

WISE Activity Booklets

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

DIY Activities,
Puzzles,
Recipes
... and more!



University
of Manitoba

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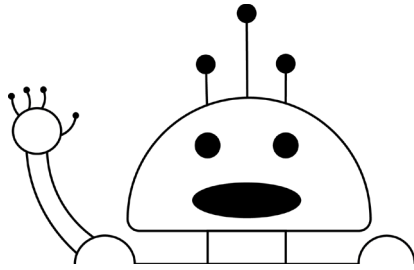
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With funding from
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Grade 2

JUNE 2020

Growth and Changes in Animals
Properties of Solids, Liquids and Gases
Position and Motion
Air and Water in the Environment



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 2 booklet, the science topics you will be exploring are the growth and changes in animals, properties of different phases, position & motion and air & water in the environment!

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!

Amelia just completed her first year of the two-year education 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.

Amelia

Brandi

Brandi just finished her first year in the Faculty of Science and plans to apply to the College of Pharmacy in the future. When she's not studying chemistry she loves to listen to music, hang with her cats, and nap.

Brenna is in her second year of mechanical engineering and loves science, especially physics! In her free time she likes to paint or draw, see friends, and play with her dog.

Brenna

Sophia

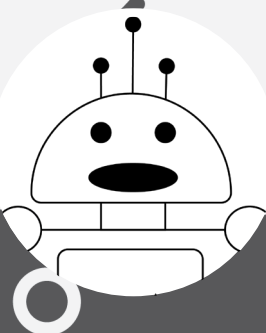
Sophia is in her second year of science and is planning on going into optometry in the future. She loves math and biology, and in her free time loves swimming, reading and trying new foods!

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

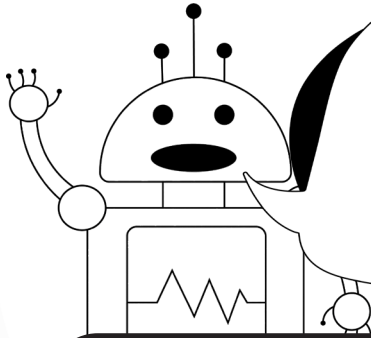
Esiw the Robot

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!



Find Five Faults on Fred's Farm

This is Fred's farm, it is a great home for Fred. However, there are some problems that are causing pollution. Can you find the five things that are causing pollution on Fred's Farm?



Pollution is a really big problem! Sometimes I have problems too. When I have a problem, it's called a "bug" and when it is fixed it's considered "debugged". Can you debug Fred's farm and find the things causing pollution?



Let's Make a Pie

When we follow a recipe we use ingredients that are solids, liquids and gases. When you are following a recipe, the ingredients go through different state changes. By combining substances together we will create something new and yummy!

Follow the recipe below to learn more about different states of matter and to make a delicious pie! Make sure you ask your parent, guardian or older sibling to help make this with you!

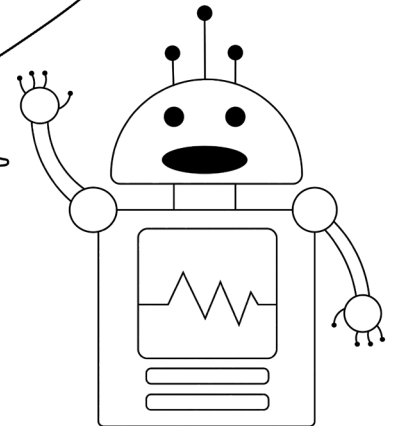
Ingredients

- 1 1/2 cups graham cracker crumbs
- 6 tablespoons butter
- 1/2 cup granulated sugar
- 2 cups milk
- 1 package of instant pudding mix
- whipped cream
- toppings of your choice

Materials

- 8 or 9 inch pie dish
- food processor/ blender/ rolling pin
- whisk
- medium bowl

Coding is a lot like baking! The ingredients are the input, the instructions are the code which creates the output, which in this case is the pie!



State of Matter Statement:
We are mixing two solids (sugar and crackers) together with a liquid (melted butter). Notice how the sugar dissolves and becomes part of the liquid and the cracker does not dissolve and remains solid.

To make the crust:

1. Crush the graham crackers to make crumbs. You can use a food processor, a blender or place the crackers in a sealed bag and crush them with a rolling pin
2. Melt the butter. Combine the melted butter with the sugar in a medium bowl.
3. Fold in the graham cracker crumbs, until the mixture has a wet, sandy texture.

State of Matter Statement:

When we let the crust set, there is state change! The melted butter cools off in the fridge and becomes solid.

4. Pack the mixture into the bottom and up the sides of the pie dish. We recommend using a spoon or a spatula or the bottom of a cup to help really pack it down into a hard crust.
5. Let the crust set for at least an hour in the fridge

To make the filling:

1. Whisk together the milk and pudding mix for about 2 minutes.
2. Pour the pudding into the set pie crust.
3. Chill in the fridge until set.

State of Matter Statement:

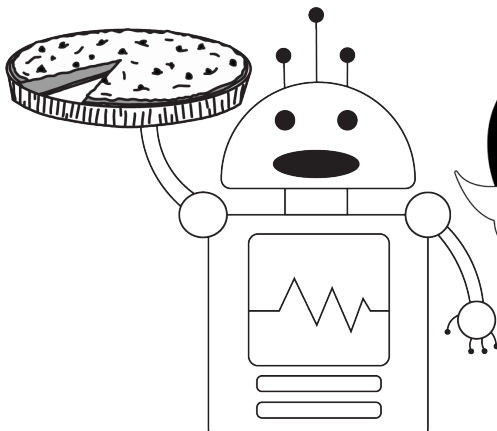
The pudding powder is a solid that is dissolved in a liquid, milk, to become a liquid, that is a lot thicker!

To decorate:

1. Finish your pie by putting whipped cream on top and any of your favorite toppings. Get creative with your flavour combinations! You could try :
 - Vanilla pudding with berries
 - Chocolate pudding with mini marshmallows (s'mores pie!)
 - Banana pudding with sliced bananas and chocolate chips
 - Pistachio pudding with chopped nuts

State of Matter Statement:

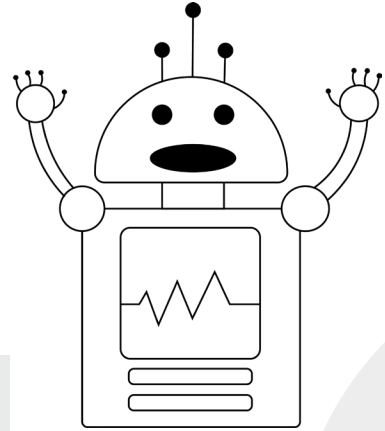
Did you know that whipped cream is light and fluffy because there are small gas bubbles trapped inside!



Your output (pie) sure does look tastier than mine! My outputs are often actions or data!

How to Build an Anemometer

I am really good at following instructions. I have special instructions that tell me what to do all of the time! These special instructions are called a “code”! Are you good at following instructions?



Follow the instructions below to build your own sundial.

Materials: 3 thin wooden dowels or skewers, 5 paper cups, an empty water bottle (any size), a hole puncher and tape.

STEP 1

Ask an adult for help to punch holes in one side of four of the cups. Add a piece of tape or colour one of the cups a different colour so it is easily identifiable.



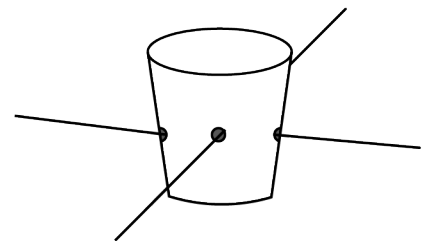
STEP 2

Ask an adult for help making four evenly spaced holes in the fifth paper cup.



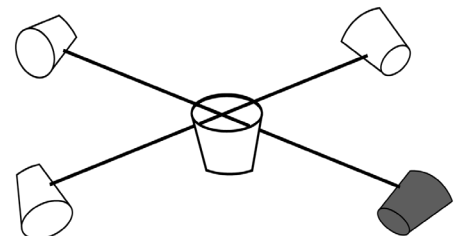
STEP 3

Slide two of the wooden dowels through the fifth cup so that it makes an “X” inside.



STEP 4

Add one cup to each end of the dowels and secure them with tape. Make sure the cups are all facing the same direction in the circle!



STEP 5

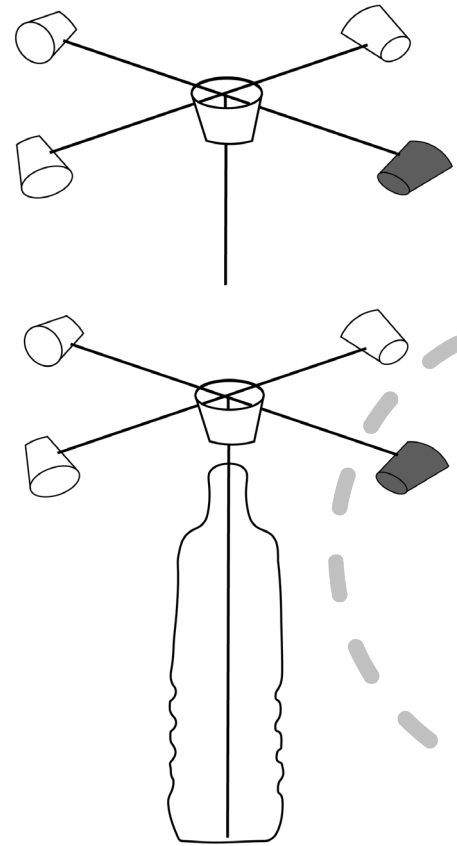
Take the third wooden dowel and poke a hole in the center of the fifth cup. Slide it up until it touches the "X" you made before with the other dowels.

STEP 6

Place the middle dowel into the empty water bottle.

STEP 7

Decorate your water bottle and the other cups of your anemometer.



An anemometer is a device used to measure the speed of the wind. The faster the wind is blowing, the faster the cups will spin around the bottle!

Take your anemometer outside and set a timer for 30 seconds, then count how many times the cup that you coloured a different colour (step 1) goes in a circle. On windier days it will go around more times in 30 seconds.

You can also try this by running as fast as you can and seeing how fast it spins, or by holding on your bike or when driving slowly. Make sure you are always setting a timer though so that you are counting how many times it spins in the same amount of time.

How to Build an Origami Canoe

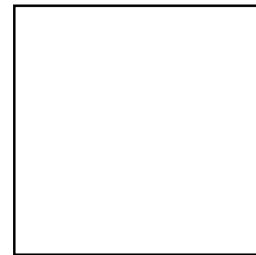
Follow the instructions below to build your own origami canoe! All you need is a piece of paper!



Did you know that Indigenous people in Canada, like the Algonquin and the people of Eastern woodlands, used the birchbark canoe to travel across water? They were made to be light and thin for easy travel over shallow water and so that they could be carried when needed.

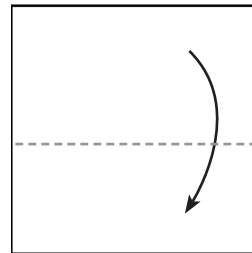
STEP 1

Ask an adult for help to cut your paper into a 7cm x 7cm square (or use some origami paper).



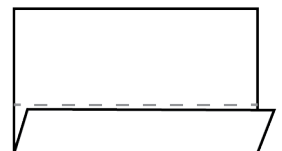
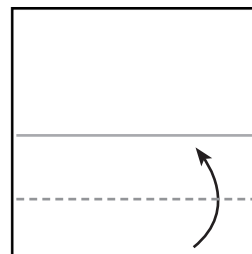
STEP 2

Fold the piece of paper in half.



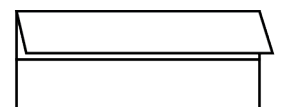
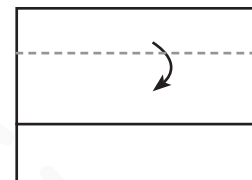
STEP 3

Unfold the paper, then fold one side in to the crease you just made.



STEP 4

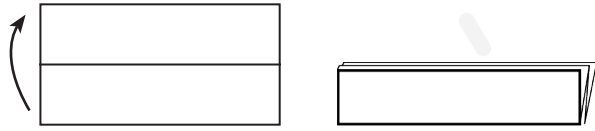
Fold the other side to the middle crease too.



This activity continues on the next page!

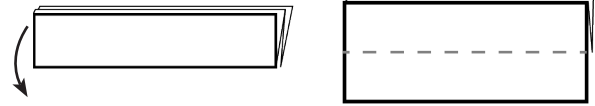
STEP 5

Fold the paper in half again, so that the edges are facing out.



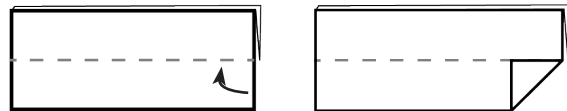
STEP 6

Unfold one flap.



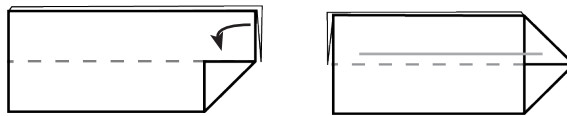
STEP 7

Fold the top corner down to the middle crease.



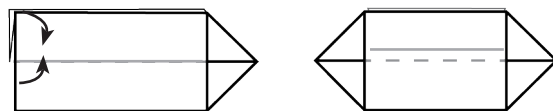
STEP 8

Fold the other corner (that is 3 papers thick) down to the middle crease too.



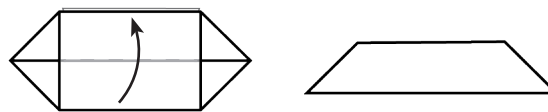
STEP 9

Repeat on the other side.



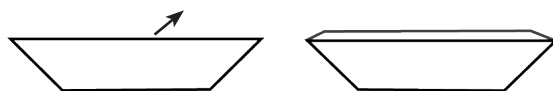
STEP 10

Fold it in half.



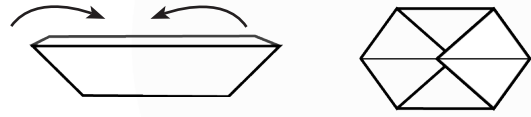
STEP 11

Turn it around and open up the long side.



STEP 11

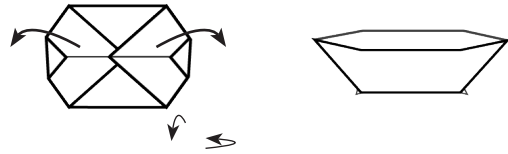
Fold the pointy edges towards the middle.

**STEP 12**

Fold down the ends of the hexagon, and really push down hard on the seam.

**STEP 13**

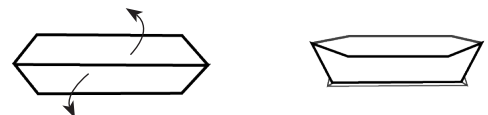
Open up the longer flaps (that you folded down in step 12).

**STEP 14**

Fold the top edges towards the middle crease.

**STEP 15**

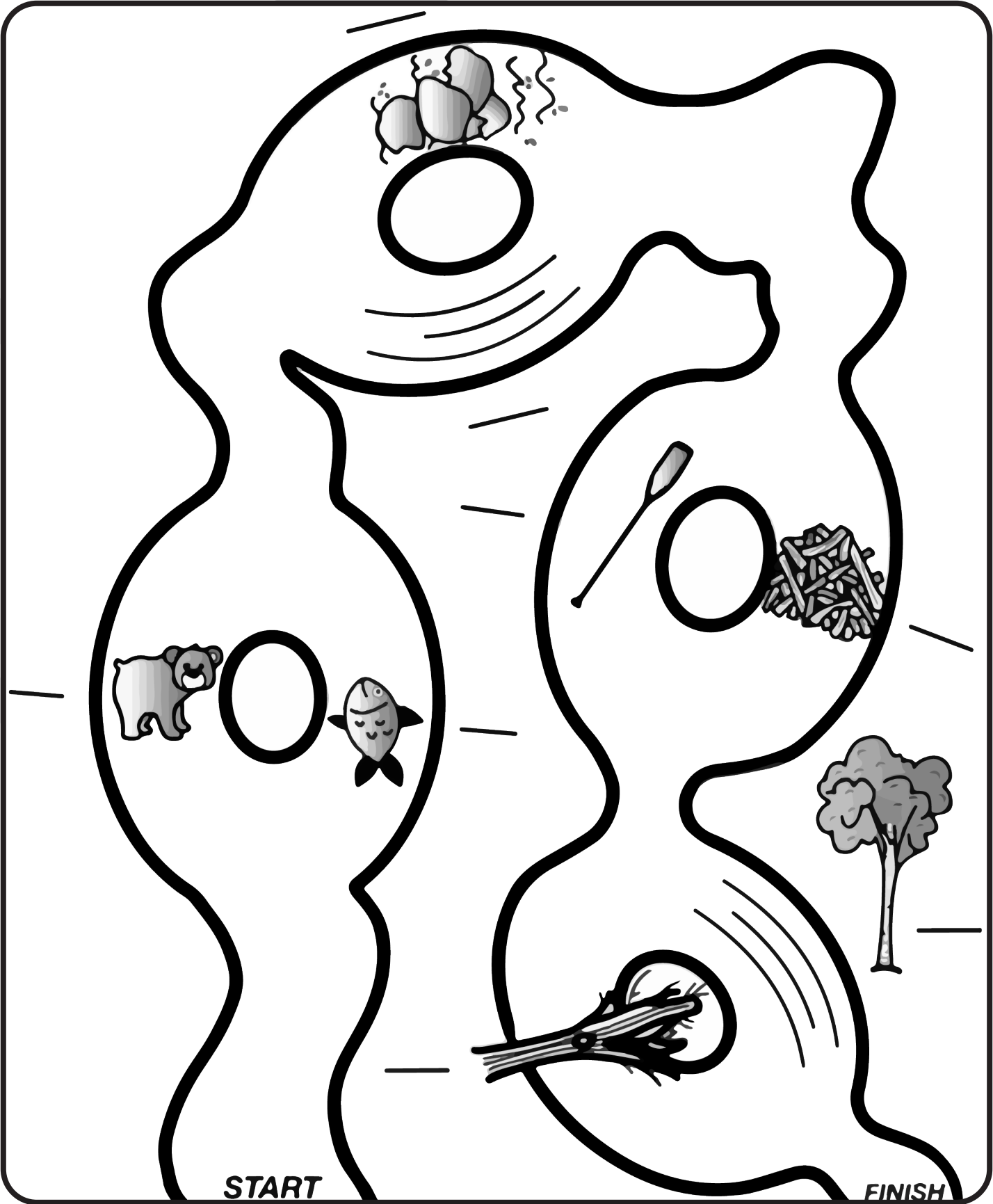
Unfold that last fold part way and there you have it! Your own canoe



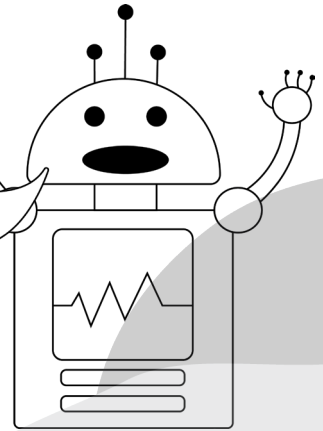
You can try making different sized canoes by starting with different sizes of square papers! How small can you make one?

And now you can use your canoe to travel through the river on the next page! Make sure you avoid paths with trees, rocks, dangerous animals and roughwaters, because they will cause you to sink!

To help you before you start look at the river and write a “0” on the line beside each object that will cause you to sink and a “1” on the line beside each object that will help you!



Whoa! Did you know you just wrote in binary? Binary is the language computer use to run; it's just 0s and 1s, like "yes" or "no". With binary you showed me which paths I should not take with 0s and which paths I should with 1s! Now we both know how to travel on the river safely!

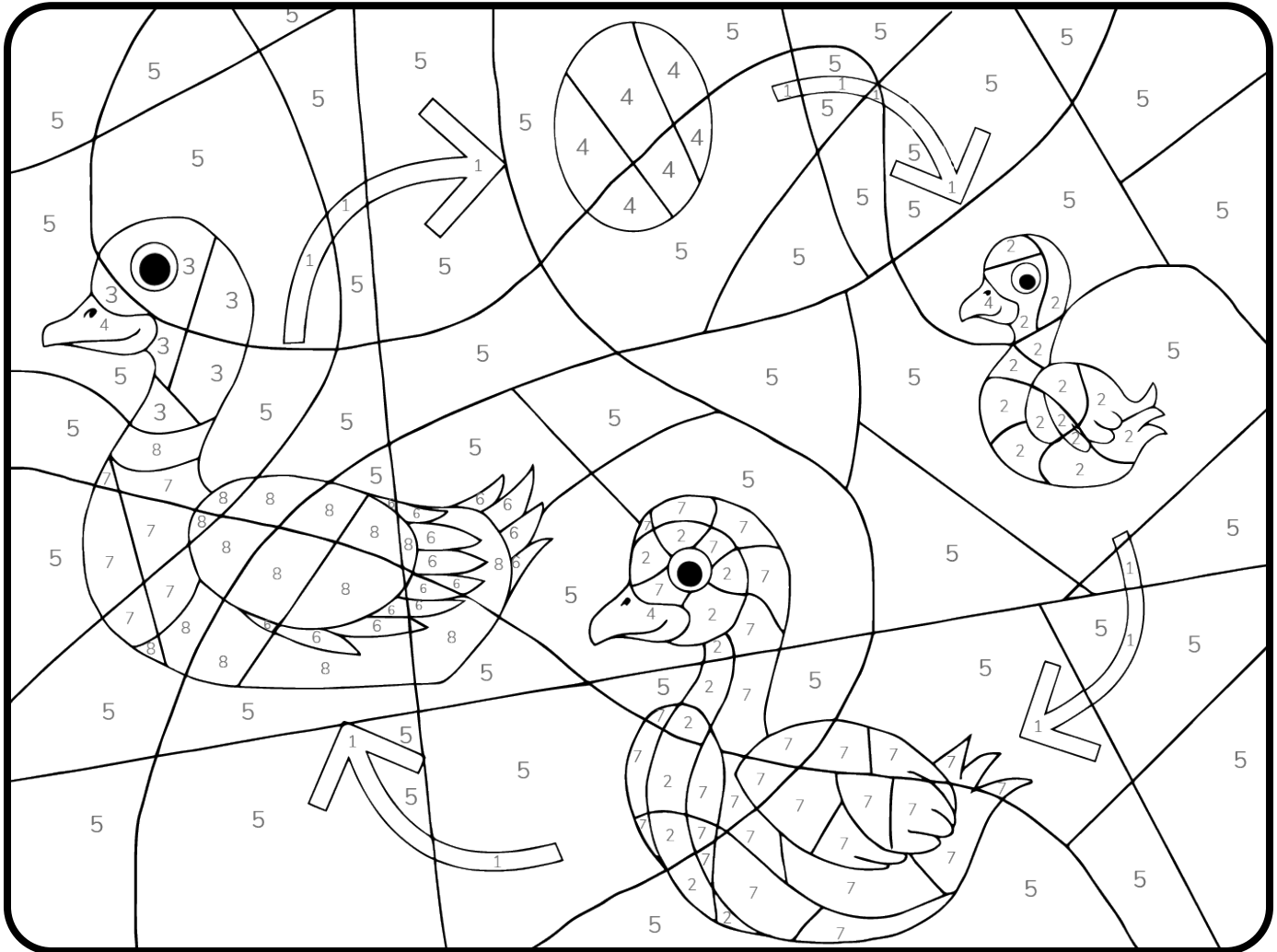


You did a great job! One problem though, I don't think our paper boat would do so well in actual water! Do you think our paper boat would sink or float in water? Why or why not?

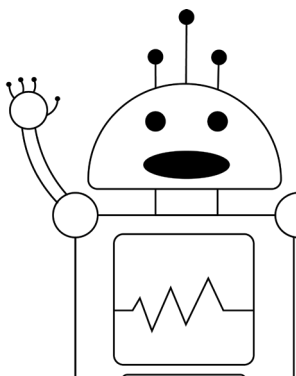
Can you think of something else we could build our boat out of that would float in the water without being destroyed? Maybe tin foil? Can you think of any other ideas?

Life Cycle of a Duck

Throughout a duck's life its colouring changes a lot. Complete this colour by number to learn more about how they change.



1 = Red	2 = Yellow	3 = Green	4 = Orange
5 = Blue	6 = Black	7 = Brown	8 = White



Searching and sorting through data is a big part of coding, and you've just done it, by sorting through the numbers in the picture and finding the right ones to colour!

Designing a Room

Time to be a bit of an interior designer! Draw the objects from the list below in the room, on the next page. Then fill in the blanks in the sentences below to describe where in the room you drew the objects!

Objects

Bed	Book	Pencil	Fan	Stuffed Animal
Lamp	Poster	Journal	Fishbowl	Computer
Clock	Favorite Toy	Shelf	Chair	Cat
Window	Blanket	Table	Dog	Headphones
Picture Frame	Rug	Pen	Plant	

Fill in the blanks to describe the picture you drew of the room.

The bed is **next to** the _____.

The _____ is **on top of** the dresser.

The poster is **above** the _____.

The clock is **to the right of** the _____.

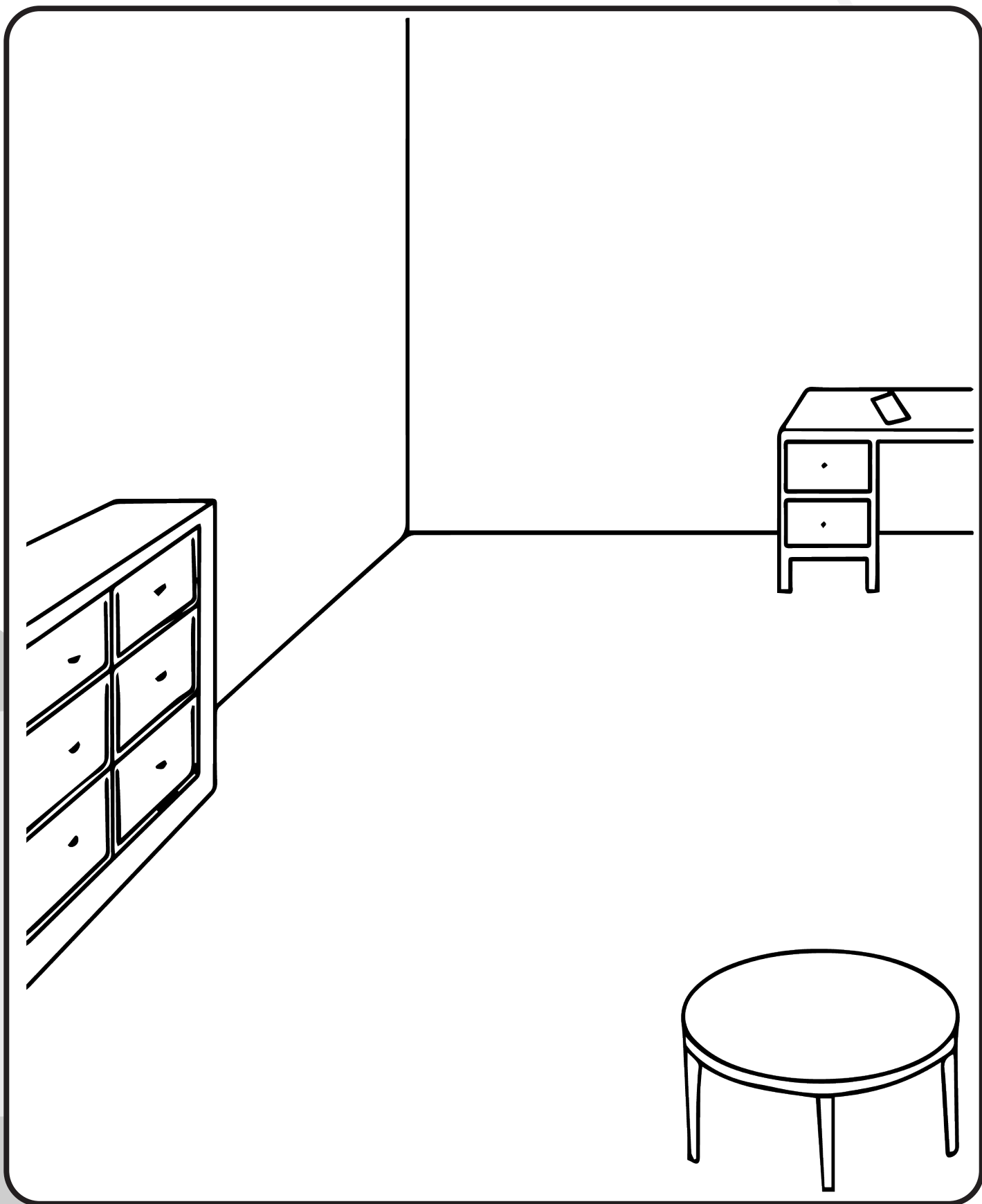
My favorite stuffed animal is **near** the _____.

The _____ is **next to** the desk.

The _____ is **behind** the table.

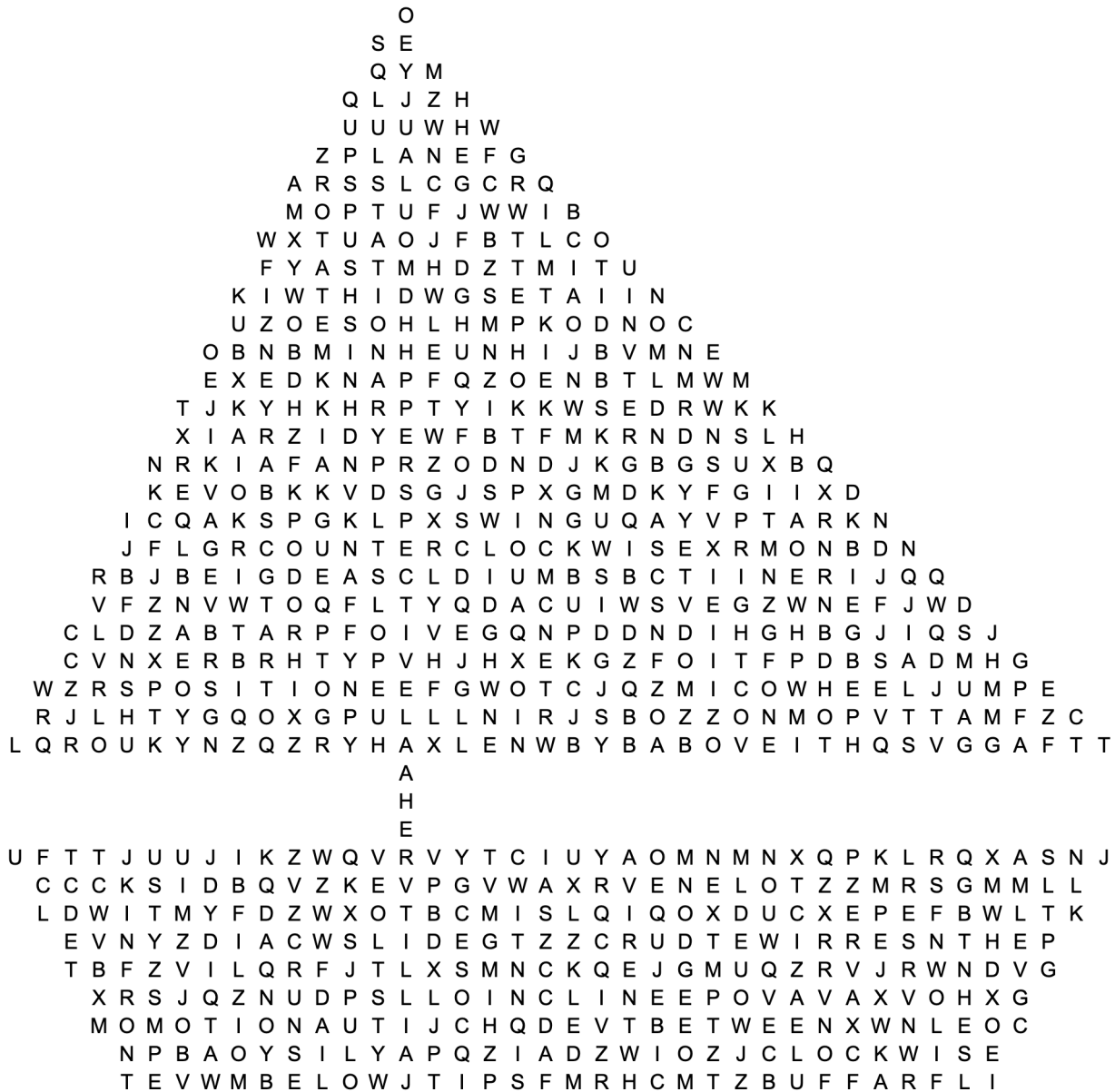
The pencil is **far from** the _____.

The rug is **below** the _____.



Position and Motion Word Search

Learn some of the vocabulary used to describe different positions and motions by finding them in the word search below.



ABOVE
AXLE
BEHIND
BELOW
BETWEEN
BOUNCE
CLOCKWISE

COUNTER-
CLOCKWISE
FAR
FRICTION
INCLINE
INFRONT

JUMP
LEFT
MOTION
NEAR
NEXT
PERSPECTIVE

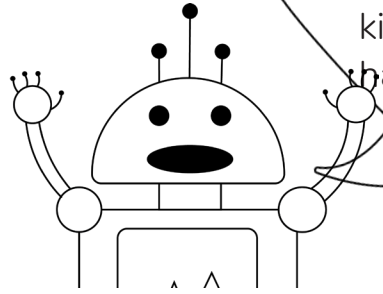
PLANE
POSITION
PULL
PUSH
RIGHT
ROTATE

SLIDE
SLOPE
SPIN
STATIONARY
SWING
WHEEL

State of Matter Scavenger Hunt

Search your house and outside for these different objects. Then once you've found them all, sort them into "Solids", "Liquids" or "Gas"

- Ice
- Water Bottle
- Coffee Mug
- Perfume
- Napkin
- Honey
- Milk
- Water Vapour
- Rock
- Juice
- Air
- Wood
- Glass
- Tin Foil
- Sweat



Sorting is an important part of computer science. Different algorithms and codes sort all kinds of data to make hard problems easier!

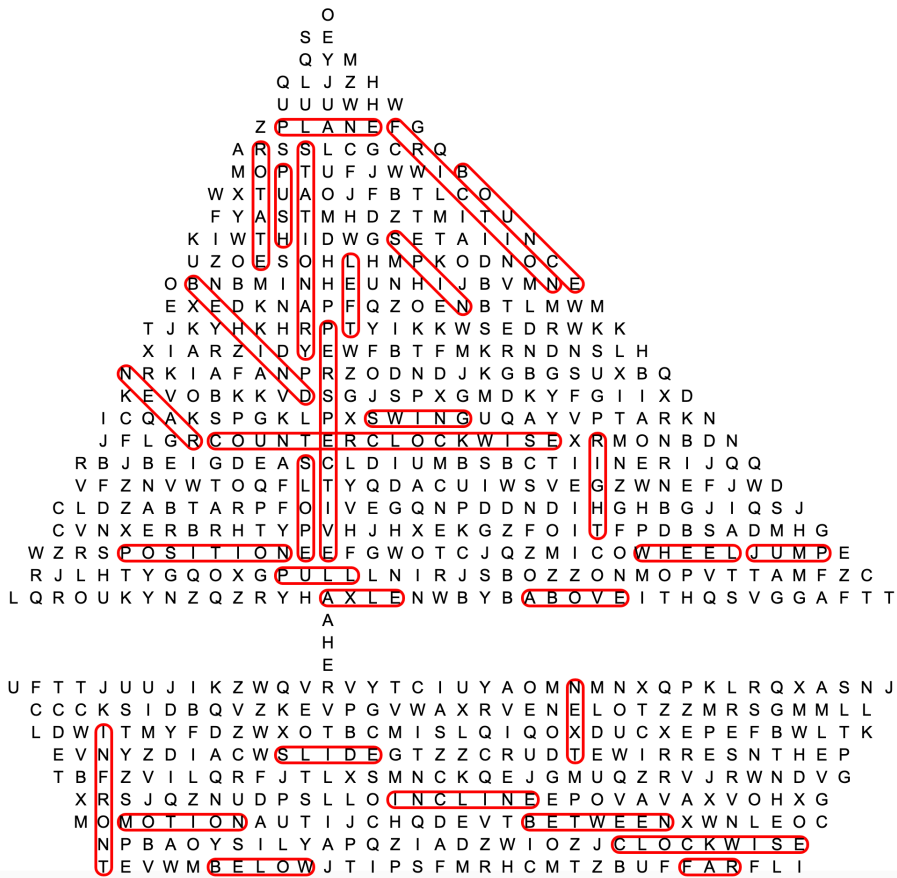
SOLID	LIQUID	GAS

Answer Keys

Find Five Faults in Fred's Farm (page 4)

1. Forest Fire
2. Barbecue
3. Factory behind the farm
4. Cow farting
5. Car exhaust
6. Home heating

Position and Motion Word Search (page 17)



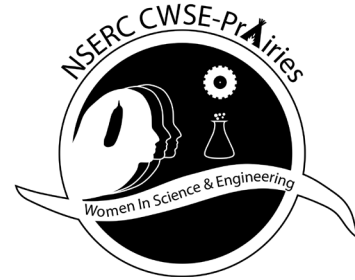
State of Matter Scavenger Hunt (page 18)

Solid: ice, coffee mug, napkin, rock, wood, glass, tin foil

Liquid: honey, milk, juice, sweat, perfume

Gas: water vapour, air, perfume (sometimes)

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