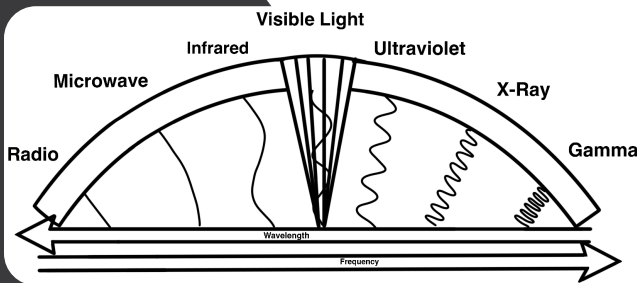
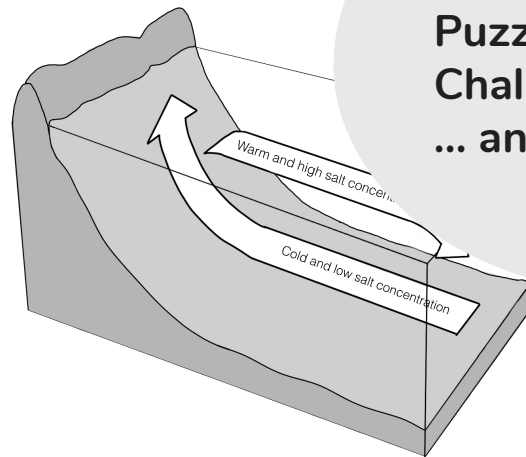


WISE Activity Booklets

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

DIY Activities
Puzzles
Challenges
... and more!



University
of Manitoba

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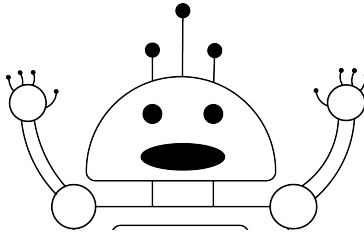
Youth · STEM · Innovation

With funding from

Canada

Grade 8 VOLUME 5

Cells & Systems - Optics
Fluids - Water Systems



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 8 booklet, the science topics you will be exploring are: cells & systems, optics, fluids, water systems, and more!

Best of luck, and until we see you again,
the WISE Kid-Netic Energy Crew



*go***CODE GIRL**
ALLEZ CODER LES FILLES

happening on

SATURDAY
February 6, 2021

Go Code Girl is an annual event that celebrates computer engineering and computer science! This year, WISE Kid-Netic Energy is offering Go Code Girl virtually for girls in Grades 7 to 9! To meet our event partners, sign up for the event and to learn how you could win prizes leading up to the event, visit our website!

For more info & to sign up go to [wisekidneticenergy.ca/go-code-girl!](https://www.wisekidneticenergy.ca/go-code-girl)

Meet our Amazing Authors!

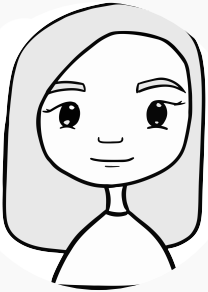
Huda

Huda is in her second 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!



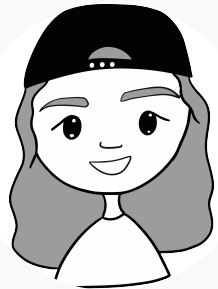
Sophia

Sophia is in her third year of science and plans to pursue a career in optometry. She loves math and biology, and in her free time loves reading, watching movies and trying new foods!



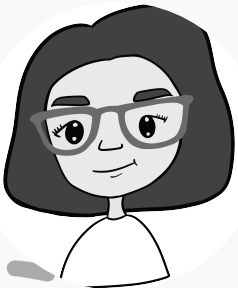
Toni

Toni is a graduate of the Faculty of Social Work at the University of Manitoba. She loves learning new things! In her spare time you can find her reading, painting or spending time with dogs.



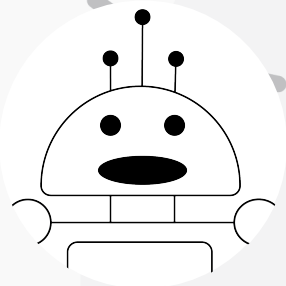
Victoria

Victoria just finished her first year as a Science student at the University of Manitoba and is starting her second year in the Faculty of Nursing. She loves to cook, read and take care of plants in her free time!



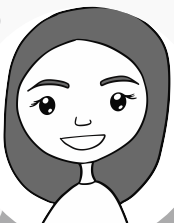
Esiw the Robot

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!

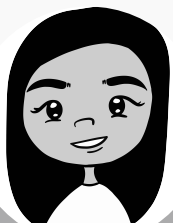


... and our Incredible Editors!

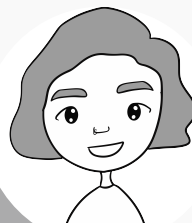
Alex



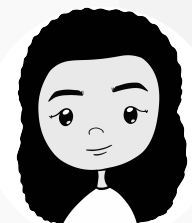
Bea



Mahalia



Michelle



Disease Risk Factors

How do we take care of our bodies? Every body is a good body, and every body is different! But there are steps that we can take to make sure that we are lowering the chance of our bodies being affected by common illnesses.

Below you will see examples of activities that are considered risk factors for certain illnesses. Using the lists provided, match each risk factor to its description and work to find the final illness. Match each illness to its appropriate factors.

Group 1

Risk Factors

1. Breathing in polluted air.
2. Pushing yourself too hard during a workout.
3. Sharing a drink with your friend.
4. Not getting enough sleep to let your body rest.
5. Going outside without a hat or jacket.
6. Breathing in cold air too often.
7. Exercising too often.
8. Eating mostly processed food.
9. Touching your face without washing your hands.

Instead of sleeping and letting your body rest, you spend all night dancing at a friend's house.
Risk factor #: _____

You do two difficult workouts each day, using the same muscle groups.
Risk factor #: _____

You finish off your night by eating an entire pizza. You had cake for breakfast and lunch today.
Risk factor #: _____

Illness

Group 2

Illnesses

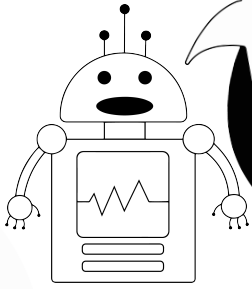
- **The common cold**
 - A viral nose and throat infection. Common during colder months.
- **Tendonitis**
 - Happens when a tendon becomes very swollen and causes the surrounding joint and musculature to become very painful.
- **Asthma**
 - A common inflammatory disease of airways that causes difficulty breathing.

Your friend sneezes near you. You're tired, so you rub your eyes right after this happens.
Risk factor #: _____

You are at the mall, opening doors, trying on clothes and forgot to wash your hands before eating.
Risk factor #: _____

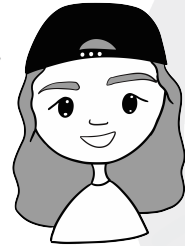
You share a slurpee with your friend at lunch. You both drink from the same straw.
Risk factor #: _____

Illness



In coding, breaking things down into smaller parts to more easily manage and understand is called **decomposition**. In the activity above, instead of saying you are sick or injured with a specific illness, you can say that there were small things that happened before you got sick that put you at risk for getting the illness.

This is really good news! This means instead of waiting to get sick and fixing an illness, we can do things **before** to help prevent them! This is called having a **proactive** approach to health, and it can help people avoid illness altogether.



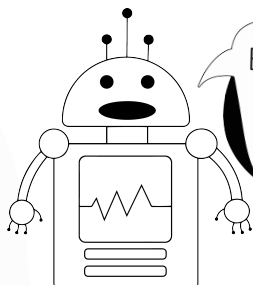
Remember that there are many different ways people can get sick, and not all of them can be prevented. Some people can't afford a good winter coat, others have to skip breakfast because they don't have food at home and their school doesn't provide meals. There are lots of reasons for illness, and just because you deal with illness does not make you careless or deserving of it. The most important thing is balance, and being happy.

Let's explore healthier alternatives to risk factors. Write down something you can change in each of the following examples that can lead to a healthier outcome.

Risk factor	Healthier alternative
Going outside in -40°C without a jacket or hat	
Forgetting to eat breakfast and drinking only coffee until lunch	
Scrolling on your phone instead of going to sleep	

My Heartbeat

Esiw is trying to learn about respiratory rate and heart rate. Since Esiw is a robot without lungs or a heart this is challenging. Can you help Esiw learn by doing the experiment below?



By doing the experiment below, you are following an algorithm, a series of steps to complete a task.

Respiratory rate is the number of breaths that someone can take per minute. Heart rate is the number of times your heart beats per minute. Your respiratory and heart rates change based on whether you are resting or working out.

People between the ages of 13-18 have a respiratory rate of 12-16 breaths per minute. People above the age of 10 can have a heart rate range between 50-100 bpm (beats per minute) while resting or during exercise. It can rise more during vigorous exercise though. For different ages, these numbers also change.

Your heart's beats per minute (bpm) are similar to songs! Songs have a fast or slow tempo indicated by the number of beats per minute (bpm) in the music. A notable tempo is the "heart rate tempo", which aligns with people's heartbeats.

Examples of heart rate tempo:

- "Turn Down for What" by DJ Snake and Lil Jon: 100 bpm
- "Thriller" by Michael Jackson: 117 bpm
- "Wake me up" by Avicii: 125 bpm
- "You Spin Me Round (Like a Record)" by Dead or Alive: 128 bpm

Testing your heart rate can tell you a few things about your heart, like how fast its beating, its rhythm, and its strength. It can also tell you how healthy your heart is, your fitness level and if you're exercising too hard or not!

How to test out your heart rate:

You will need a stopwatch or a clock with a second hand. Use the tables provided on the next page to fill out your collected data.

Resting Heart Rate

1. Rest for a few minutes prior to taking the test so that you are relaxed.
2. Place your middle and ring finger on your wrist right below your thumb on the opposite hand. You can use another area to measure your heart rate by placing your middle and ring finger next to your Adams apple, in the soft area beside your neck on either side.
3. Using the flat part of your fingers, press firmly on your neck or wrist until you can feel your heartbeat.
4. Count the number of beats you feel for 30 seconds and multiply the number by 2 to calculate your bpm (beats per minute).

This activity continues on the next page!

SLO: 8-1-15

	BPM for 30 Seconds	Bpm multiplied by 2
Resting Heart Rate		

Heart Rate during Exercise

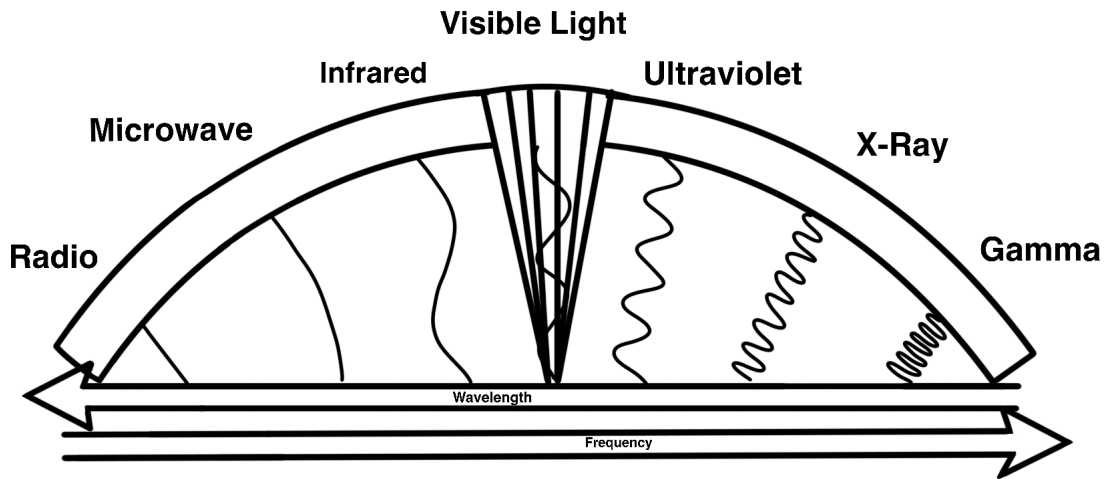
1. Choose a few physical exercises to do like jump rope, jogging, jumping jacks, riding a bike, or anything else you can think of that will get you to use some energy. Do the activity for a total of 15 minutes.
2. Place your middle and ring finger on your opposite wrist or your neck.
3. Using the flat part of your fingers, press firmly on your neck or wrist until you can feel your heartbeat.
4. Count the number of beats you feel for 10 seconds. It is important to do this quickly because your heart rate can begin to slow down 15 seconds after exercising. Multiply the number by 6 to calculate your bpm (beats per minute)

	BPM for 10 Seconds	Bpm multiplied by 6
Resting Heart Rate		



During exercise, the numbers are higher because your heart is working harder to pump blood that carries oxygen to your body faster! While you are resting, your heart does not have to work as much, so your bpm is lower.

Electromagnetic Radiation (EMR) - Choose Your Own Adventure



A huge difference between types of EMR is the frequency and wavelength of each wave. As the frequency of a wave increases, the wavelength decreases. These functions are **inversely** related. When one increases, the other will decrease.

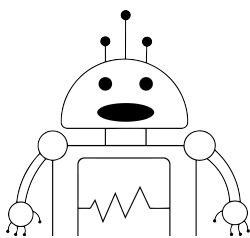
Which wave has the highest frequency?

Which wave has the longest wavelength?

Which wave has the shortest wavelength?
(remember the inverse relation)

There is only a small part of the spectrum that you can see with the naked eye. Which is appropriately called visible light. This can be split up into the colours of the rainbow. An easy way to remember which way the order goes by is looking at the waves on either side of the visible light. In this diagram, infrared is to the left and ultraviolet is on the right, so we know it will follow the rainbow from left to right. So, from left to right the visible light spectrum would go red, orange, yellow, green, blue, indigo, violet.

Let's go on an adventure starting on the next page (Page 10)!



Following a choose your own adventure is like following branches of code. Branching is used in coding to account for different possible outcomes, especially when using conditional statements.

This activity continues on the next page!

SLO: 8-2-07, 8-2-08

The adventure starts!

1

You have woken up on the mysterious planet of Electromagneton. The only way you can leave is by helping its inhabitants. Fortunately, there are superhuman beings who specialize in certain tasks based on the waves they're named after. Their names are: Radio Ram, Micro Man, Iggy Infrared, Visible Vera, Yugi UV, X-Ray, and GoGo Gamma. You must use each of them for help at least once to get off the planet. Your job is to decipher the problems of those you meet and find the best solution for their problems. **Go to 37.**

2

As you climb through, you feel something start to scratch your ankles, so you crawl faster and emerge into a massive cave. In the corner to your right, you see a young boy leaning against a stalagmite, hugging his knees and crying. As you get closer, he looks up and starts crying. To go closer, **go to 28.** To talk to him from where you are, **go to 16.**

3

You slowly approach the little girl and her mother. Her mother looks up at you and smiles softly. You ask her what's wrong and the little girl looks at you with snot and tears running down her face. "We were playing a game on the playground where the leader called out a colour and you had to touch something that was that colour". You tell her that sounds like lots of fun. "Yes, but I'm colour-blind so I can't tell the difference between some colours, so it makes the game really hard". She sniffles and hugs her mom. You tell her not to worry, and that you'll make sure she can play the game before you leave. To call Visible Vera, **go to 18.** To call Yugi UV, **go to 39.**

4

As you walk, you see a beach. There's sand, and beautiful crystal-clean water. You take your shoes off and start walking through the sand. Your feet start sinking in, and you realize you're walking through quicksand. Your exploration of Electromagneton has reached an end. **Go back to 1 and start again.**

5

As you follow the path, you see a small cottage, and an old woman sitting on the porch with a microphone and a small speaker. She tells you that she wants to advertise her new brand of cereal to the community, but she can't seem to get it working. She hands you her scripts. To skim over it, **go to 29.** To read it carefully, **go to 20.**

6

You look up at the man towering over you and are able to choke out, "Ok". His face brightens and he says "Oh great! I'm so glad". He takes both of your hands and tells you his pet chameleon has gone missing. Princess doesn't do this often, so he's really scared she could be hurt, and since she can camouflage herself, it's going to be almost impossible to find her. You tell him you know exactly who can help. To call Iggy Infrared, **go to 13.** To call Visible Vera, **go to 9.**

7

As you walk closer to the boys you hear one of them scream, "Underduck, underduck!". Confused, you walk closer. You see the parents simultaneously run back and then forward, grabbing the kids in the swings and pushing them high up into the air as they run underneath them. One of the adults doesn't see you and runs straight into you, and you both fall backward into a large metal slide. You start to see stars and birds chirping as the parent who ran into you asks who he can call. **Go back to 1 and start again.**

8

Micro Man appears out of nowhere and grabs the device from the girl's hands. He asks if you're trying to communicate with the craft you got this from. She says yes and asks if he can help? "Of course I can". He twists some buttons and then sends waves from the remote. He hands it back to the girl. "Vivienne to 0320? Vivienne to 0320 do you copy?", "Agent 20 are you with agent 19?" she sighs with relief. "Yes we are together. Are you able to pick up?" They respond, "Be there in 20". She turns to you and gives you a hug and then she turns to Micro Man. He looks at her and offers a hand. She shakes it. **Go to 27.**

9

A rainbow materializes and Visible Vera slides down it. She says she'd be able to help if she knew what colour Princess was, so she could isolate all the other colours we see. But since we don't know what colour Princess is, she unfortunately can't do anything to help. She grabs the rainbow from the sky, turns it into a skateboard and skates away. **Go back to 1 and start again.**

10

Yugi UV arrives in a flash. He looks up from the trees covering the sky, and looks at the man. "You are suffering from a Vitamin D deficiency". He looks back up at the trees, and rays of sun start to stream in and open up the space. A large amount of rays go straight to the man and he instantly stands taller, and his face starts to look brighter. You've done it! **Go back to 32.**

11

You emerge into a heavily forested area. A man sits by a large tree looking up at the leaves. He tells you he's been feeling very tired recently and doesn't know why. He invites you into his home, a small door inside an even bigger tree. To go inside, **go to 14.** To decline and stay outside, **go to 21.**

12

You find a small playground where there are children playing and with parents talking amongst each other while watching their kids. You see a small girl crying to her mother. You also see two children laughing on the swings while their parents push them. To approach the crying girl, **go to 3.** To approach the boys on the swings, **go to 7.**

This adventure continues on the next page!

13

Iggy Infrared appears in a flash of bright red light. You notice she has a soft red glow to her skin, and you guess that she would probably glow in the dark. You explain what the problem is, and she tells you she'll switch to thermal imaging, so she can see Princess. "This will be more difficult, since chameleons control their temperature based on their surroundings, but I will do my best". After about 15 minutes of her walking around with the wrestler nervously following behind, she points up at a tree branch. Iggy walks over and carefully picks Princess up off the branch. "Oh Princess! I was so worried!" the wrestler says hugging her tightly. "Thank you so much, both of you". Iggy gives him a salute, winks at you, and disappears in a flash of red. **Go to 15.**

14

He tells you to follow him and opens the door for you. Inside you notice that there are no windows, but plenty of artificial lighting. He asks you to help him feel more energized. Who do you call? To call Yugi UV, **go to 27.** To call Visible Vera, **go to 17.**

15

You walk down the street and come up to a man who's coughing uncontrollably. (Fortunately, Corona Virus has been eradicated on Electromagneton, so you won't have to worry about that, though you do still keep your distance. He hoarsely asks if you have any cough medication for his sore throat. You apologize and turn to leave as he coughs again. To leave, **go to 45.** To stay, **go to 44.**

16

You say hello to the boy and ask what's wrong. He looks at you and says "I hurt my leg" before starting to cry again. Who should you call? To call GoGo Gamma, **go to 40.** To call X-Ray, **go to 35.**

17

Visible Vera appears. She looks at the man and at the sky. She uses her laser vision to burn holes into some of the leaves above. Small beams of light stream down onto the forest ground. The man looks at her, then at you. He says thanks for your help and walks back into his house. You're left feeling tired too and begin to fall asleep. **Go back to 1 and start again.**

18

Visible Vera appears, this time riding a bike with wheels that look like they're made of rainbows. She comes to a stop in front of you and asks what's wrong. You and the little girl take turns explaining the situation. Vera reaches down and grabs two balls of rainbow from her bike. The spots where she grabbed from reforms the bike shape, like nothing ever happened. She moves her hands quickly and forms what looks like glasses. "These will help you see all the colours and be able to differentiate them much easier". The little girl looks up and gives her a big squeeze of a hug, shrieks, "Thank you!" and runs over to the playground to a group of kids around her age. The mother thanks both of you as well and walks over to the group of parents sitting on the benches. Vera asks if you need a ride. To go with Vera, **go to 30.** To decline her offer and keep walking, **go to 4.**

19

You walk further into the cave and see a large tunnel that opens up into a small neighbourhood filled with lots of greenery like trees and shrubs. You keep walking and hear a low, guttural voice yelling, "Princess, Princess, where are you?!" You turn the corner and see a large man in a wrestling uniform. He sees you and stops yelling. "Hey you!" He runs at you and grabs you by your shoulders. "Can you please help me? I've lost my Princess!" When you don't answer right away, he starts to get angry. "You better help me". To run away, **go to 25**. To stand up to him, **go to 6**.

20

You read over the script and notice that she has written in the channel she wants to broadcast on: 109.7. You look up and realize the small speaker is a radio. You know exactly who to call. Who do you contact? To call Micro Man, **go to 36**. To call Radio Ram, **go to 38**.

21

You tell him that you don't want to intrude, and that you'll stay outside. He agrees and asks you to help him feel more energized. Who do you call? To call Yugi UV, **go to 10**. To call Visible Vera, **go to 17**.

22

She takes you to a big field and you see a parachute lying on the ground, and a girl sitting near it fiddling with some kind of remote control or radio. Vera lets you off and drives away. As you walk closer you hear static and see that she's trying to communicate with something. When you're about five feet away she looks up at you and exclaims, "Where have you been!?" Confused, you ask her what she means. You don't even know who she is. She explains that you were on a space mission. When your part of the ship got released and crash landed on Electromagnetron, but she couldn't find you anywhere. You told her about your mission and said that you're pretty sure there's only one person left to contact. She asks you if she's the last person you need to help. You shrug, "I guess so". Which super being will help you this time? For Radio Ram, **go to 34**. For Micro Man, **go to 8**.

23

You decide to explore around the rock formations and start to make your way around it. You find a large opening that leads deep inside one of the rocks. Thinking it looks safer, you go through. **Go to 42**.

24

Micro Man walks up from who knows where and looks down his throat. He asks if he's hungry for a snack and offers to cook up a nice piece of leftover chicken for him. The man tells him it hurts to swallow, and he wouldn't be able to enjoy it. Micro Man looks disappointed and walks away with a trail of microwaved snacks falling out of his pockets. You turn to leave but step on a pizza and slip. The man turns the other way. **Go back to 1 and start again**.

25

You start to run, and you hear him yelling behind you. You turn back and see him staring you down. You turn your head back to face forward and run into a stop sign. You fall asleep and notice the two suns above you. **Go back to 1 and start again**.

This adventure continues on the next page!

26

You come up to a huge mountain, but it looks climbable. You start to scale it, and as you get higher it starts to get very cold. You realize you are only wearing a thin jumpsuit, and you're either going to have to climb back down or find some shelter. Before you make a decision, a large hawk comes and scoops you up by your shoulders. **Go back to 1 and start again.**

27

On the ship Vivienne gives you a recap of your mission. You are safe and heading home now. **You did it!**

28

You move closer to sit next to him. You can see his shin is red and starting to swell. You ask him what happened. He looks at you and says he was running and tripped on a rock, and when he fell, he heard a large crack. His eyes start to tear up and you rub his shoulder and tell him you're going to help him. Who do you contact? To call GoGo Gamma, **go to 40**. To call X-Ray, **go to 35**.

29

You glance at it and nod approvingly. You hand it back to her and tell her you know exactly who to call. Who do you contact? To call Micro Man, **go to 36**. To call Radio Ram, **go to 38**.

30

You agree and Vera grabs her bike and molds it in her hands into a motorcycle. She hands you a helmet and tells you to hop on the back. You start talking and you tell her that you need to find someone who needs help, so you can get back home. She says that earlier when she was skateboarding, she saw a girl about your age who looked like she had parachuted from the sky. She tells you that's where you're going. **Go to 22.**

31

GoGo Gamma comes down in rays from the ceiling and lands softly on the ground. She takes one look at the man and orders him to open his mouth. She looks inside and says, "You have strep. I'm just gonna get rid of that bacteria for you." She looks into his throat and you hear a small sizzle. She stands up straight and asks the man how he feels. "I feel great Gamma! Thanks." She nods and leaves the way she came. You start to walk towards a park. **Go to 12.**

32

As you walk through the forest, it starts to clear up a bit, and you come across a path. To the right you see the woods open up a bit more. To follow the path, **go to 5**. To head towards the clearing, **go to 4**.

33

You quickly walk away and around the cottage. You notice the forest start to open up. There are some large rock forms to your right and a mountain to your left. To go to the rock forms, **go to 43**. To go towards the mountain, **go to 26**.

34

Radio Ram materializes suddenly and looks at the radio. He asks what you need, and you tell him you're trying to communicate with your spacecraft that you got seperated from. He says he'll broadcast your message for you. The static stops and he nods at the girl to speak. "SOS this is Vivienne, from craft 0320. We are on Electromagneton, request pickup." Twenty minutes later a saucer floats down from the sky and a beam comes down, you assume to lift you into the craft. You walk up to it and hear Vivienne say something behind you. She's probably just excited to get home! You look down and see Vivienne waving her arms and jumping up and down. You look up and see greenish aliens looking down at you. **Go back to 1 and start again.**

35

X-Ray shows up with a flash of light and looks at the boy. They bend down and stare at the boy's leg. "It's broken," he says. "Come with me little boy, let's go get that fixed". He picks up the boy and together they dematerialize. Good call. **Go to 19.**

36

You call up Micro Man. He shows up and tries to create waves to reach the satellite and bounce back. The waves bounce back and knock you off your feet. Micro Man and the old woman stand over you, both shaking their heads. **Go back to 1 and start again.**

37

You get up from the field you woke up in and look around. There's a wooded area to your right, and a town to your left. To go to the town, **go to 41**. To go towards the woods, **go to 11**.

38

Radio Ram materializes in front of you. He stretches one arm out to the sky and puts his other hand on the radio. He does the wave with his arms, and the radio starts to make static, then you hear someone online say, "and now we have our first guest for today, advertising the next big cereal: Spectrum Shapes". The old woman shoos you away. **Go to 33.**

39

Yugi UV appears in a flash wearing sunglasses and a glass of lemonade. He offers the little girl his sunglasses, but she shakes her head. She starts crying harder and says wearing those will make the game even harder. Yugi scoffs, takes his sunglasses back and disappears in a flash. The mother glares at you until you run off. **Go to 26.**

40

GoGo Gamma comes down in rays from the ceiling and looks at the boy. She asks him what's hurting, and he says his leg. She says she can kill any bacteria causing an infection but that's about all. The boy shakes his head, so GoGo Gamma apologizes and leaves the way she came. **Go back to 1 and start again.**

41

As you get closer to the town, you notice that it's just a billboard for a new neighbourhood coming in the spring. Disappointed, you turn around and head to the woods. **Go to 11.**

This adventure continues on the next page!

42

You emerge into a massive cave. In the corner to the right, you see a young boy leaning against a stalagmite, hugging his knees and crying. As you get closer, he looks up and stops crying. To go closer, **go to 28**. To talk to him from where you are, **go to 16**.

43

You walk up to a large cave with a small entrance, just big enough for you to fit through. To go through it, **go to 2**. To walk past it, **go to 23**.

44

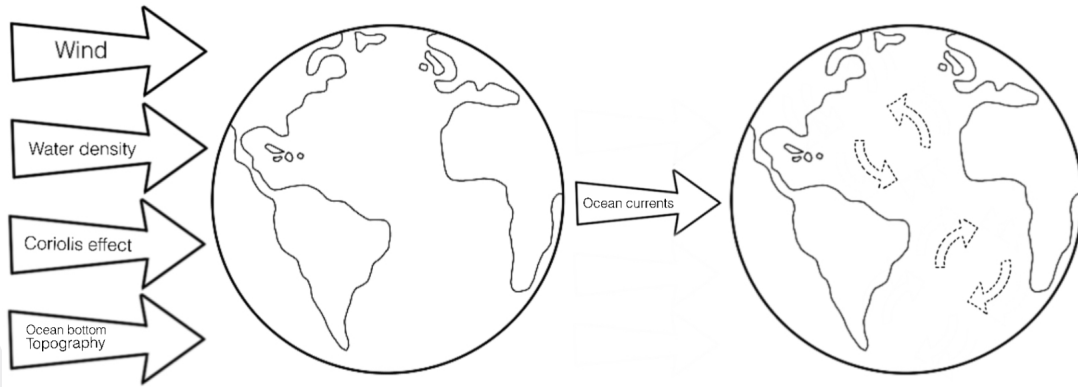
You turn around and tell him you can try to call someone for help, but you want to know some of his symptoms first. He says he has throat pain, and it hurts to swallow, and he may have swollen lymph nodes. You nod in condolence and tell him you're going to help. To call Micro Man, **go to 24**. To call GoGo Gamma, **go to 31**.

45

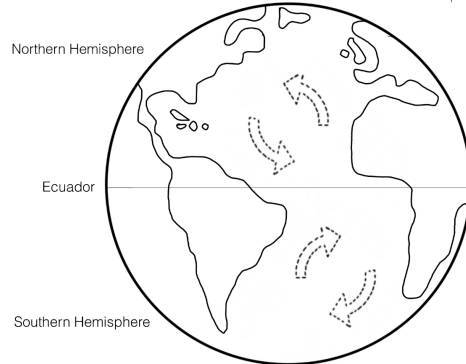
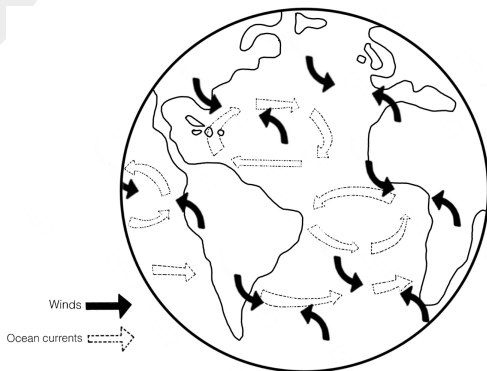
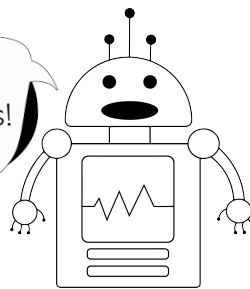
Feeling safer away from the sick man, you walk towards a burger joint that smells delicious. You order some food, but when the cashier asks for you to pay, you realize you don't have any money on you. They tell you to get in the back. You're washing dishes until someone can come pick you up. **Go back to 1 and start again.**

Ocean Current Factors

Ocean current is the flow of water across the ocean. Let's understand ocean currents in coding terms! Computers work through inputs and outputs. **Inputs** are the information that is given, and **outputs** are the result of that information. Ocean currents are the result (outputs) of 4 inputs: wind, water density, coriolis effect and ocean bottom topography.



Use your critical thinking skills and fill in the blanks!

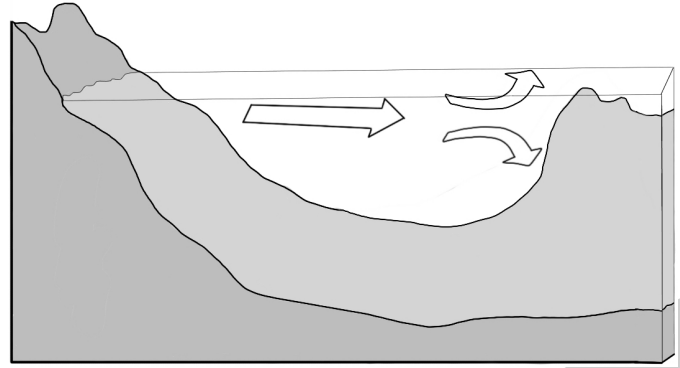
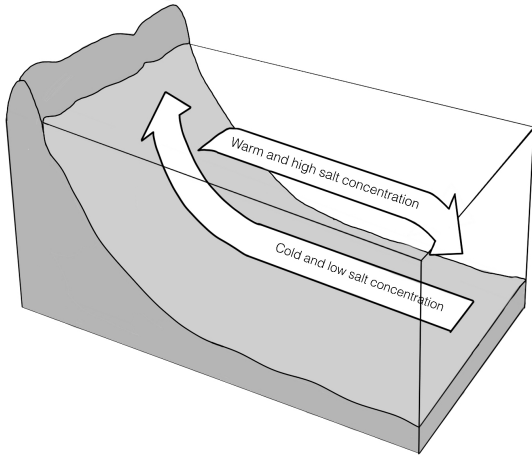


Wind

When wind blows, it moves the surface of the water, how does this input affect currents?

Coriolis effect

The earth rotates and it creates two big currents. In the Northern Hemisphere and the water moves clockwise. In the Southern Hemisphere it moves counterclockwise. How does this affect currents?



Water density

Water is most dense when the salt concentration is high and the water is warm. Things of higher density tend to sink. How do you think this causes a current?

Ocean bottom topography

Topography is the shape of surfaces. The ocean does not have a smooth regular floor, it raises and drops like a mountain or valley. When a current hits land, it changes directions. How does this input affect the output?

Benefits of ocean currents

1. The current moves _____.
2. The “liquid wind” brings cold nutrient rich water to the _____.
3. The nutrient movement attracts _____.
4. This movement benefits _____ and the _____ of seaweed and shellfish.
5. _____ are used as power electricity.

Use your critical thinking skill to answer the following questions:

1

In Spain, in the Northern Hemisphere, fresh river water and ocean salt water mix, the sun is hot, and the topography of the riverbed is very rocky and uneven. What do you think the current output would be?

2 It is very cold in Hudson Bay located in the Northern Hemisphere and the sun does not warm the water up. How would this input affect the ocean current output?

3 In Brasilia it is very windy, hot, the bottom of the ocean is flat and even, and it is also located in the Southern Hemisphere. What would the ocean currents look like?

4 The ocean bottom topography is very rough in Manila, Philippines and since Manila is very close to the equator it is also very hot. How do these inputs impact the ocean current output?

If the currents don't move as much:

- Fishing would be impacted because _____

- The agriculture of seaweed and shellfish would be _____
- The decrease in current movement could affect the _____
_____ by electricity powered by currents.

Answer Keys

5-6 - Disease Risk Factors

Group 1: Risk factors - 4, 7, 8. Illness: Tendonitis.

Group 2: Risk factors - 9, 5, 3. Illness: The common cold.

16-17 - Ocean Currents

Wind	Coriollis effect	Water density	Ocean bottom topography
Wind moves the surface of the water and determines where the currents will flow.	It moves the water in the hemispheres in a determined direction and ensures the constant movement of water.	If water has different density in places, then the denser water will sink and the less dense water will float. This movement will create a current.	When a current hits land it will be deflected in a different direction, creating another current.

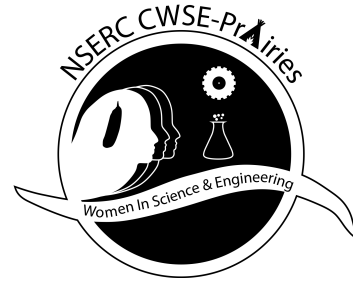
Benefits of Ocean Currents

1. nutrients.
2. surface.
3. marine organisms.
4. fisheries, agriculture.
5. Ocean currents.

Critical thinking questions

1. The ocean current will be very strong because all four inputs that cause ocean currents are in place.
2. The density difference will be lower because the temperature input is removed, therefore the currents will not be as big as they could be.
3. There will be one big current, rather than multiple currents since ocean topography is smooth and the current will not change directions.
4. The currents will be going back and forth due to the rough ocean bottom and the warm water due to it's geographical location.

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