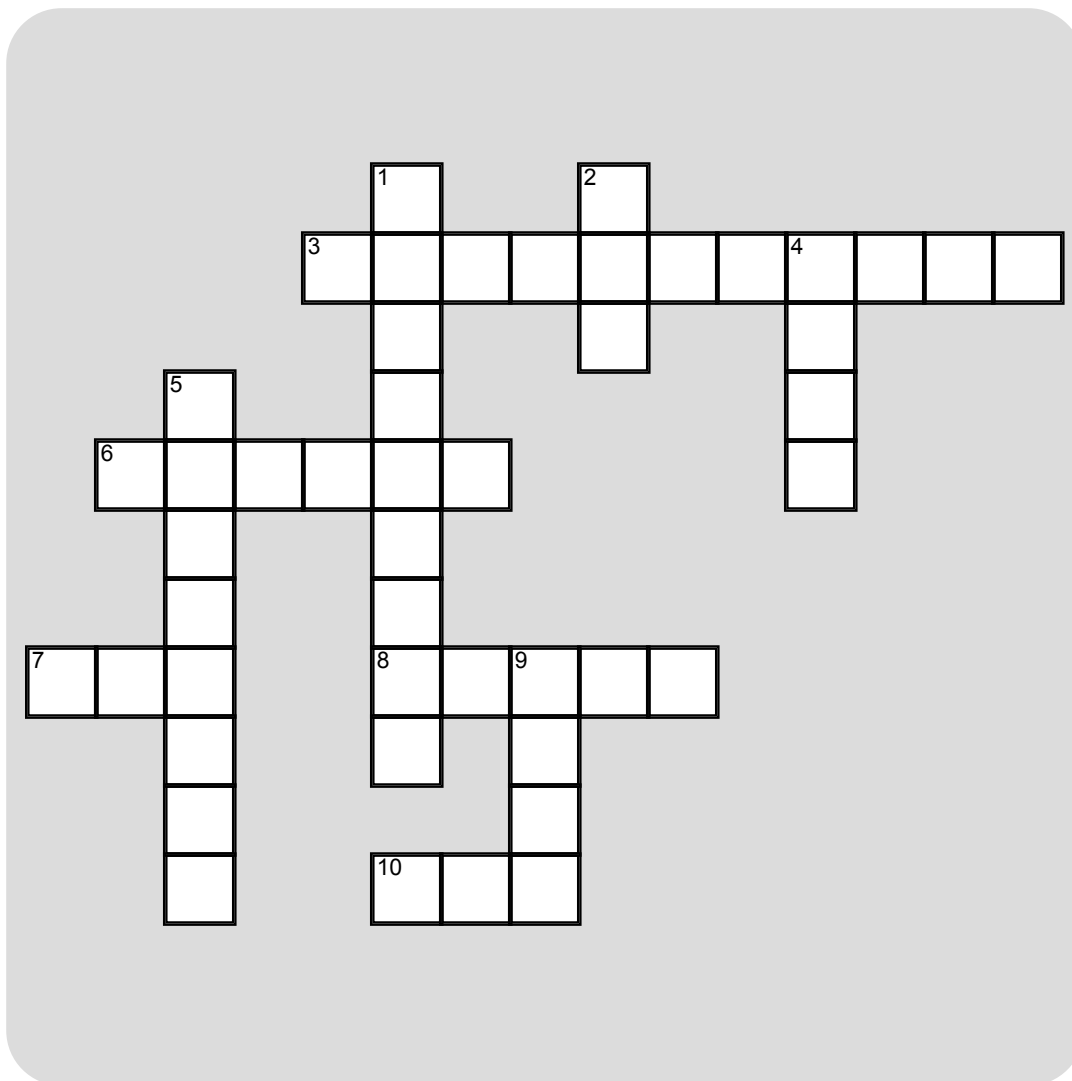
What do the plants in your terrarium need to stay healthy? \_\_\_\_\_

\_\_\_\_\_

Is your terrarium open to the atmosphere like the one above? \_\_\_\_\_

Does your terrarium need to be watered? Remember, open terrariums need to be watered, and closed terrariums already have water inside. \_\_\_\_\_

# Pollinator Crossword



## Across

- 3 A bird that likes red, pink and purple flowers. The bird that does the most pollination!
- 6 Butterflies cannot digest this.
- 7 An insect that is attracted to gross smelling flowers.
- 8 A monkey-like creature with a black and white striped tail that loves to pollinate.
- 10 An nocturnal animal that likes to pollinate bananas and mangoes.

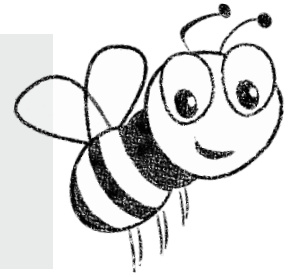
## Down

- 1 An insect that likes fragrant orange, yellow and pink flowers.
- 2 The kind of tree that depends on different types of wasps to pollinate it
- 4 The kind of pollination that happens when a plant is vibrated. It's also the sound a bee makes!
- 5 The insect that does more pollination than any other.
- 9 People hang this from trees to attract flies and increase pollination.



## Bee Hotel

Bees are so important! Because of them, we get pretty flowers to look at and fresh fruit and vegetables to eat. Since we love bees so much, let's build them a hotel! Make sure you get an adult to help you use some of these tools.



What is a bee hotel?

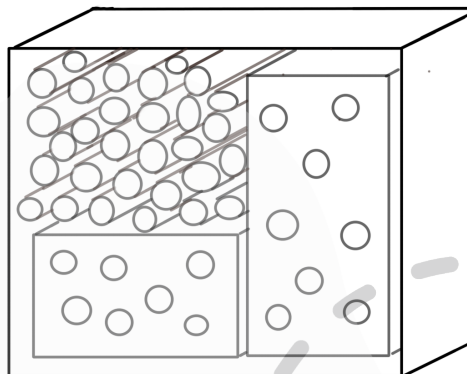
A bee hotel is a place for solitary bees to go and lay eggs. It also keeps them safe from other bugs or animals! Solitary bees don't want to sting you because they don't have a nest to protect. All they want is a safe place to lay eggs.

### Supplies

- A milk carton, bucket, pipe or old crate. Make sure it's waterproof!
- Wood blocks or logs
- Straws (bubble tea straws) or hollow stalks like bamboo

### Instructions

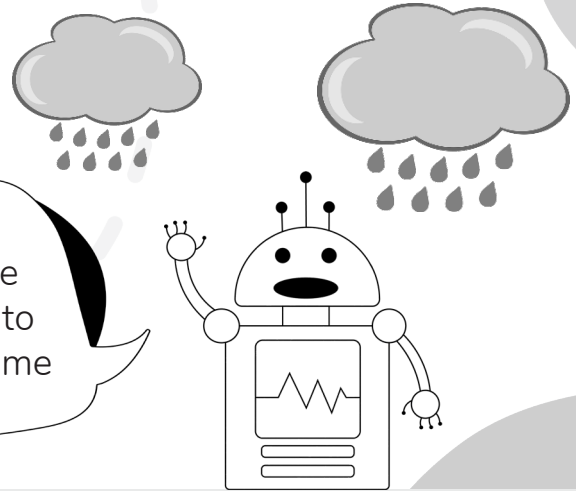
1. Get an adult to help you drill  $\frac{1}{4}$  inch holes into the wood blocks. Try to make them around 3 to 6 inches deep.
2. Put the wood blocks into your waterproof container. Add the straws or bamboo stalks around the blocks.
3. Hang your bee hotel outside. Try to put it close to some flowers and hang it so that it doesn't move in the wind. Make it so the entrance points east or southeast so it faces where the sun rises! You can even put a piece of wood on top of it to protect it from the rain. Bees don't like movement, so you want it to be secure and stable in a high place where other people won't move it.
4. Finally, check out your hotel and watch for any bees!





## Survive the Storm

I need your help! There's a storm coming but because I am a robot, the rain would make my circuits fry and my metal rust. Your job is to design and build a shelter that will help keep me safe and dry during the storm!



**Guidelines:** Your design needs to be able to keep out heavy rain and stand against strong winds. It needs to be at least 6 inches tall and 5 inches wide, so Esiw has space to fit inside. There needs to be a door that can open and close so our robot friend can easily get inside and the shelter needs a floor so that the water doesn't get on Esiw's feet.

It's important to think about what shapes and materials to use. Here are some good questions to ask yourself:

- Can you think of any materials around your home that are waterproof?
- What materials would be strong and durable enough to stay standing against strong winds and heavy rain?
- What shapes can you use to make sure your structure is very stable?

Once you come up with some ideas, it's time to draw your design! Include some labels to show what supplies you're going to use.

*Draw your shelter here!*

## Survive the Storm ... Let's Test!

Below, list the supplies you found around your home that you think are waterproof and non-waterproof that you will use in your design. Make sure you talk to an adult to see if you can use something.

### Waterproof supplies:


### Non-Waterproof supplies:


Now it's time to build! Grab all your supplies and have fun!

### Let's test your shelter to see if it's waterproof:

Put your structure outside or in a bathtub or sink, take a cup or watering can and fill it with water. Put something inside your structure that will help you see if water comes in, like a piece of crumpled paper or a cloth. Now pour water over your structure!

### Let's test your shelter to see if it will stand up against wind:

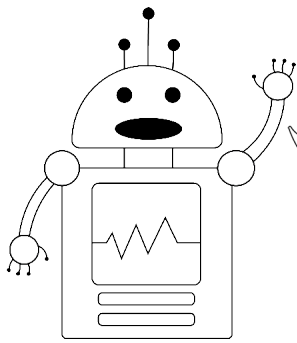
If you have a fan, you can do this inside, put the structure in front of the fan to test its wind resistance. If your structure has some weight to it, it should not be easy to blow over. With the fan, start on the lowest setting and increase the fan speed to see how your shelter stands up against the different wind speeds.

If you don't succeed, don't worry! Design is all about trying until you find something that works. The only way to truly fail is to give up.

## Balance

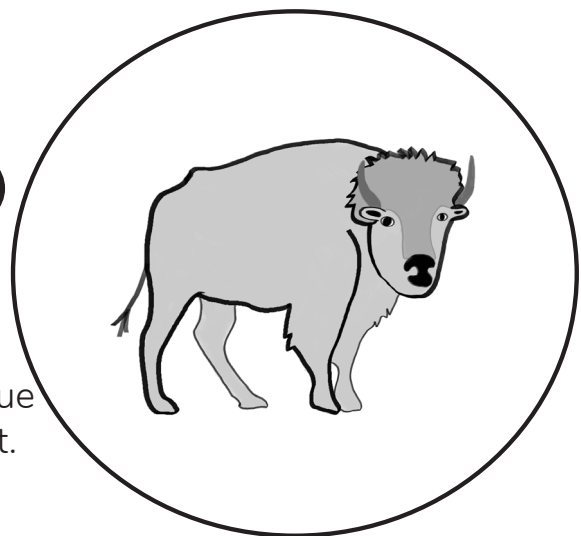
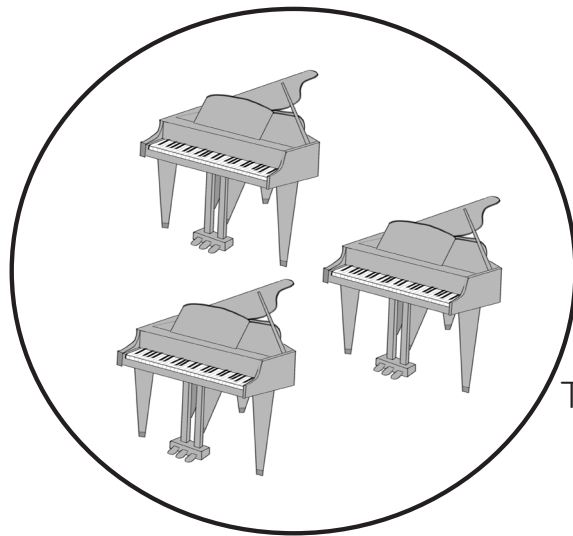
When we are building structures, it is important to recognize that balance affects stability.

Every object has a weight and a density; the way the weight is distributed in an object, or living thing is different and affects their balance.



Did you know that in coding true is represented as ~1~ and false as ~0~?

Here's an example of two different objects that equal the same weights.



This is a true statement.

~1~

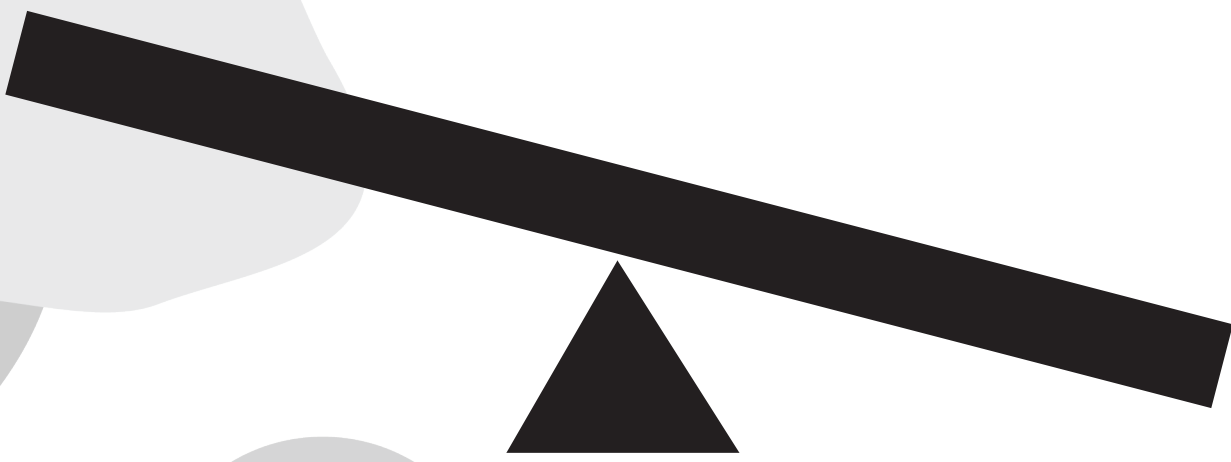
3 Pianos = 1 Bison  
10 Humans = 1 Piano  
12 Bowling balls = 1 Human

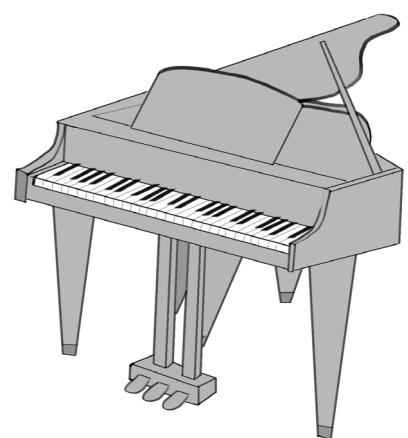
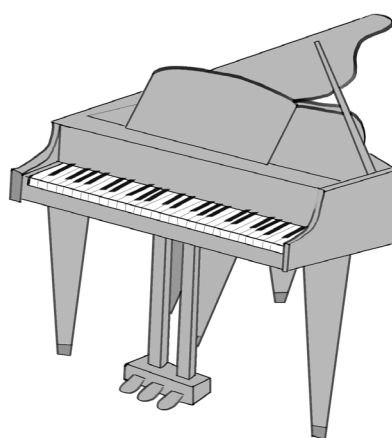
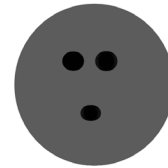
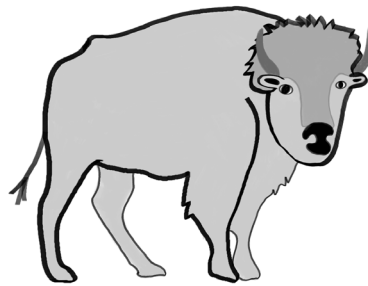
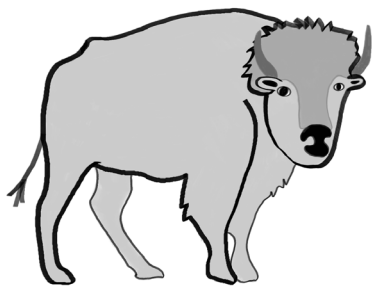
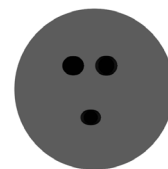
~1~

5 Humans ≠ 1 Bison  
2 Pianos ≠ 5 Humans  
1 Computer ≠ 1 Bowling ball

Let's practice balance!

Cut out the object on the next page and place them onto the balances below to make them true. For the scales to be true, you will need to make the first balance have equal weights and for the second have weights that are not equal.





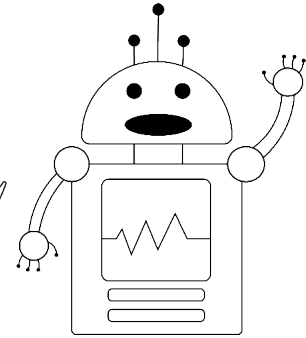
Try making a balance at home! Here are some ideas:

- Use a hard cover book and a can of soup
- Use a long flat piece of wood and a tennis ball
- Check out your local park and see if they have a teeter-totter; it's a big balance!

This page is left blank intentionally because the previous page is meant to be cut up.

## Electric Prank

Caution: Only prank those who want to be pranked. Be prepared, once you prank someone, they can prank you back!



This prank uses everyday materials to create electrostatic charges that you can transfer to your friends or family!

### Instructions:

STAND ON  
CARPET

RUB FEET ON  
CARPET

GENTLY TAP  
PERSON YOU  
WANT TO  
PRANK

By rubbing your feet on the carpet, you create a build-up of electrons. The shock you feel is the transfer of electrons from your finger to the other person



## Help Esiw bridge the gap!

It's time to put your engineering skill to the test.

Help Esiw bridge the gap, think about the type of soil you are building on. Will it fall into the gap with certain types of bridges? What shape would be the best to use to help Esiw get to the other side of the gap?

**Phase 1:** Plan out your design by drawing a rough sketch on a scrap piece of paper.

**Phase 2:** List your materials below.

**Phase 3:** Draw a final sketch.

Materials:

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---

---

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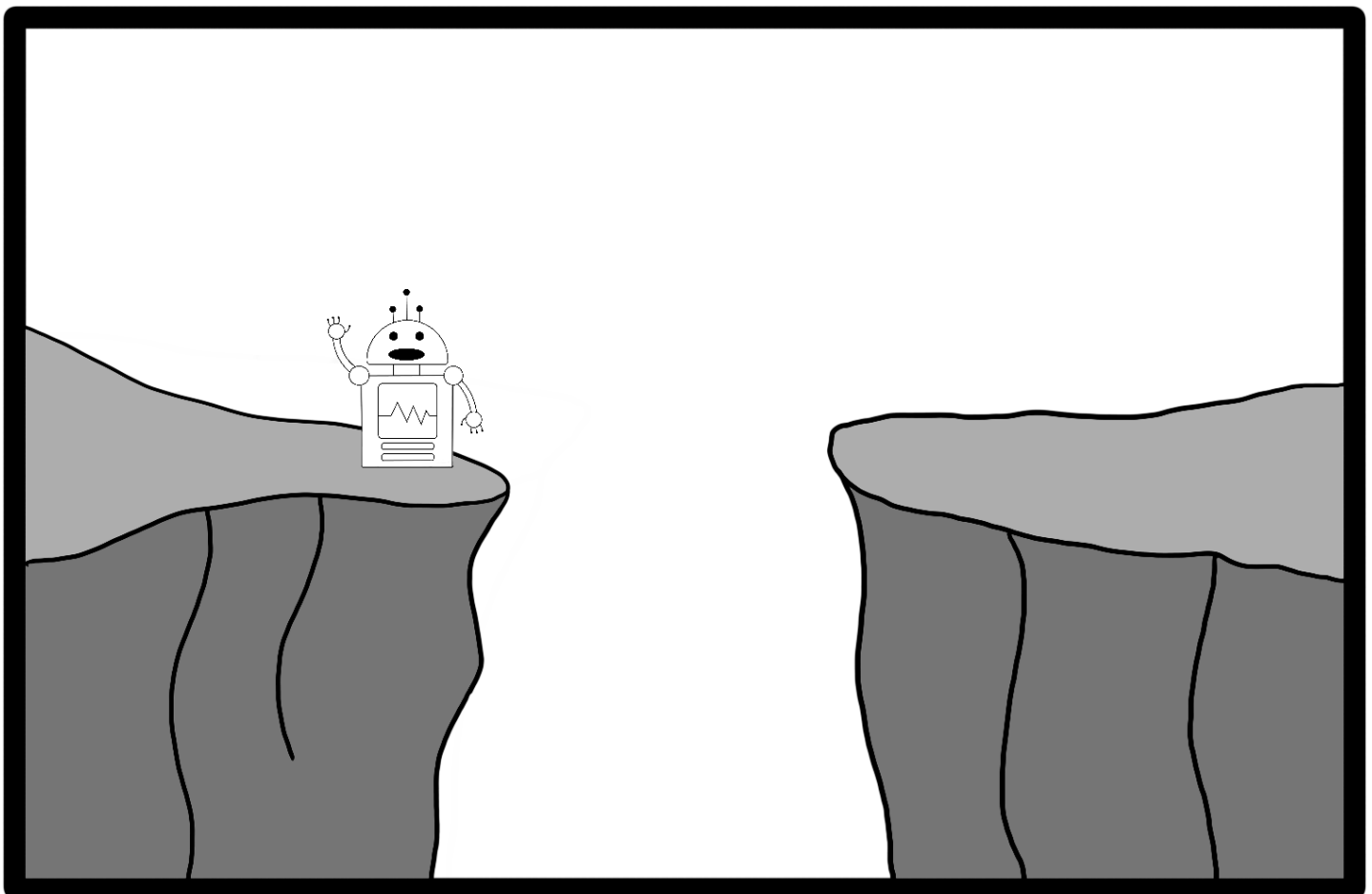
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The gap is about 10 meters wide and your structure will be subject to strong winds.

Be sure to list materials that are strong; Esiw needs to get across safely.



## The Science of Compost

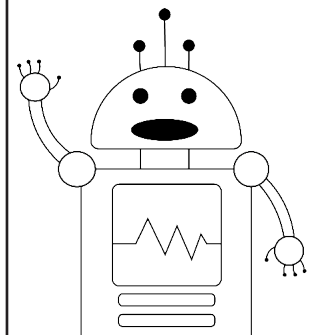
Composting is nature’s way of recycling. But how does it work? Composting is when organic waste is broken down by tiny microorganisms called bacteria. Once broken down, it can be reused in nature as nutrient-rich soil to grow new plants. But not everything can be composted. When we compost, we have to consider if a material is organic waste. And remember, if waste cannot be composted, we might be able to recycle it! Let’s look at examples of compostable materials and non-compostable materials in the chart below.

Compostable Materials	Non-Compostable Materials
<ul style="list-style-type: none"> <li>• Fruit and vegetable scraps</li> <li>• Egg shells</li> <li>• Coffee grounds</li> <li>• Plant/grass clippings</li> <li>• Leaves</li> <li>• Paper towels</li> <li>• Napkins</li> <li>• Newspaper/paper products</li> <li>• Dryer lint</li> </ul>	<ul style="list-style-type: none"> <li>• Meat</li> <li>• Dairy products</li> <li>• Plastics</li> <li>• Metal</li> <li>• Glass</li> <li>• Styrofoam</li> <li>• Ceramics</li> </ul>

### Green and Brown Materials

Within the list of compostable materials, we have green and brown materials. Green materials have a lot of nitrogen, and brown materials have a lot of carbon. We need both green and brown materials in our composter so we have both nitrogen and carbon in our compost. Let’s sort the green and brown materials into the chart below!

Green Materials	Brown Materials
-	-
-	-
-	-
-	-



# Make a Home Composter

## Supplies

- Clear plastic container (4L milk jug, 2L pop bottle, etc.)
- Scissors
- Spoon/small shovel
- Green compostable materials
- Brown compostable materials
- Spray bottle/watering can

## Instructions

STEP 1

Rinse your container and cut the top section off, approximately 10 cm down from the lid at the top. Ask a parent or friend for help using the scissors.

STEP 2

Place a 5 cm layer of brown material in the bottom of your container, and spray the layer with water until the material is damp. (If you forget what brown materials are, review the chart on the previous page).

STEP 3

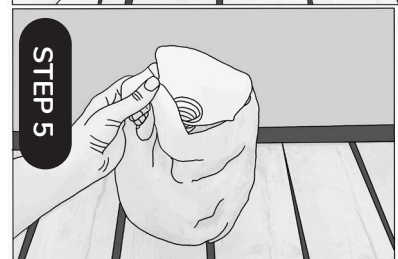
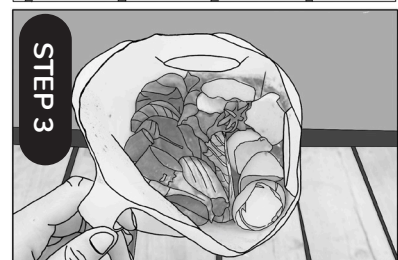
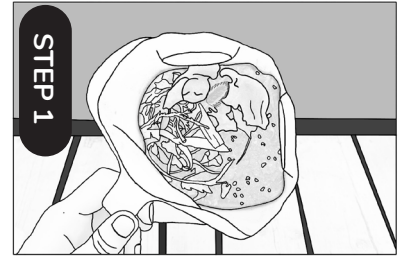
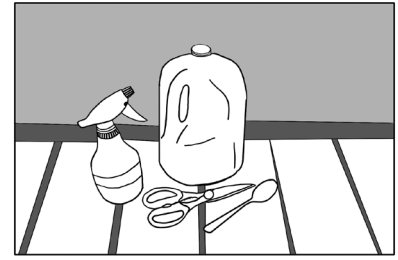
Place a 5 cm layer of green material on top of the brown layer. Spray the green layer until the new material is also damp.

STEP 4

Continue to layer your materials, alternating between green and brown and watering after each new layer, until you have filled up your container. Make the final top layer a brown material layer to prevent odour from your composter!

STEP 5

Place the lid you cut off from your container on top of your composter upside down, to close the container. You could also use tape to reattach the lid of your container. And you're done!



## How to Care for Your Composter

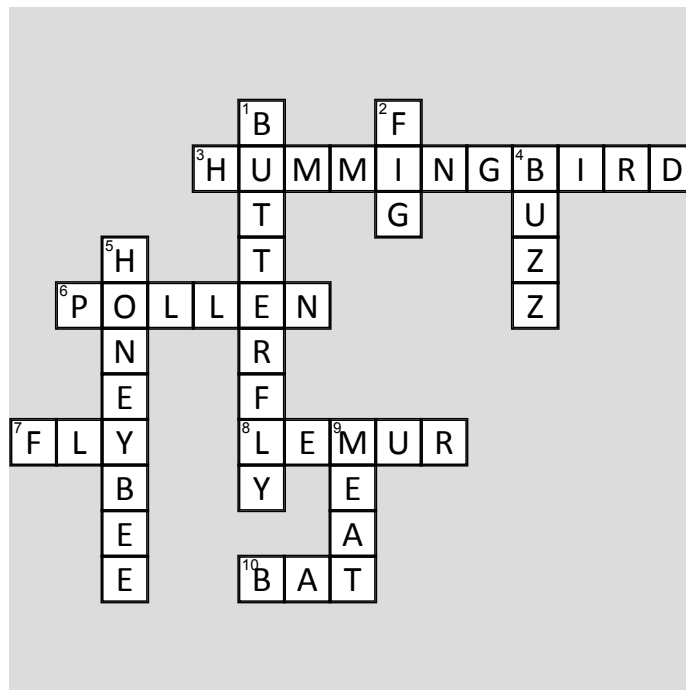
Spray your composter with water every day, through the top of your container, to keep the material damp and the microorganisms healthy. Put your composter in a sunny window to speed up the composting process. Stir your composter once a week with a spoon to mix the green and brown materials together. When you're ready, put your compost outside in a garden to add nutrients to the soil!

Congratulations on making your own compost, and helping nature recycle!

SLO : 3-4-11

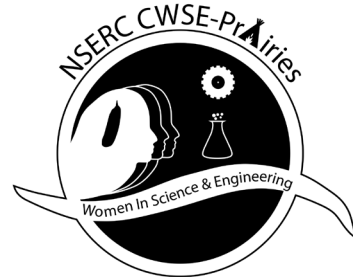
# Answer Key

## Page 7: Pollinator Crossword Puzzle



**Page 18:** Green Materials: Fruit and vegetable scraps, Egg shells, Coffee grounds, Plant/grass clippings. Brown Materials: Newspaper/paper products, Dryer lint, Soil, Dried leaves.

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