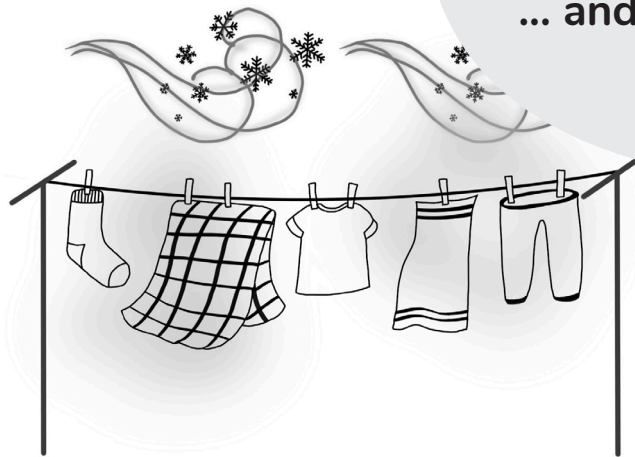# WISE Activity Booklets

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

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

University of Manitoba

Grade 2
VOLUME 5 2020

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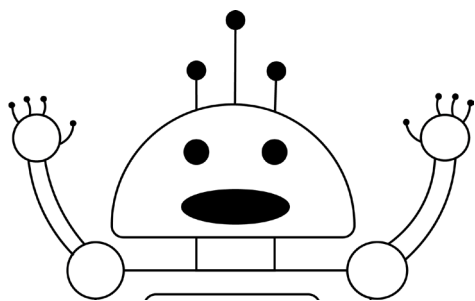
Hello there!

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 next page of this booklet to see who created the activities, experiments and recipes within.

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

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

In this Grade 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!
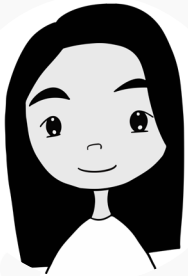
Amaris

Amaris is in her second 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.
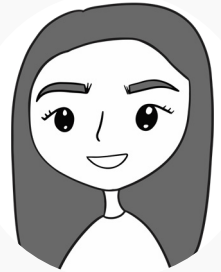
Brandi

Brandi is in her second year of the Bachelor of Science program 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!
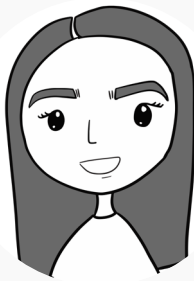
Shannon

Shannon is in her second year of Engineering at the University of Manitoba, with a plan to go into biomedical engineering. Her favourite animals are giraffes and dogs. In her spare time she enjoys drawing, exercising, being outdoors, and trying new things.
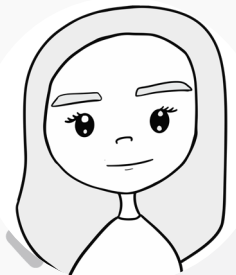
Zoe

Zoe is in her second year of Engineering, and just entered the department of Civil Engineering. She loves math, and in her free time enjoys walking her dog, as well as playing volleyball and ultimate frisbee.
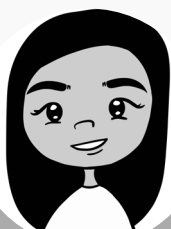
Esiw the Robot

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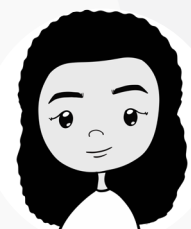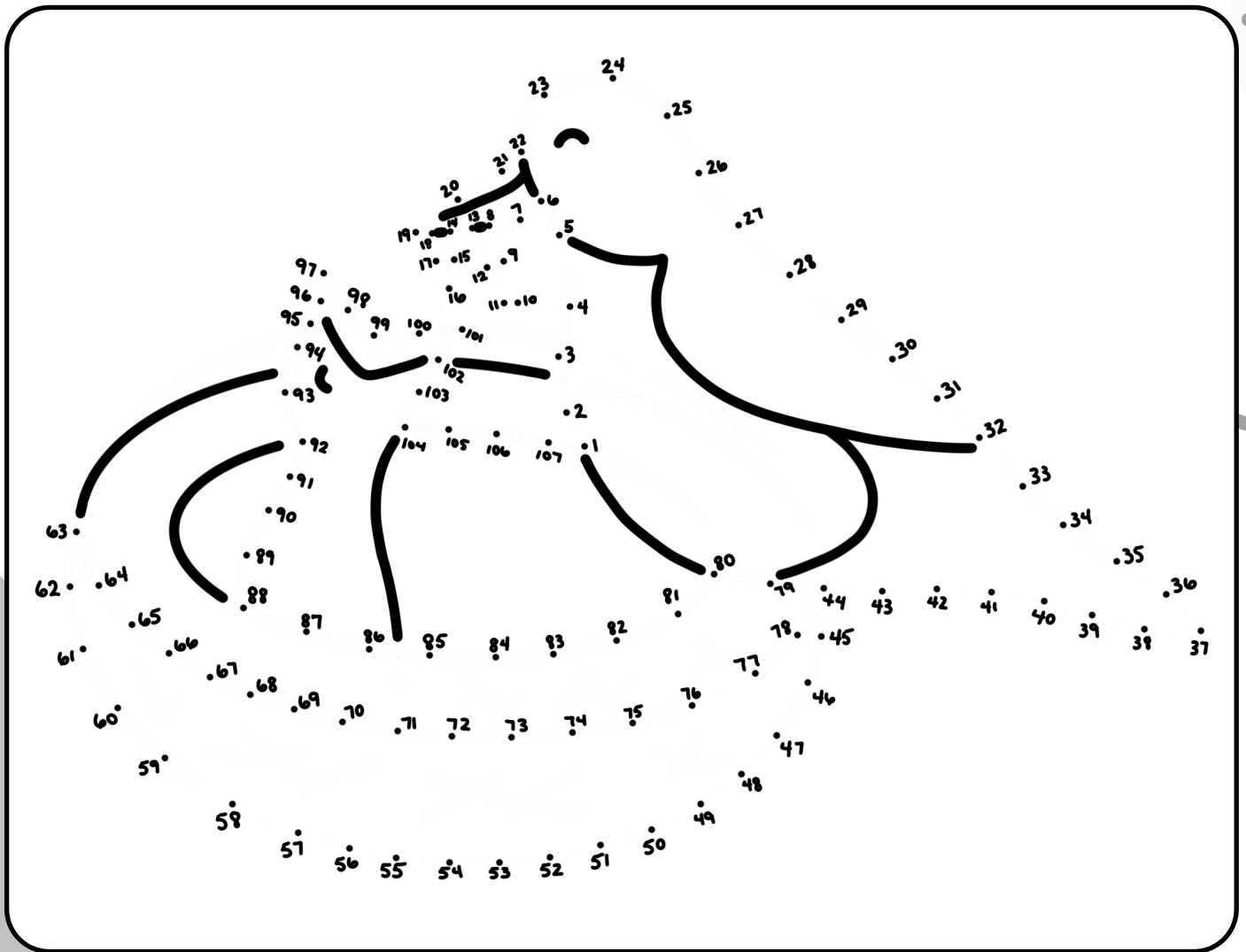
... and our Incredible Editors!

Alex   **Bea**   **Mahalia**   **Michelle**
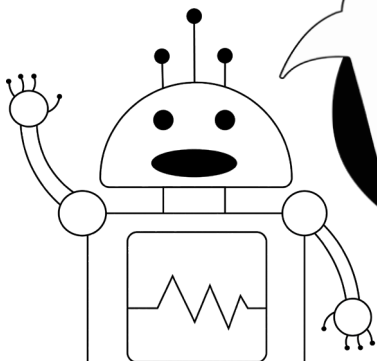
Animal Connect the Dots

There are many different ways animals take care of their young. Connect the dots to reveal some animals' methods.

When baby birds are hungry, they tip their heads back, open their mouths and screech to let their mother know that they need food. When birds are young, they can't break down their food by themselves so the mother chews the food first then puts the food into their babies' mouths.

SLO : 2-1-13

When ducks travel in the water, the mother duck leads her ducklings as they usually follow in a line behind her. Young ducklings feathers aren't waterproof, so the mother duck coats the ducklings in oil that they produce to keep them afloat in the water.

In my computer language, I use something like connect the dots to help complete some of my codes. This is called a linked list. A linked list is a collection of data elements that must follow a specific order. Each element directs the code to the next element like how one number leads to the next in a connect the dot picture.
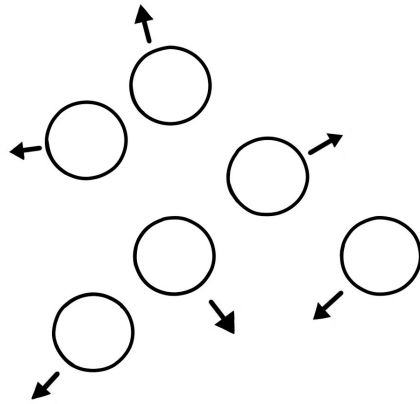
Turn up the Heat

When we add or take away heat from things like water, we can change the state of matter that it is in!

Warming something up is <u>adding heat</u>! It makes the particles spread apart.
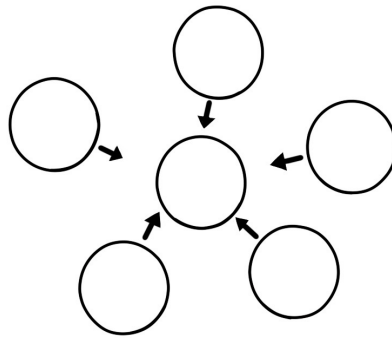
When the particles are far apart, something is a **liquid**.

When particles are really far apart, something is a **gas**.

Cooling something down is the same as <u>taking away heat</u>! This brings the particles closer together.

When particles are close together, they create a **solid**.

The three states of water are: **ice** (solid), **liquid water**, and **water vapour** (gas),

This activity continues on the next page!

SLO : 2-2-14, 2-2-15

Decide what state the water will go into if we add heat (warm it up) or subtract heat (cool it down) by writing ice, liquid water, or water vapour in the empty spaces:

1

+ Heat = _____

2

- Heat = _____

3

- Heat = _____

4

+ Heat = _____

5   +   Heat   =   _____
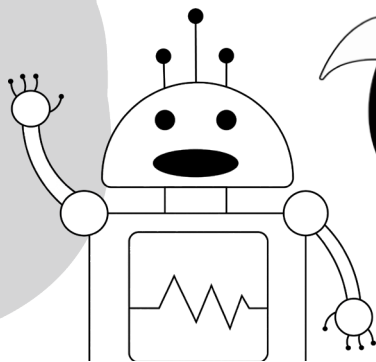
6   -   Heat   =   _____

This activity uses inputs and outputs which are very important in computer science! The input was heat or a lower temperature, and the output was a change in the state of water. In computers, we input certain codes to get it to output/do what we want.
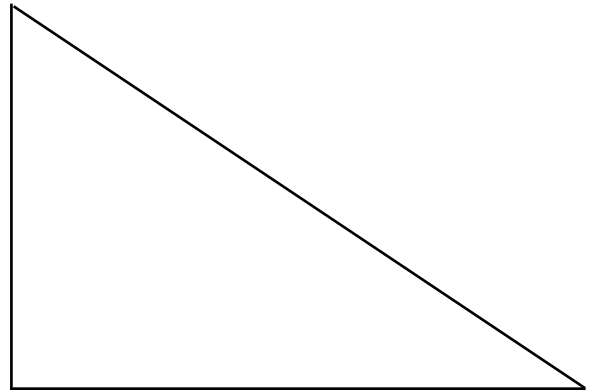
Let's *Ski* What Inclined Planes are

You've likely seen an **inclined plane** before, but maybe you didn't know that's what it's called! An inclined plane is a flat surface that has one end higher than the other. It's used to make moving objects easier.

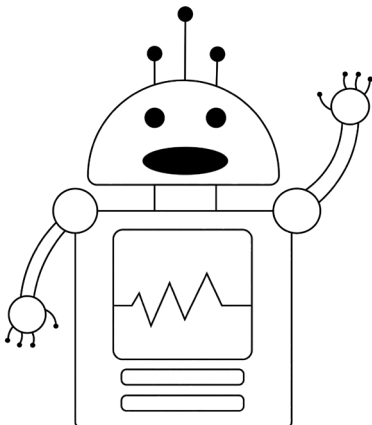Inclined planes are everywhere! Some examples are ramps, slides, stairs, and even anthills.
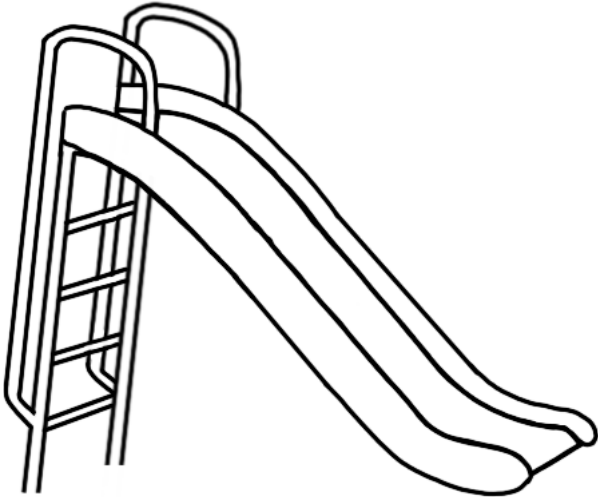
Slide

Ramp

(Feel free to colour these examples!)

If one end is a lot higher than the other, we call it a steep incline. If it's too steep, it's harder to move objects up. Going down an inclined plane is much easier and doesn't require much work.

On the next page, help Esiw debug their system so they can figure out what type of inclined plane the skiier is on.

SLO : 2-3-09

Circle the correct word for each inclined plane!

1 The skier is going **up // down** the hill.
The incline is **steep // not steep**.
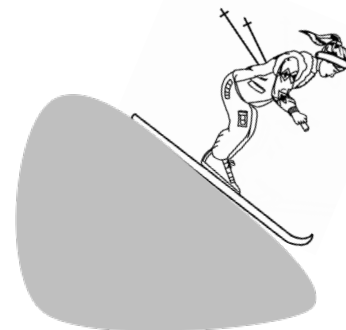The hill is **easy // hard** to ski on.

2 The skier is going **up // down** the hill.
The incline is **steep // not steep**.
The hill is **easy // hard** to ski on.

3 The skier is going **up // down** the hill.
The incline is **steep // not steep**.
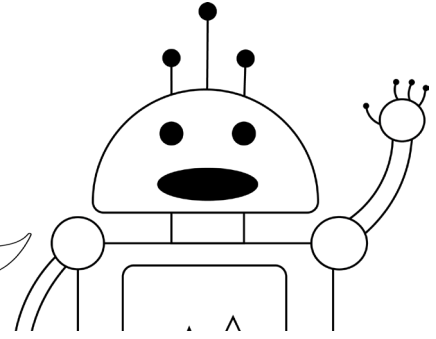The hill is **easy // hard** to ski on.

4 The skier is going **up // down** the hill.
The incline is **steep // not steep**.
The hill is **easy // hard** to ski on.

Human vs Animal Lifespans

Answer the questions below each chart to help me debug the code so they can tell the difference between human and animal ages!
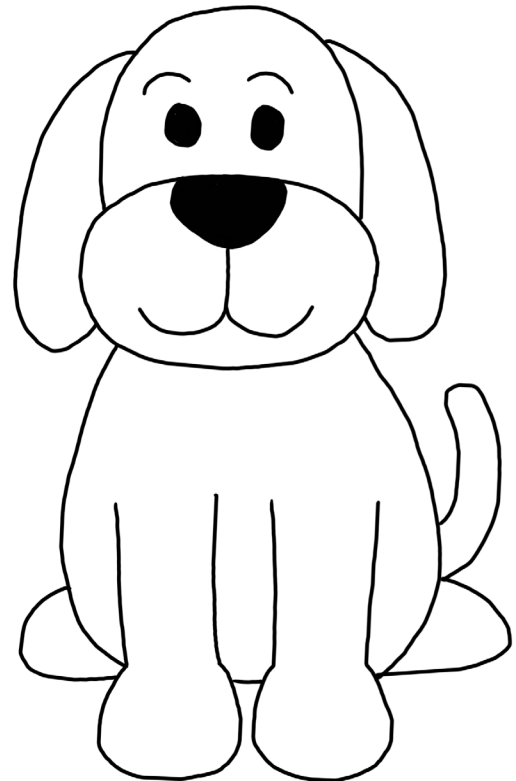
Dog Age	Human Age of a Small Dog (1-20 lbs)
1	7
2	13
3	20
4	26
5	33
6	40
7	44
8	48
9	52

1. How old would you be *in human years* if you were a one-year old small dog? _____.

2. How old would you be in dog years if the human age of a small dog is 33? _____.

Colour me in!

This activity continues on the next page!

Dog Age	Human Age of a Large Dog (50-90 lbs)
1	8
2	16
3	24
4	31
5	38
6	45
7	50
8	55
9	61

3. *If you were a two-year-old large dog, your age in human years would be 16.* Find your age under the "Dog Age" column and write down what your age would be in human years if you were a large dog.

_____

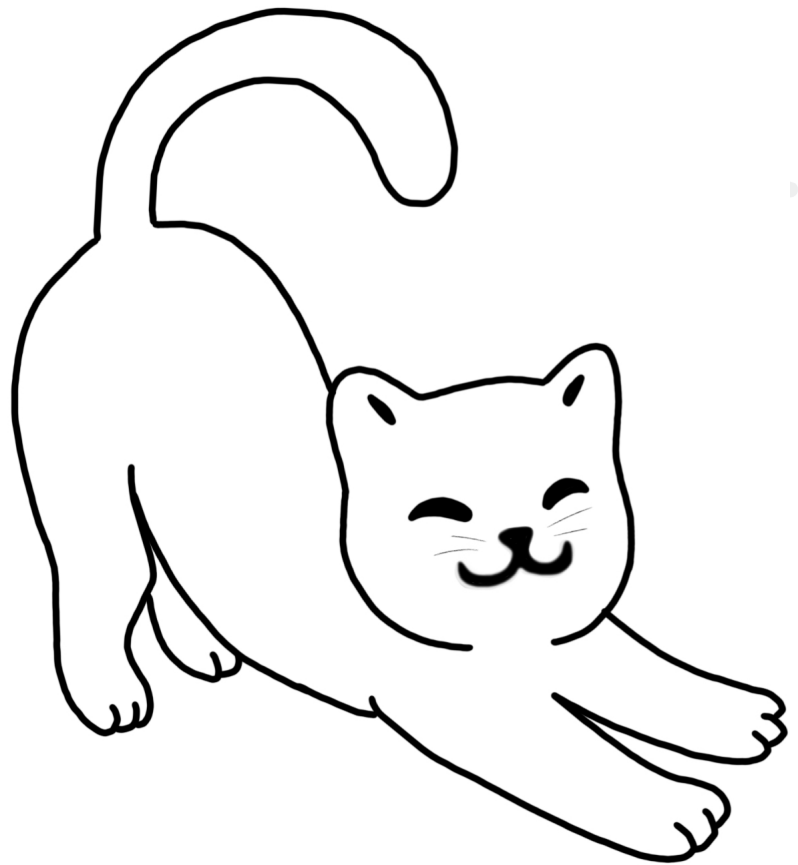| Cat Age	Human Age of a Cat (1-20 lbs)
1	7
2	13
3	20
4	26
5	33
6	40
7	44
8	48
9	52

4. How old would you be *in cat years* if you were 20 years old in human years?

_____

5. Find your age under the "Cat Age" column on Page 12 and write down what your age would be in human years if you were a cat.

_____

Colour me in!

Parrot Age	Human Age of a Parrot
1	4
2	6
3	8
4	10
5	12
6	14
7	16
8	18
9	20

6. If you were 10 years old *in human years*, how old would you be if you were a parrot?

_____

This activity continues on the next page!

7. Find your age under the "Parrot Age" column on Page 13 and write down how old you would be in human years if you were a parrot.
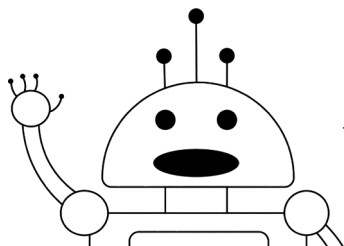
_____

Colour me in!
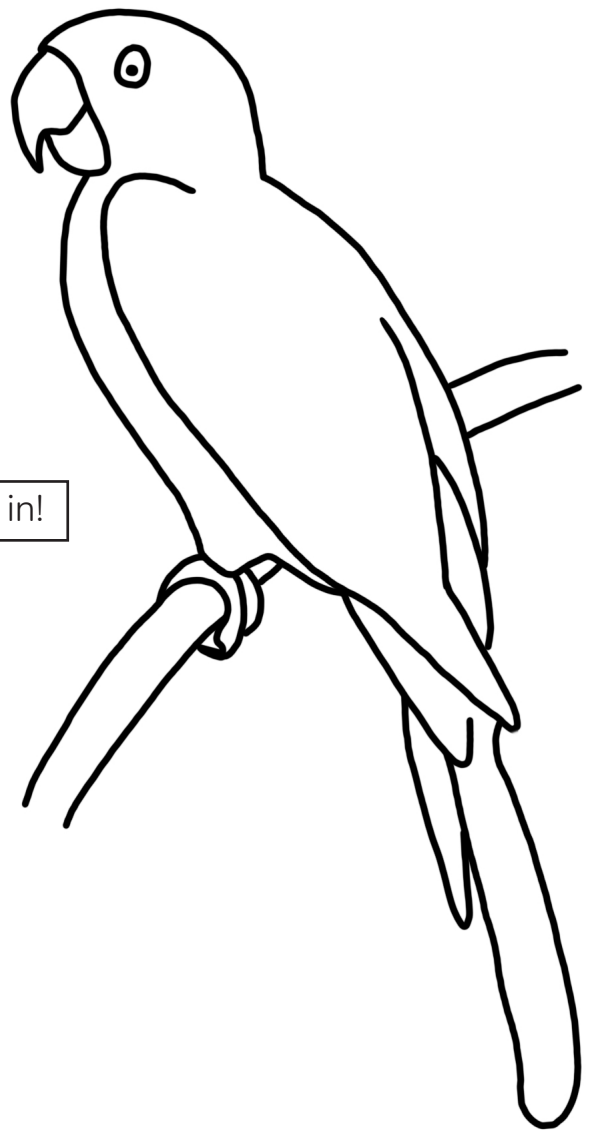
Mini Bonus Activity

Here is a chart comparing the age of a computer to human years.

| Computer Age	Human Age of a Computer
1	17
2	34
3	50
4	67
5	83

If Esiw is four years old in computer years, how old are they in human years? _____

Esiw's Laundry Day

Esiw has just washed some laundry and wants to hang it outside to dry, but is not sure what weather will dry the laundry the fastest. Can you help them out?

Look for these 3 things in the scenes on the next page to decide if the weather outside is good or bad for drying laundry:
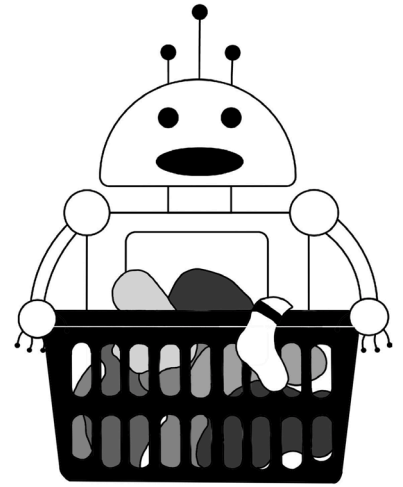
1. **Humidity**. The amount of water vapour in the air is called humidity! The more water in the air, the slower it will dry.
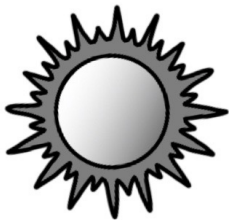
2. **Temperature**.

Hot days usually = high humidity!

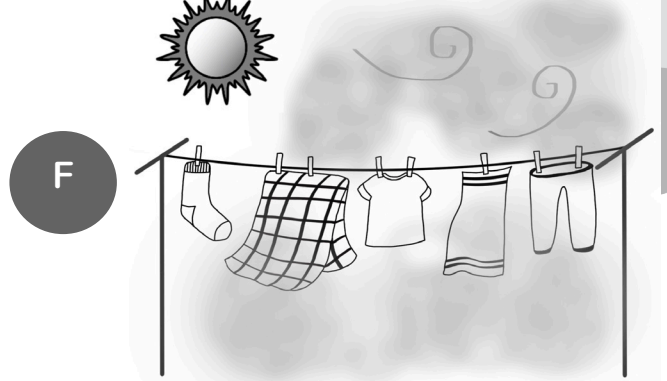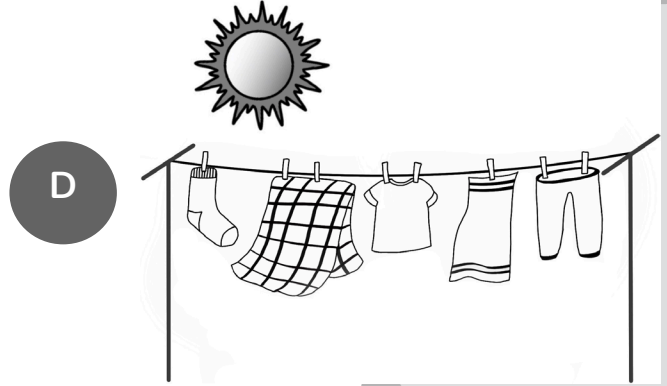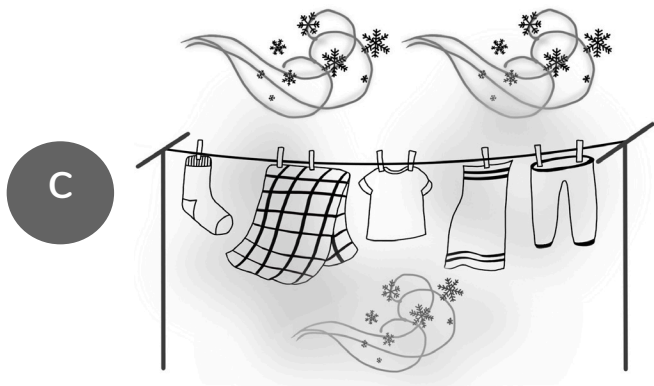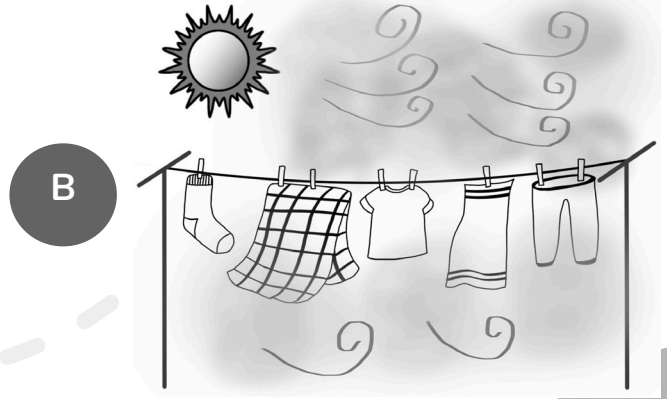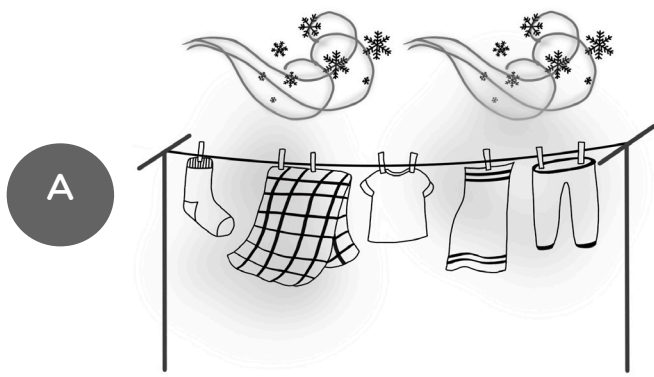Very cold weather may cause the laundry to freeze because it is wet.

3. **Wind**.
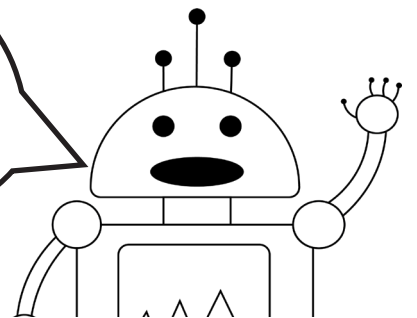
Too much wind can made the clothes blow away!

On Page 16, circle the scene where there is perfect weather to dry Esiw's laundry?

A

B

C

D

E

F

You are using decomposition to solve this problem! This skill is helpful in computer science because it helps to break a big problem into smaller, easier steps.

Push and Pull Forces

A force is push or pull on an object which often causes that object to move. The greater the force, or the harder you push or pull, the faster that object will move. Think about kicking a ball. If you lightly tap on it, the ball won't move very far, but if you kick it really hard, it'll go pretty far.

The amount of force used on an object is measured with a unit called Newtons, "N" for short. More newtons equal more force.

Did you know, the unit of measurement for force, "N" is named after one of the greatest scientists and mathematicians, Sir Isaac Newton? He discovered a lot about physical science and is considered to be one of the fathers of physics.
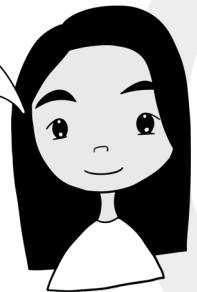
Esiw is standing to the left of some objects. Each of the objects below will be pushed or pulled by some amount of force. You need to circle either **push** or **pull** and fill in the blanks with a less than sign "**<**" or greater than sign "**>**" or equal sign "**=**".

A Esiw is standing to the left of a box of some of his favorite candy but someone is pulling it away from him with a force of 5 N!

Circle either **push** or **pull** to show which kind of force is needed for Esiw to stop the box so he can get to his candy. Then fill in the blanks with a less than sign "**<**" or greater than sign "**>**" or equal sign "**=**" to show how much force is needed for Esiw to stop the box from moving.
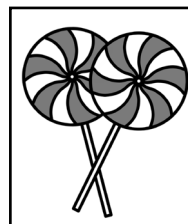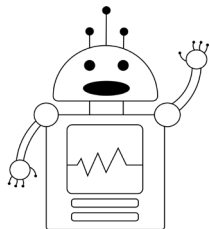
Pull force of 5 N

To get his candy from the box, Esiw needs to **push** / **pull** the box with a force _____ to/than 5 newtons.

B Uh oh, someone pushed a rock boulder towards Esiw with a force of 8 N and if it doesn't stop, he could get hurt.

Circle either **push** or **pull** to show which kind of force is needed for Esiw to stop the boulder so he can be safe. Then fill in the blanks with a "**<**", "**>**" or "**=**" to show how much force is needed for Esiw to stop the boulder from moving.


Push force of 8 N
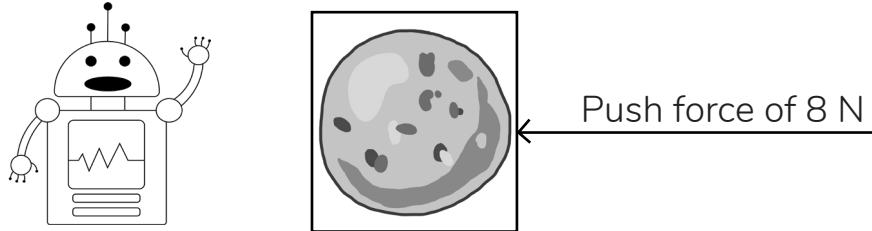
To stop the boulder, Esiw needs to **push** / **pull** the box with a force _____ to/than 8 newtons.

Someone's trying to give Esiw some things that he doesn't like. In fact, he wants them far away from him.

Circle either **push** or **pull** to show which kind of force is needed for Esiw to make the objects go in the opposite direction and then fill in the blanks with a "**<**", "**>**" or "**=**" to show how much force is needed for Esiw to change the objects' direction of motion.

C

Push force of 3 N
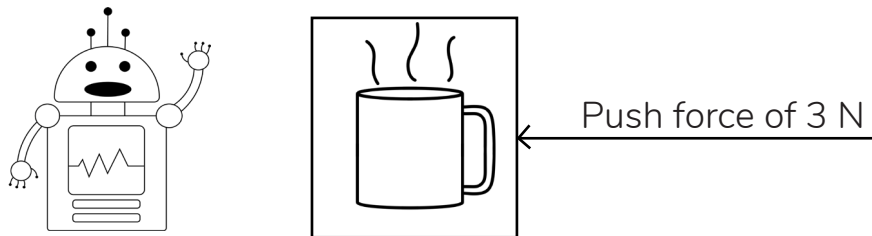
To make the coffee go in the opposite direction, Esiw needs to **push** / **pull** the box with a force _____ to/than 3 newtons.

D

Pull force of 10 N
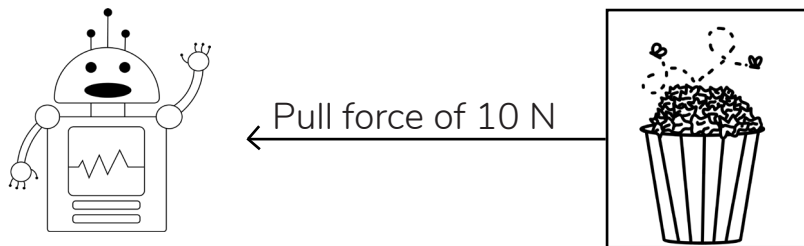
To make the garbage go in the opposite direction, Esiw needs to **push** / **pull** the box with a force _____ to/than 10 newtons.

Answer Keys

Turn up the Heat (pages 6-8)

1. Liquid water
2. Ice
3. Liquid water
4. Water vapour
5. Water vapour
6. Ice

Let's Ski What Inclined Planes are (pages 9-10)

1. The skier is going **up** the hill.
The incline is **steep**.
The hill is **hard** to ski on.

2. The skier is going **down** the hill.
The incline is **not steep**.
The hill is **easy** to ski on.

3. The skier is going **up** the hill.
The incline is **not steep**.
The hill is **easy** to ski on.

4. The skier is going **down** the hill.
The incline is **steep**.
The hill is **easy** to ski on.

Human vs Animal Lifespan (pages 11-14)

1. 7 human years
2. 5 dog years
3. Depends on your age
4. 3 cat years
5. Depends on your age
6. 4 parrot years
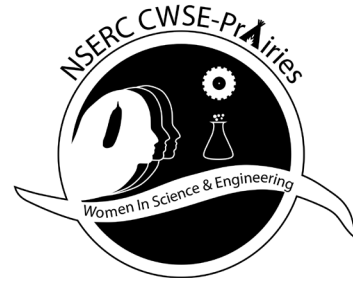7. Depends on your age
8. Esiw would be 67 in human years

Esiw's Laundry (pages 15-16)

The answer is A! A cold day with some wind and low humidity will help to dry Esiw's laundry the quickest.

Push and Pull Forces (pages 17-18)

A) Pull, =
B) Push, =
C) Push, >
D) Push, >

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