



Hazards, Disasters & Climate Change



What us kids need to know to
#Prepare #Prepare #Prepare
and #KeepSafe during #disasters

For Primary School Kids
8 to 12 years

THIS BOOK BELONGS TO:

Published by CCRIF SPC

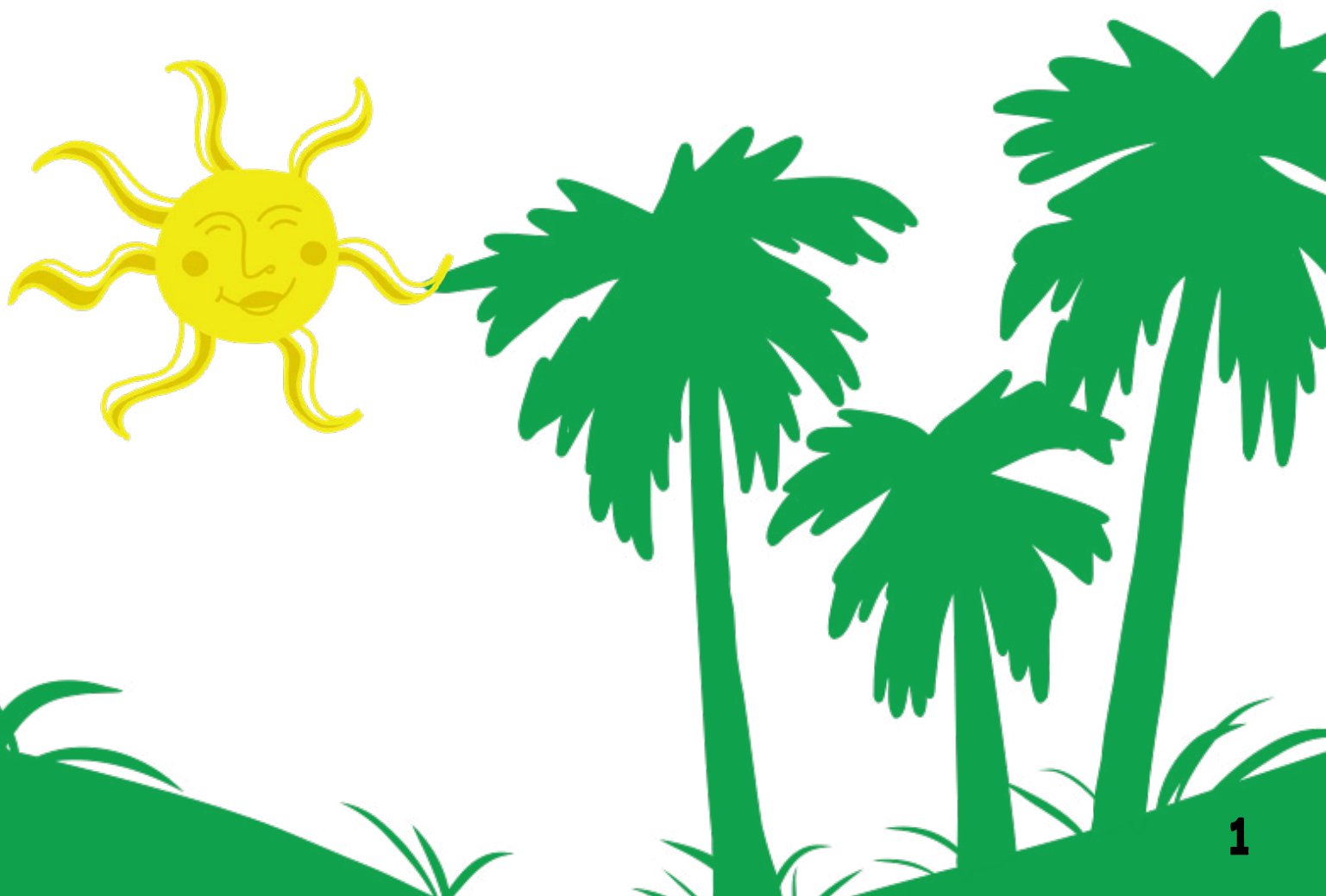
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ABOUT CCRIF SPC

CCRIF SPC (formerly the Caribbean Catastrophe Risk Insurance Facility) is a not-for-profit, multi-country, multi-peril risk pool and the world's leading development insurer. Established in 2007 following the devastation of Hurricane Ivan on the Caribbean, CCRIF was the first regional parametric insurance facility of its kind - created to give Caribbean governments rapid access to liquidity after natural disasters. Today it serves 39 member governments and public utilities across the Caribbean and Central America, offering parametric insurance policies for tropical cyclones, earthquakes, excess rainfall, fluvial flood, and sector-specific risks including fisheries, water utilities, and electric utilities, all underpinned by state-of-the-art proprietary models. As a development insurer, CCRIF's mandate is not to maximize profit but to protect its members' development gains: it delivers rapid liquidity within 14 days of a triggering event and reinvests its surpluses in the regions it serves, keeping premiums cost-effective, developing new products to close the protection gap, funding technical assistance, and investing in young people through scholarships and internships. Since inception, CCRIF has made 82 payouts totalling approximately US\$483 million, helping governments and utilities stabilize budgets, maintain essential services, and support vulnerable populations during the critical period after a disaster.

CCRIF's success and value to its members is measured by:

Quick Liquidity:

Provides quick liquidity within 14 days of an event to members following natural disasters when a policy is triggered.

Protection Gap:

CCRIF is helping to close the protection gap through parametric insurance and developing additional products to address new and emerging hazards.

Models:

CCRIF's parametric insurance models are customized for the regions we serve and are data rich, enabling model losses to more accurately reflect actual losses from an event.

Risk Pooling:

Allows CCRIF to benefit from the best prices for reinsurance, making coverage more affordable to members and to encourage them to purchase higher levels of coverage.

Innovation:

CCRIF is using its base products — XSR, TC to develop products to support economic sectors — e.g. agriculture, government infrastructure, microinsurance etc.

Loss and Damage:

Developing new and innovative policy endorsements to address the new risks that climate change poses — e.g. accounting for micro events, soil saturation.

A fun and interactive booklet for us kids to better understand natural hazards, disasters, and climate change and our roles in **#preparing, #keepingsafe, and #sharing information with our #friends, #family, and #community.**



Jean
Haiti



Lily-Rose
Jamaica



Éla
Barbados



Thomas
Dominica



Isha
Saint Lucia



Alicia
Belize



Suzie
Trinidad & Tobago



Zach
Grenada





Peter

St. Vincent &
the Grenadines

As a group of 10 friends from all over the Caribbean, we will be sharing information on hazards and disasters that affect our region as well as important tips on how to stay safe during and after a disaster.



Sol

The Bahamas

How we prepare for and manage disasters (disaster risk management) is everyone's business, including ours!





Message from the CEO, CCRIF SPC



We need to
#prepare and
#keepsafe!



“ I am pleased to present this booklet for primary school children to learn more about hazards, disasters, and climate change, and what we can all do to protect ourselves, and our homes and communities.

The booklet was developed as part of an initiative responding to requests from some of our stakeholders to become more involved in disaster risk reduction (DRR) activities “on the ground”, and specifically to develop a disaster risk reduction programme in schools that would inculcate a culture of resilience and safety in our children. CCRIF always seeks to meet the needs of its member countries and consequently, we have developed a Regional Disaster Risk Education and Communications Programme, which includes support for formal DRR community education, DRR programmes in schools, and DRR communications for the general public. It is not CCRIF’s intent to duplicate the efforts of other organizations. In this initiative CCRIF will work closely with regional and

international organizations that work with children, to develop and enhance access to dynamic resources on DRR for teachers, students, and all members of the school community and education sector. The booklet allows children to learn about the different types of hazards that affect the Caribbean; how to prevent hazards from becoming disasters: actions to do before, during and after these hazard events; climate change; and how to take care of our natural environment.

We also thought it was important to introduce these young readers to CCRIF SPC, a trail-blazing facility that provides parametric insurance to Caribbean and Central American countries, covering the catastrophic effects of tropical cyclones, earthquakes, excess rainfall, and other hazards.

We are sharing this booklet with schools throughout the region and believe that it will be beneficial to children ages 8-12 to help them – and their teachers, parents, guardians, caregivers, and community leaders – be safe when we experience a hazard event.

Isaac Anthony

”



We will be listening keenly to learn about these hazards and disasters. Hazards also impact us as well!

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Hi, I am Lily-Rose and first off, I am going to share with you information about hazards and disasters.

Chapter 1

Understanding Hazards, Disasters, and Risk Reduction

What is a Hazard?

There are two main types of hazards:

1. Natural Hazards

Natural hazards are naturally occurring physical events such as earthquakes, landslides, volcanic activity, floods, droughts, storms/cyclones, disease epidemics and insect/animal plagues. Sometimes these hazards can be very destructive and result in disasters.

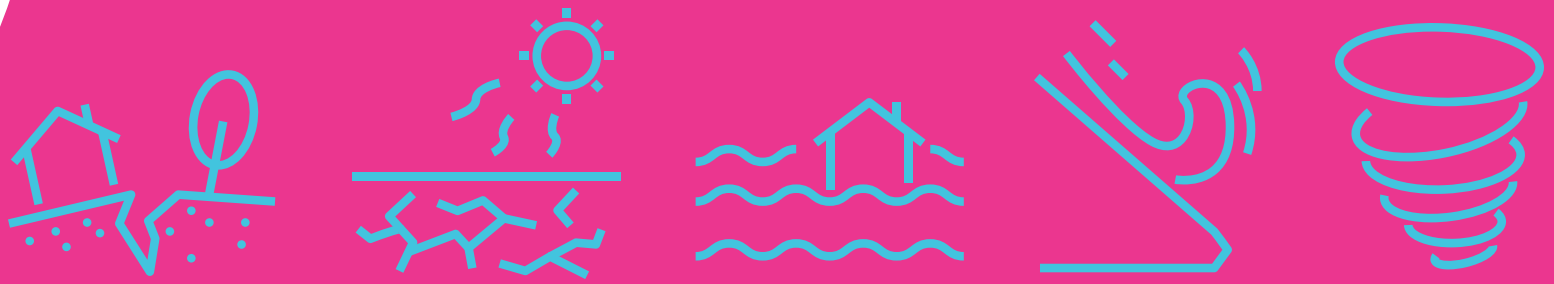
2. Manmade Hazards

Manmade hazards on the other hand are not caused by nature but by human activities. They are sometimes also referred to as technological hazards. Examples of manmade hazards are air and water pollution, fires, oil spills, other industrial accidents, transport accidents and even wars and conflict.

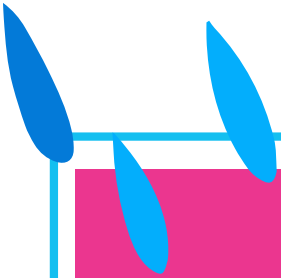
Let us explore a bit more...

Some hazards occur quickly or rapidly and are called rapid onset hazards or events. Some happen slowly and are called slow onset hazards or events. The table below lists some of the hazards that can affect us.

Class	Natural	Manmade
Rapid onset	Earthquakes Floods Hurricanes/Tropical Cyclones Storms Rainfall Volcanic eruptions – occur when the vent of a volcano releases lava or magma and gases Landslides Tsunamis Heat waves	Fires Wild fires Chemical spills Industrial accidents Air and water pollution Oil spills Transportation accidents Nuclear accidents
Slow onset	Drought Floods Epidemics Increasing temperatures Soil and land degradation	Famines (shortage of food) Civil strife, conflicts and wars



Countries here in the Caribbean experience many natural hazards such as hurricanes and storms, heavy rainfall, earthquakes, and even volcanic eruptions. Some hazards can lead to other types of hazards or disasters known as secondary hazards or disasters. For example, storms and rainfall can cause flooding and landslides, storm surges or big waves, and earthquakes can cause tsunamis. Also lack of rainfall can cause drought.



Did you know that hazards and disasters are not the same thing?

How and when does a hazard turn into a disaster?

When a natural hazard such as a hurricane leads to casualties such as major injuries and loss of human life, damage to buildings and infrastructure (which is just a big word for roads, bridges, etc.) and/or damage to the natural environment (such as coral reefs or forests destroyed by wind), then it becomes a natural disaster.

When a disaster occurs some persons may also lose their livelihoods or jobs as crops may be destroyed or hotels may be damaged, for example.

So we can answer the “when” part of our question...But I think that we need to understand “how” it is possible for a hazard to become a disaster.... this is where we need to talk about disaster risk.



The risk of a disaster occurring, also known as “disaster risk”, is the likelihood of loss of life, injury or destruction and damage resulting from a hazard.

The likelihood or possibility of a hazard becoming a disaster depends on how strong the hazard is (such as a storm’s wind speed or amount of rainfall) and also on the vulnerability, preparedness and ability of our countries, communities and households to prevent and withstand the effects of the hazard.



This seems like a mouthful - Suzie and I will try to explain a bit more.



Let me explain vul-ner-a-bil-i-ty.

Vulnerability is when people, communities, buildings, houses, roads, etc. are in danger of being affected by a hazard. We can determine how vulnerable our communities are by answering the following questions:

- *Where do people live?* Do they live in a location that would be affected by a hazard, such as close to the sea or on a hillside— in other words, how exposed are they to the hazard?
- *How well built are houses and other buildings?* Are they strong enough to withstand hazards? What materials are they built from? Are our houses built of wood or stronger materials such as concrete?
- *How are different people affected by a hazard?* Can children, seniors, and people with disabilities evacuate or move to a place of safety easily? Are women and men affected differently by disasters? Are girls and boys affected differently?
- *What about the social and economic wellbeing of our countries?* Sometimes persons who may be poor are not able to afford to build their homes in a safe place and may need the help of the government and various organizations. Does the government have plans in place to help poor persons before a natural hazard strikes?
- *Is our natural environment healthy?* Do we have many forests or have we cut down all the trees in our forests? Are the coral reefs along our coasts healthy? Do we still have mangroves or have they all been filled in for the construction of hotels, roads and communities? Do we dispose of our garbage properly and are our rivers, streams and gullies free of garbage and solid waste?



Hi, I am Suzie from the twin island Republic of Trinidad and Tobago. During a disaster we also need to always remember the vulnerable in our communities - persons like me with disabilities, and older persons as well, who may need help moving around.



So, to prevent a hazard from becoming a disaster we have to reduce our vulnerability and improve our level of preparedness and abilities (also known as capacity).

There are actions that we can take to reduce our vulnerabilities, prepare for hazards and disasters and reduce the risk of us being negatively affected.

Look at the two pictures on the next page - both from my island of Jamaica. Which one do you think would be more “vulnerable” to wind from a hurricane?



Picture 1



Picture 2



Hi, Isha from Saint Lucia here!



The answer is Picture 1. The house in Picture 1 will be more affected by a hurricane or earthquake or even heavy rainfall than the homes in Picture 2!



Correct Isha! Share your thoughts!

- How vulnerable do you think you are?
- How vulnerable do you think your community is?
- Have you ever been affected by a hazard – natural or manmade – a hurricane, an earthquake, a flood, a fire?
- Think about your experience... How did it affect you? Your family? Your community? Your country?

We know that we cannot stop a hazard such as an earthquake or hurricane or storm from happening but we can do things to reduce our risk, vulnerability, and to some extent the amount of damage and loss of life. We can definitely try to learn more about these hazards and find ways to prepare for them and find out how we can reduce our risk. In other words, we can prepare for disasters.

Come on - Let us explore some terms!



I am Éla from Barbados, a future disaster risk manager, and I will examine the terms disaster preparedness, disaster risk reduction and resilience.

Let me now talk about disaster pre-par-ed-ness.

Preparedness is how ready we are before a hazard occurs. It describes the different measures or things that we do at home, at school, in our communities, and in our country to reduce as much as possible the loss of human lives and damage to buildings, communities and the environment when there is a hazard.

- Preparedness can also involve moving people and their property to a safe location when a disaster threatens. It also includes planning for the timely and effective rescue of persons who may be trapped when the hazard strikes.

I am sure that before the hurricane season each year you hear announcements on the radio telling us where the “hurricane shelters” are located in our communities and the things that we can take to those shelters.



And now let us discuss disaster risk reduction.

Disaster risk reduction activities are designed to reduce, minimize or eliminate damage from hazard events. Risk reduction measures can address existing vulnerability through actions such as strengthening roads and bridges and building safer homes and also relocating communities to safer places. Actions taken to reduce future vulnerability, such as the implementation and enforcement of building standards, ensuring buildings are accessible to vulnerable persons, and protecting and conserving our natural environment can have a significant effect on how we are affected by natural hazards.

These activities make us resilient.



Being resilient means that we will be more prepared when a hazard comes, and this means that we are able to improve how we respond and could even prevent the hazard from becoming a disaster. This will make us better able to cope with the hazard.

We all need to be prepared! We can all play our part in preparedness, no matter how small. The better prepared we are as a family, a school, a community, and a country, the less tragic the effects of a natural hazard can be.



We now know how to reduce the risk of a disaster. Yay!

Being prepared makes us more resilient!



**Remember we said that a hurricane is a hazard,
but Hurricane Dorian became a disaster when it hit the island of Abaco.**

Sol from The Bahamas experienced a hurricane in 2019 – Hurricane Dorian – when it passed over his home on Abaco Island. It destroyed Sol's home and many other buildings, people died and his beautiful island was totally devastated. Sol wants to share his experience with us.



It was a disaster!
It was so scary!



There were strong winds and they were howling like wolves.

We live next to the sea and the waves were getting very high and crashing onto the rocks and then the houses. Eventually the water from the waves started to enter our house and the water started to rise in the same way a glass fills up when you put it under a tap. We did not know what to do. There was also lots of rain and then there was water pouring down on us directly because the winds caused our roof to fly off. Everything got soaked – my school bag, my books, my bed. The winds also caused the electricity poles to fall and all the lights went out. So imagine strong winds, no roof, heavy rain, water filling up in your house and complete darkness. And of course, it was not quiet, dogs were barking, babies were crying and people were moving about in the darkness trying to save what they could. Sounds like a horror movie doesn't it?

But it was not just my home, most of the other homes on the island were destroyed. My dad is a fisherman and his boat and gear were all destroyed. Some persons died – one of my friends lost his dad as he was swept away by a big wave while he was trying to tie down his boat.

Here are pictures showing my beautiful island Abaco before Hurricane Dorian and what it looked like after Hurricane Dorian.



**Abaco Island - Before
Hurricane Dorian**



**Abaco Island - After
Hurricane Dorian**



Salut, je suis Jean d'Haïti et je nous guiderai dans ce chapitre et je décrirai les types des catastrophes naturelles et artificielles.



Let me translate...

Hello, I am Jean from Haiti and I will lead us through this chapter and describe some of the natural and manmade hazards.

We know that if we manage these hazards well and know what to do, they do not have to become a disaster!

Chapter 2

Preparing - Before, During, and After a Hazard

Let us look back at that table from Chapter 1 which showed the different types of hazards.

Class	Natural	Manmade
Rapid onset	Earthquakes Floods Hurricanes/Tropical Cyclones Storms Rainfall Volcanic eruptions – occur when the vent of a volcano releases lava or magma and gases Landslides Tsunamis Heat waves	Fires Wild fires Chemical spills Industrial accidents Air and water pollution Oil spills Transportation accidents Nuclear accidents
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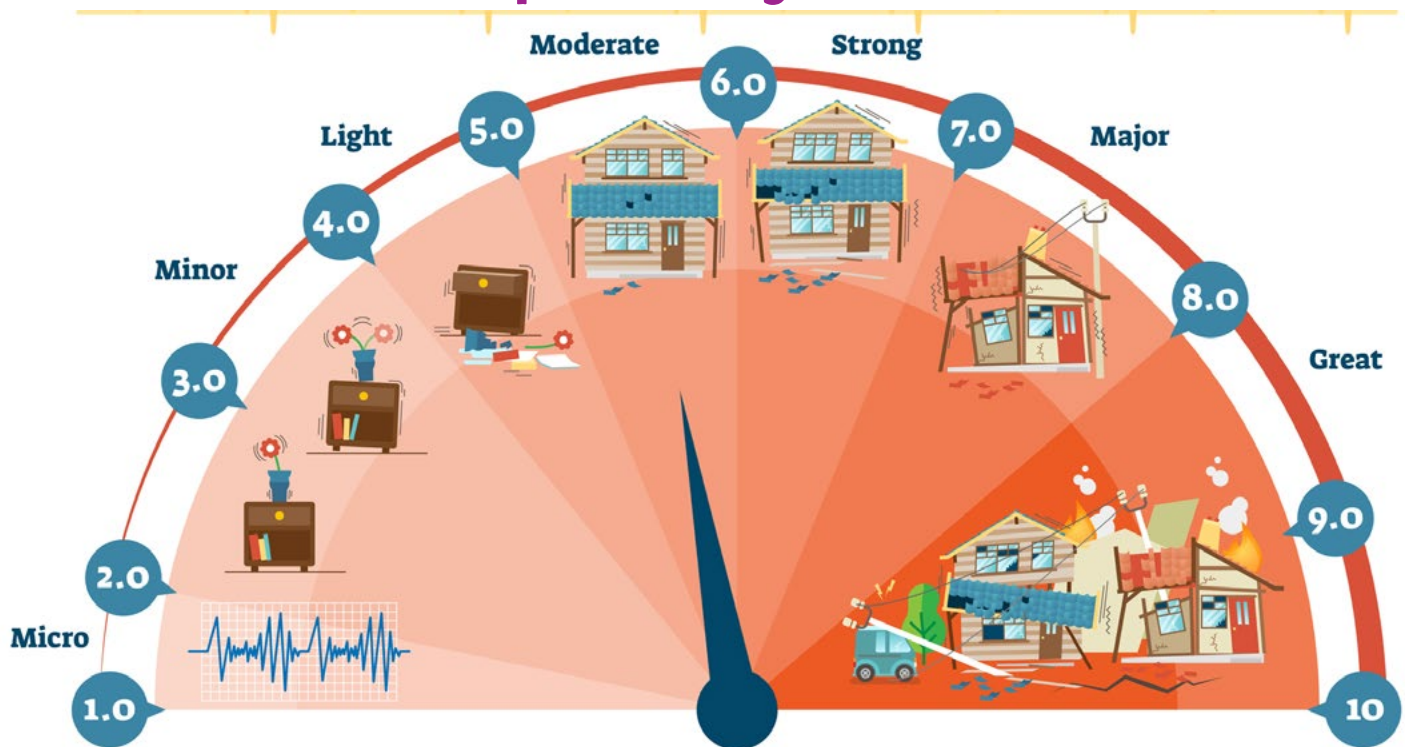
Earthquakes

An earthquake is a sudden violent shaking or movement of part of the Earth's surface caused by abrupt displacement of rock masses, usually within the upper 10 – 20 miles of the Earth's surface. An earthquake can happen anytime in the day or night and there is usually no warning so there is nothing we can do to stop an earthquake from happening.

Earthquakes are caused by the movement of plates (huge slabs of rock) making up the surface of the Earth. When these huge rocks under the Earth's surface shift in places, the whole ground shakes violently.

To measure the strength or intensity of an earthquake, the Richter scale is used. This is a scale that measures the intensity of seismic waves, usually expressed in terms of magnitude. The figure below shows a Richter scale. Earthquakes at 1 on the scale are very mild and not even felt. Earthquakes between 3 and 4 on the Richter scale are considered to be mild earthquakes but earthquakes beyond 7 on the scale are major and those beyond 8 are great.

Earthquake Magnitude Scale



In 2010, Haiti experienced a major earthquake, and our friend Jean will tell us a bit about it.

Micro

Not felt

1.0–1.9

Minor
felt slightly



2.0–2.9

Minor
often felt by people



3.0–3.9

Light
noticeable shaking of objects



4.0–4.9

Moderate
windows rattle or break



5.0–5.9

Strong
slight damage to buildings



6.0–6.9

Major
buildings receive severe damage



7.0–7.9

Great
major damage to buildings



8.0–8.9

Great
total destruction



9.0 and greater

Richter Earthquake Magnitude Scale

This figure shows us what happens and what we are likely to see at each point on the Richter scale, although these effects may be different depending on where we live.

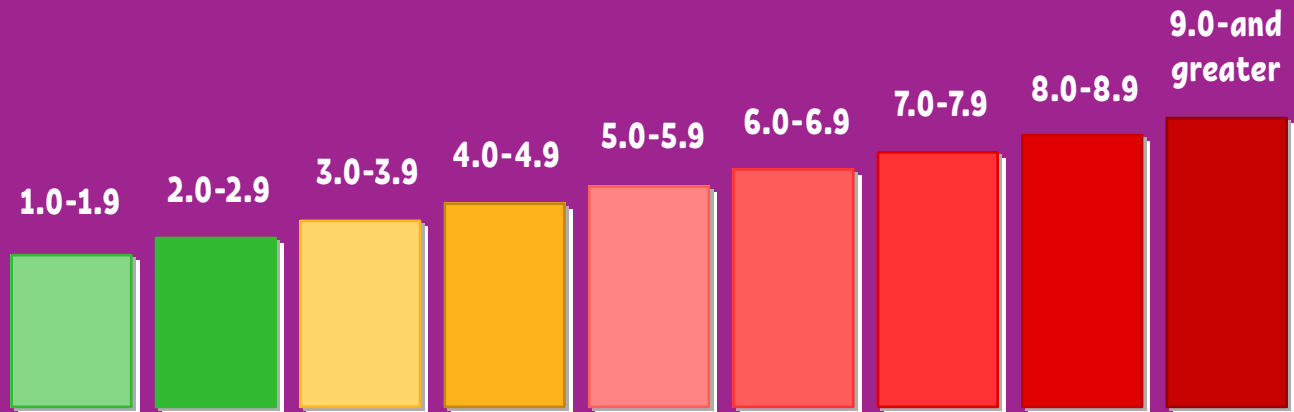
Hi, I'm Alicia from Belize! Let me describe a seismic wave before we move on.

First of all, we know what a wave is. A wave is a motion up and down or side to side. Let us practice a wave by waving to a friend or a neighbour. There are also waves in the ocean. Waves are all around us, and the Earth produces waves as well. Scientists call the waves that travel through the Earth seismic waves. These waves are actually energy waves that result from earthquakes, explosions, or volcanoes. These waves are felt on the Earth's crust.

The graph on the right shows the strength of earthquakes and the size of the waves. The stronger the earthquake the bigger the seismic waves and the stronger the shaking.



Richter Earthquake Magnitude Scale



MICRO

MINOR

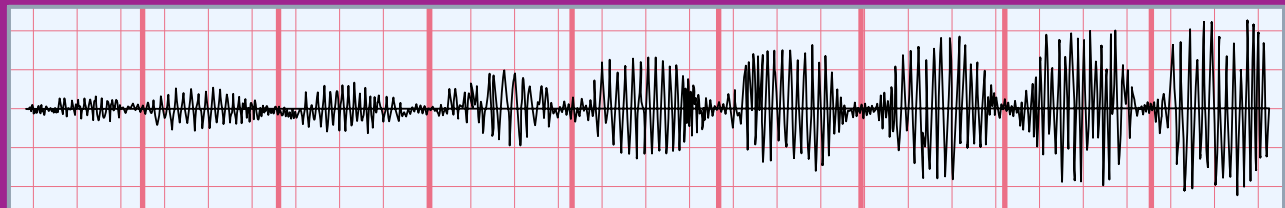
LIGHT

MODERATE

STRONG

MAJOR

GREAT



1.0



2.0



3.0



4.0



5.0



6.0



7.0



8.0



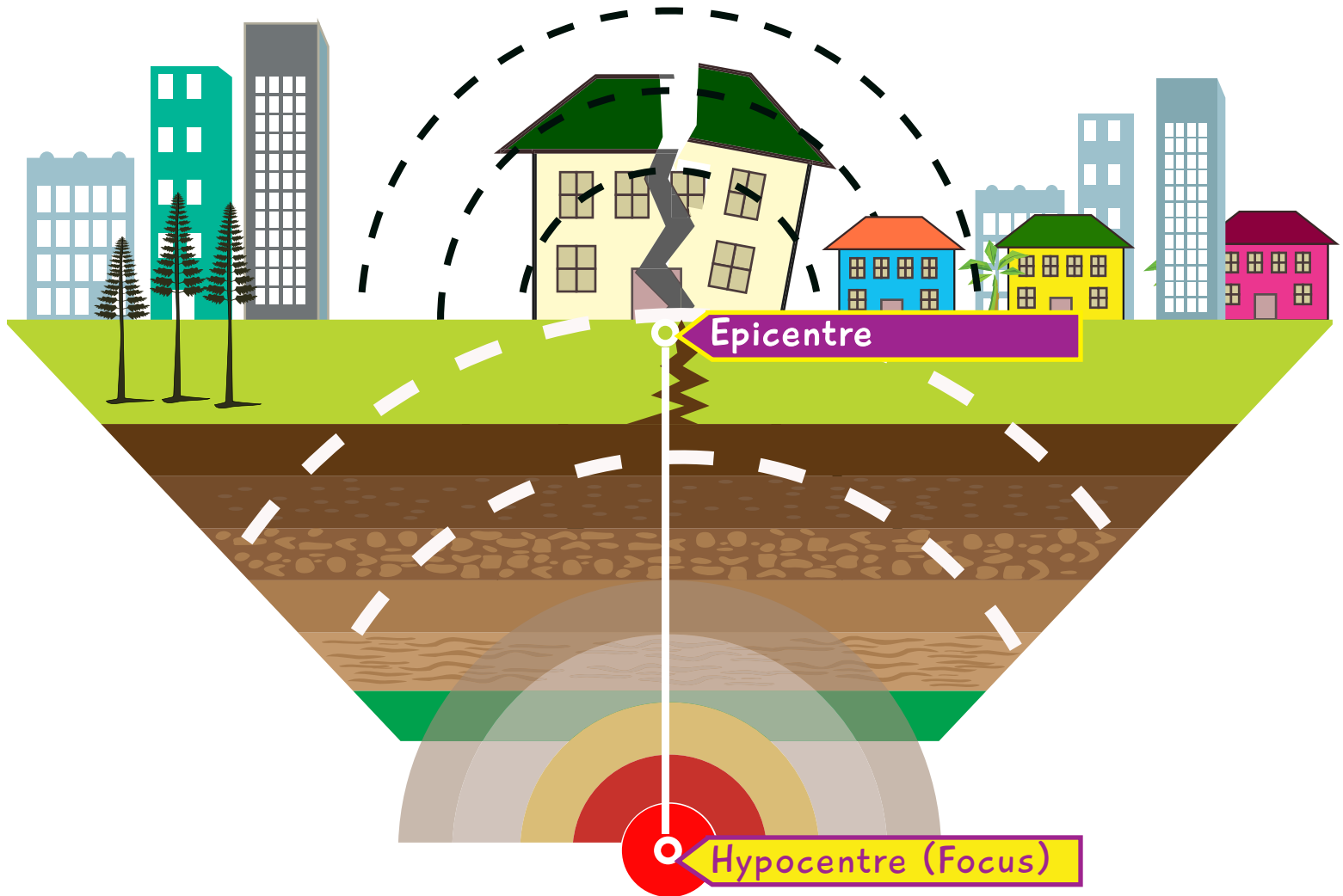
9.0

One more term that you may have heard about is epicentre.



What is that? Well, it is the location on the Earth's surface directly above the point where the earthquake starts.

EARTHQUAKE



In the Caribbean we experience many earthquakes throughout the year, but most do not cause damage. On my island of Haiti there was a major earthquake in 2010 which caused a lot of destruction. I was only a baby when the earthquake struck in 2010, but my mom tells me stories of what happened during the earthquake and what happened in the days and months afterwards. Maman said that the earthquake struck just before 5 pm, right after I had my evening bath. It was a very strong earthquake with a magnitude of 7.0. Maman says the shaking was felt in Jamaica, Cuba and as far as Venezuela. The epicenter of the quake was just 16 miles away from Port-au-Prince, the capital city. The effects were catastrophic. All of the hospitals in Port-au-Prince sustained serious damage, as did the airport and seaport, which had to be closed. Our telecommunications services (like our cell phones and internet) were greatly affected, and major roads were impassable. Close to 300,000 buildings, most of which were homes, were damaged beyond repair. Our house was totally destroyed. Luckily, I was still in Maman's arms when the earthquake struck and she was able to go under a large table with me until it was safe to move. She was very scared and she said of course I started to cry and in some way she says she felt I knew what was happening. She was very worried for my dad who was at work and my older brother who was still at school. We were eventually reunited after the shaking stopped. Many people were not as lucky as we were – 300,000 people died because of the earthquake and many people including us lost our home and all our belongings.

The picture at right shows how our home was destroyed!





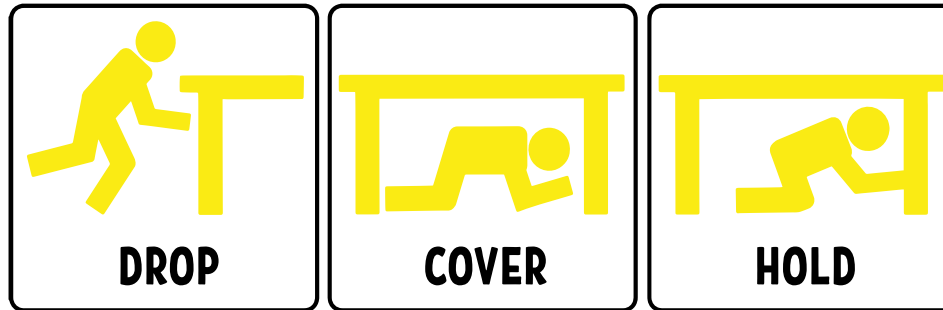
We can be safer when an earthquake strikes if our houses are well constructed, on stable ground, and tall and heavy furniture such as bookshelves are securely fastened. It is also important to know how to prepare before an earthquake strikes and what to do when it does.



Hi, this is Suzie again. In my home country of Trinidad we have many earthquakes every year, so I feel like I am an expert on being prepared and knowing what to do. So, I am sharing some tips with you, your family and your community.

Tips: During the Shaking or when an Earthquake Happens

- **Drop, Cover and Hold On** - make sure to protect your head and make yourself as small as you can. Only when the shaking has stopped, can you go out, but stay far from any buildings or trees, as the danger is not over yet



- If you are inside stay there. Stand in a doorway or crouch under a desk
- Stay away from windows and glass dividers. Watch for heavy furniture that may topple
- If you are in a high rise building do not crowd exits since stairways may be jammed with people
- If you are in a building do not try to use the elevator
- If you are outside, stay there. Stay away from buildings, trees, and telephone and electricity lines
- If driving, stop in the safest place possible. Avoid overpasses and underpasses

Tips: Preparing for an Earthquake Before it Happens

- In your home or in the classroom, ensure that top-heavy objects and furniture such as storage cabinets and bookcases are fastened to the wall and the largest or heaviest objects are placed on lower shelves
- Always have at home emergency equipment e.g. radios and medical supplies
- Know the basic positions (Drop, Cover and Hold On) and what to do in the event of an earthquake
- At your school and at home, know and agree on the designated open area for everyone to meet and make sure it is away from electrical lines and other hazards
- Ensure that there are adequate emergency supplies to last for 3 days in your home
- Keep your important papers like passports in a plastic bag in a cabinet or other secure place that cannot be easily destroyed or at a location outside of the earthquake zone
- At school and home conduct regular earthquake drills

► Always have an emergency kit packed. Your emergency kit should include:

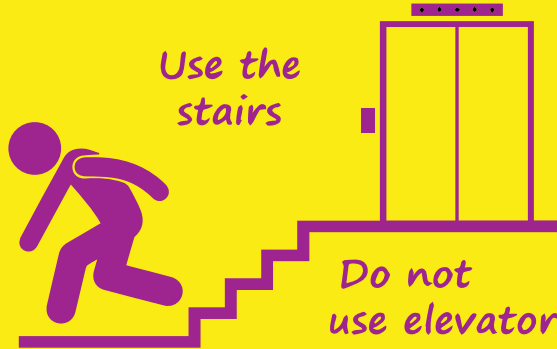
- a. Portable radio and extra batteries
- b. Flashlight and extra batteries
- c. First aid kit and first aid booklet
- d. Canned or dried foods
- e. Non-electric can opener
- f. Fire extinguisher
- g. Bottled water – 2 gallons per day per person
– store enough for at least 3 days



Tips: After the Earthquake or After the Shaking Stops



Tremor



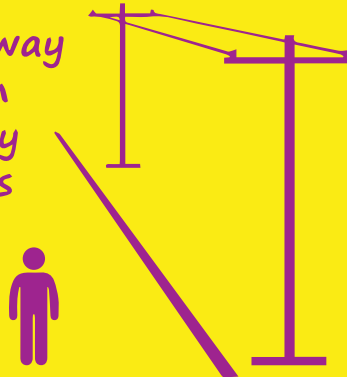
Use the stairs

Do not use elevator



Cover your head and neck

Stay away from utility wires



Get under desk and hold on



Stay away from potential danger objects



Drive to clear area and avoid bridges

- If you are inside immediately evacuate and go to an open area
- If you are at school go to the designated open area
- Check for injuries and provide first aid
- Check for safety hazards such as gas, water or sewage leaks, and broken, dangling or damaged electricity lines
- Do not use matches, lighters, appliances or electrical switches until you are certain there are no electrical shorts or gas leaks
- Do not use the telephone except in the case of an emergency
- Wear shoes to prevent injuries from stepping on materials that may have fallen
- Listen for emergency bulletins or public announcements from the national disaster agency or the government
- Follow the instructions of public safety personnel and relief organizations
- Do not go into damaged areas unless you are told it is safe to do so by the authorities
- Be prepared for the “aftershocks” or those smaller earthquakes that follow the major earthquake
- Report any damage to the relevant authorities

Exercise: Let us conduct an earthquake drill!

You can do this exercise at home, at school or in your community.

There are 10 simple steps.

1

Use a whistle or PA system or an alarm to signal the beginning of the shaking

2

Announce that the earthquake drill has begun and instruct your fellow students, teachers or community members to "Drop, Cover, and Hold On"

3

Count seconds out loud for the duration of the quake – 20 seconds. This will help keep everyone focused and calm and will allow persons to identify how long an earthquake can last

4

With the PA system or another alarm, signal that the shaking has stopped

5

Have everyone count to 60 and suggest that while still under the desk or table, persons should look around at what might fall on them in a real earthquake. These should be secured or moved after the drill

6

After the 60 seconds are up, have everyone go to the designated area

7

In a school setting, make sure the teacher has a list of students. At home or in a community use the buddy system to account for everyone in the safe designated area

8

Use suggested evacuation routes or an alternate route if yours is blocked or unsafe

9

Use 4 Evacuation Rules – Don't Talk! Don't Push! Don't Run! Don't Turn Back!

10

Check that exit routes are clear. Move directly away from the building when exiting. Cover your head with a bag or book if available. Do NOT use any elevators.

Always remember the vulnerable in our communities and schools

- persons like me, and older persons as well, who may need help moving around.





Hi, I am Thomas
from Dominica.

And I am Zach
from Grenada.



We will be discussing tropical cyclones and hurricanes.

You met Sol, from The Bahamas, and he shared with you his experience with Hurricane Dorian. We will share with you information on different storms - Tropical Storm Erika in 2015 and Hurricane Maria in 2017, which hit my island Dominica - and Hurricane Beryl, which affected Grenada in 2024.



Tropical Cyclones & Hurricanes



Tropical cyclones are the most severe storm systems in the tropics – that is countries like ours in the Caribbean. According to the United States National Hurricane Center, “a tropical cyclone is a rotating, organized system of clouds and thunderstorms that starts or begins over tropical or subtropical warm waters and has a closed low-level circulation”.

Based on the maximum wind speeds, tropical cyclones are categorized or grouped into tropical depressions, tropical storms, and hurricanes.

A tropical depression is a relatively weak tropical cyclone with maximum sustained winds of 38 miles per hour (mph) or less, and a tropical storm has maximum sustained winds of 39–73 mph.

A hurricane is a severe tropical cyclone with sustained or constant winds of 74 mph or greater. Meteorologists rank hurricanes into five categories, according to the Saffir-Simpson Hurricane Wind Scale, with 1 being the mildest and 5 the strongest.

Now that category 5 wind speed is fast and scary!



The categories give an estimate of the possible damage and flooding to expect if the hurricane makes landfall. A hurricane is usually accompanied by heavy rain (6-12 inches) and storm surges (waves up to 25 feet high — that is as tall as your dad x 4).

The table on the right shows how the Saffir-Simpson hurricane wind scale determines the rank of a hurricane using wind speed and storm surge.

Hurricane Rank	Wind Speed (mph)(km/h)	Storm Surge or height of waves (ft) (m)	Example of Damage
1	74-95 mph 119-151 km/h	4-5 ft 1.2-1.5 m	Minimal – no damage to buildings
2	96-110 mph 152-176 km/h	6-8 ft 1.8-2.4 m	Moderate –some damage to roofing material, doors and windows on buildings. Considerable damage to vegetation and agriculture
3	111-130 mph 177-209 km/h	9-12 ft 2.7-3.6 m	Extensive – Structural damage to buildings and a potential for external wall failure. Significant roof damage
4	131-155 mph 210-248 km/h	13-18 ft 3.9-5.4 m	Extreme – More extensive roof damage and structural failures. Major erosion of beach areas. Significant inland flooding of low-lying areas
5	More than 155 mph More than 248 km/h	More than 18 ft More than 5.4 m	Catastrophic – Complete roof failure on many residences and industrial buildings. Some complete building failure. Major damage to lower floors of all coastal structures



Do you know why hurricanes
are called by name?

Yep I sure know the answer to that!
You see, tropical cyclones like hurricanes and
storms can last a long time — a few days and
even a week or two — and are given names so
scientists can keep track of them and tell them
apart. In 2017, there was a category 5 hurricane
named Maria, which is my middle name!



Do you know if there has ever been a storm with
your name, which country it made landfall in and
how it affected the country? Look at the list of the
2020 Atlantic Hurricane Season names on the next
page and see if you see your name!

2020 Atlantic Hurricane Season Names

There are the names of tropical storms or hurricanes that formed in the Atlantic Ocean in 2020. Names are alphabetical, and alternate between male and female. Usually all names in the entire list are not needed.

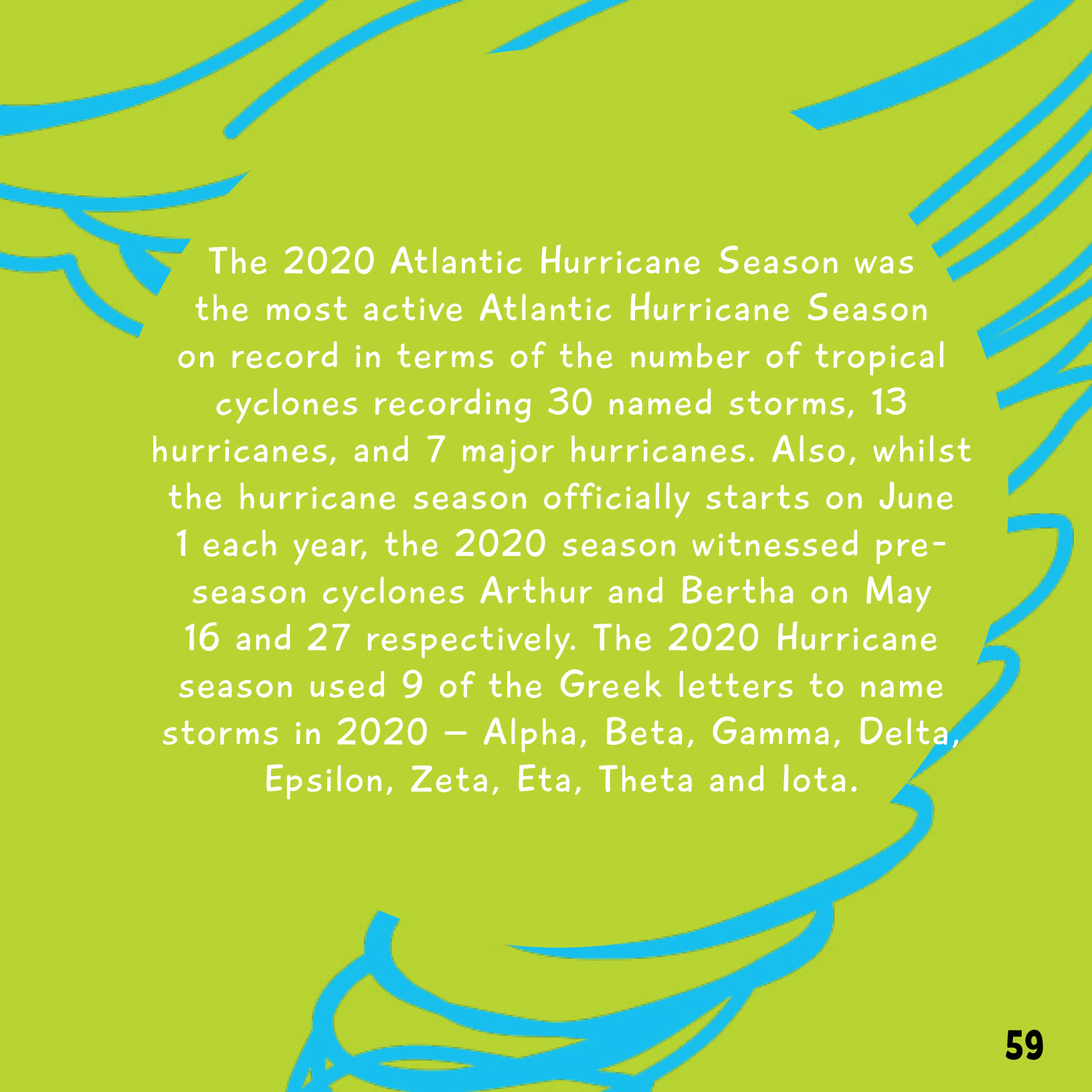
Arthur	Hanna	Omar
Bertha	Isaias	Paulette
Cristobal	Josephine	Rene
Dolly	Kyle	Sally
Edouard	Laura	Teddy
Fay	Marco	Vicky
Gonzalo	Nana	Wilfred

Storm names are retired or never used again when they cause loss of life and major damage to roads, buildings, communities, etc. The name Maria was retired in 2018. Thomas will share with us a bit about Hurricane Maria shortly and how it affected his beautiful island of Dominica.

When all the names for a season have been used and there are more storms coming (or when the normal list of storm names is exhausted), additional names used to be taken from the Greek alphabet to name storms, for example Hurricanes Zeta and Eta which affected Jamaica and other countries in the Caribbean in 2020. This was necessary only for the 2020 and 2005 Atlantic Hurricane Seasons. From 2021, Greek letters stopped being used, and a secondary list of alternate names are now used instead.

Go and check out the names of the current Atlantic Hurricane Season!





The 2020 Atlantic Hurricane Season was the most active Atlantic Hurricane Season on record in terms of the number of tropical cyclones recording 30 named storms, 13 hurricanes, and 7 major hurricanes. Also, whilst the hurricane season officially starts on June 1 each year, the 2020 season witnessed pre-season cyclones Arthur and Bertha on May 16 and 27 respectively. The 2020 Hurricane season used 9 of the Greek letters to name storms in 2020 – Alpha, Beta, Gamma, Delta, Epsilon, Zeta, Eta, Theta and Iota.

The Atlantic Hurricane Season that affects the Caribbean starts on June 1 and ends on November 30 each year.

I am going to share with you a bit about Hurricane Maria which destroyed much of my island of Dominica in 2017. Tropical cyclones like hurricanes and storms have had significant impacts on the Caribbean – on our people, on property and on our economies. Did you know that these disasters cost our countries a lot of money? My country was devastated and almost completely destroyed by Hurricane Maria. The cost of damages totalled about US\$931 million and losses another US\$380 million! That is a lot of money. We did not even realize that a hurricane could develop from a tropical storm to a major hurricane of Category 5 within a 24-hour period and cause such devastation. Most of the people in my country were affected – about 93 per cent – that is close to everyone. Thirty persons lost their lives and another 34 went missing. A lot of houses were damaged or totally destroyed. Many of our roads, bridges and water, electricity, and telecommunications systems were destroyed. Agriculture and tourism were also affected and my mom was out of work for a while as she works at a hotel. We also had damage to many of our ecosystems – such as our forests, watersheds, wetlands and coral reefs. It was a disaster! This is the damage to my house and to my father's bus. So for a time both my parents were out of work because of Hurricane Maria.

With this hurricane I felt really sad as it almost felt like a thief had come in the night and taken all we had.







I am so sorry for your loss, Thomas.

My family and I also experienced a disaster in 2024 - it was called Hurricane Beryl.

I am from the island of Carriacou, one of the sister islands that form Grenada. My island was almost totally devastated by the hurricane. I remember listening to the howling sounds of the wind as the storm passed and feeling scared. Then, afterwards, looking outside and seeing the destruction. I was heartbroken.

Beryl damaged almost all the buildings on my island - the airports, marinas, gas stations, the hospital, and our homes. It also damaged our electricity systems and affected our natural environment.

Hurricane Beryl also affected St. Vincent and the Grenadines and Jamaica.

Both Thomas and I will be sharing some tips on preparing for tropical storms and hurricanes.



Hurricane Checklist

Tips - Before the Start of the Hurricane Season - Before June 1

Have a talk with your parents or caregivers and make sure your household is prepared. Here are some tips to guide your family and the rest of your community.

- Ensure all family members and community members know what to do to keep safe during and after a hurricane
- Know and understand the various terms associated with hurricanes (watch, warning)
- Check your hurricane supplies
- Identify the nearest shelter
- Check the storm surge history and elevation of your area
- Know who your local Disaster Coordinator is
- Remind your parents to check that their insurance policies are up to date and that they have adequate coverage in case of damage to your property



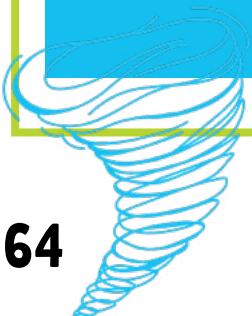
Know what they mean!

Tropical Storm Watch - Tropical storm conditions with sustained winds from 39 to 73 mph are possible in the watch area within the next 36 hours.

Tropical Storm Warning - Tropical storm conditions are expected in the warning area within the next 24 hours.

Hurricane Watch - Hurricane conditions (sustained winds greater than 73 mph) are possible in the watch area within 36 hours.

Hurricane Warning - Hurricane conditions are expected in the warning area in 24 hours or less.

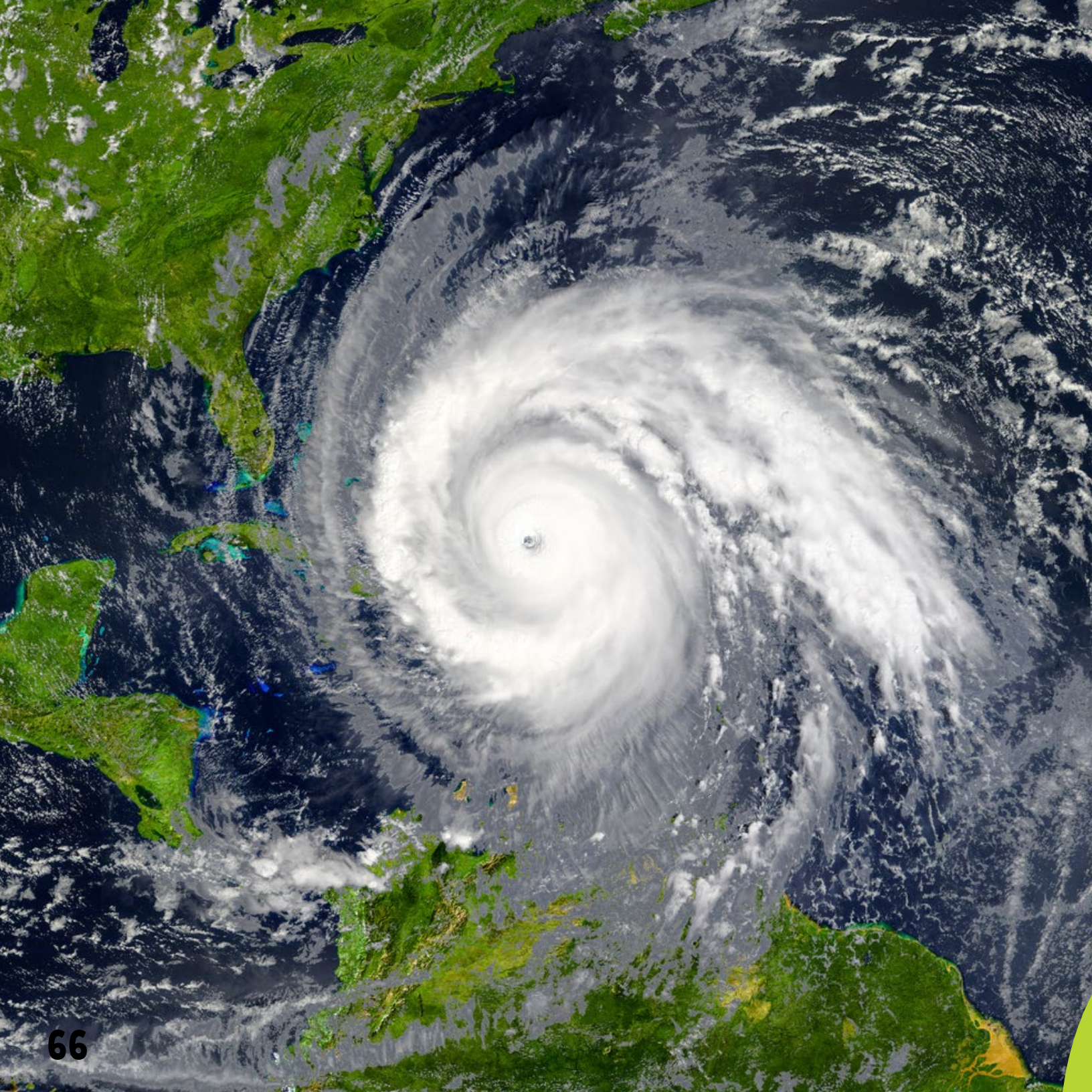


Tips - At the Start of the Hurricane Season - June 1

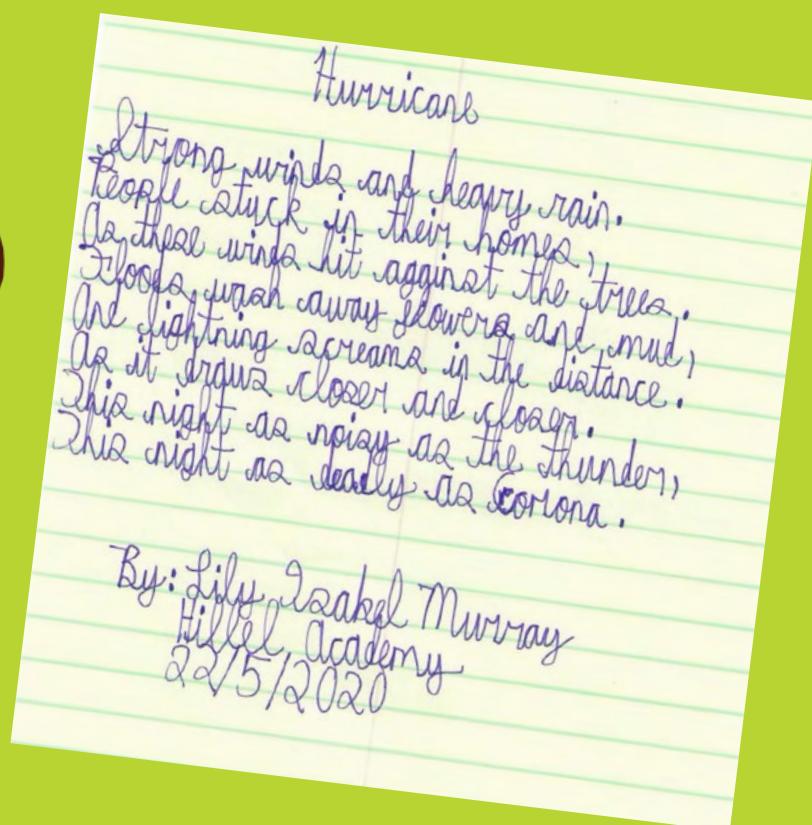
Have a talk with your parents or caregivers and make sure your household is ready. Here are some tips to guide your family and the rest of your community.

- Check on inventory — do you have items such as water boots, raincoats, flashlights, batteries, radio, hurricane lamp, hurricane shutters, hooks and latches, plastic/garbage bags, nails, rope and matches?
- Trim trees with branches near houses and electrical lines
- Ensure that you have adequate drinking water supplies and storage facilities for water (barrels, tanks)
- Stock 4-5 days' supply of food that does not need cooking — tinned foods such as sardines, tuna, corned beef; dry goods such as crackers, cereal; tinned or powdered milk
- Ensure that you have a first aid kit and other medical supplies
- Carefully mark and store all hurricane supplies
- Develop an emergency contact list — have phone numbers for the police and fire services as well as phone numbers for other family and friends
- For your home, make sure that windows and doors that need repair are taken care of before the Hurricane Season





Oh wow, we have learned a lot about tropical cyclones and hurricanes and Sol, Thomas and Zach have shared their experiences. Do you want to share your experiences? Maybe you can write a poem as my namesake did or write a song about a hurricane. Let's do this!



Tips - When a Storm or Hurricane is Approaching



*Stock food, supplies,
and medicine*



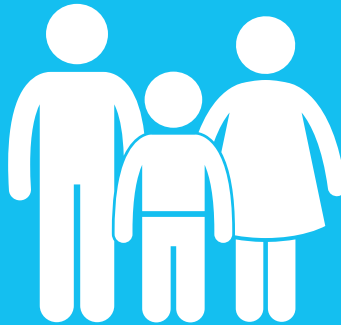
*Protect your
home*



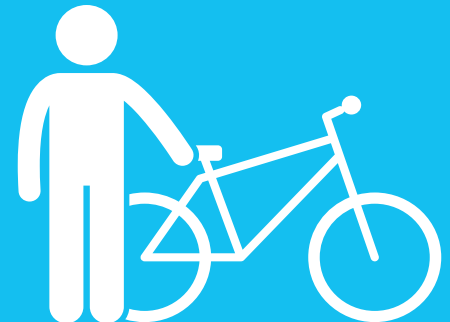
Stay on the news



Plan evacuation route



*Keep your
family close*



Get a bicycle



*Unplug propane
tank*



*Keep a
list of
important
contacts*



*Check
phone
battery*



Plan ahead

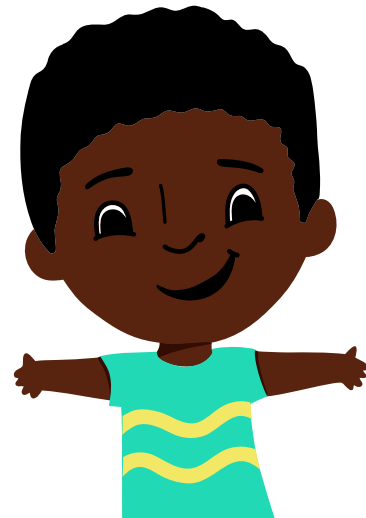
Ensure that you and your family as well as persons in your community:

- Listen to all warnings and bulletins on the radio or television
- Buy extra food (mainly dry goods and canned foods) and water if you have not already done so
- Remind your parents to fill up their vehicles with gas and place vehicles on high ground preferably in a garage or other shelter
- Store at least two gallons of drinking water per person per day – store enough for at least 3 days
- Ensure that all items on the outside that can be blown away are secured or placed inside or in an enclosed shed
- Keep your pets inside if possible
- Ensure that your roof is secure and remove all loose objects that might cause damage during strong winds
- Tape all glass windows to secure them. If your house has many glass windows use shutters to protect the glass. If shutters are not available use strong masking tape to tape an "X" across the glass to prevent splinters from scattering in case the glass shatters. If the glass on your windows are shatterproof you should be ok without the "X"
- Know these two terms to assist with your preparations:
 - a** Hurricane Watch - Hurricane conditions (sustained winds greater than 73 mph) are possible in the watch area within 36 hours
 - b** Hurricane Warning - Hurricane conditions are expected in the warning area in 24 hours or less

Tips - During the Hurricane

Share these tips with your family as well as persons in your community:

- 1 Keep calm
- 2 Continue to listen to the radio for reports and bulletins
- 3 Do not go outside unless it is necessary
- 4 Do not open windows and doors that are exposed to the full forces of the wind
- 5 Use the brief time during the eye of the hurricane to do any absolutely necessary repairs for your personal safety



Tips - After the Hurricane

Share these tips with your family as well as persons in your community:

- 1 Clear up debris such as fallen trees and bushes and undertake emergency repairs
- 2 Do not touch loose or dangling electrical wires – these can be very dangerous
- 3 Boil all drinking water for at least 10 minutes
- 4 Protect yourself before going outside
- 5 Do not empty any stored water until safe drinking water is restored
- 6 Check for damage to your home
- 7 Report any damage of water or sewer mains or any fallen electrical poles to local authorities



Floods



A flood is an overflow of water mostly over land and normally on dry ground. This is most commonly due to heavy rainfall or an overflowing river. A flash flood is a sudden local flood caused by heavy rainfall. If you live in a

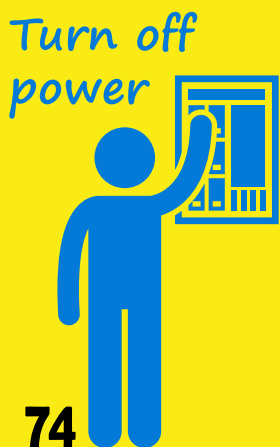
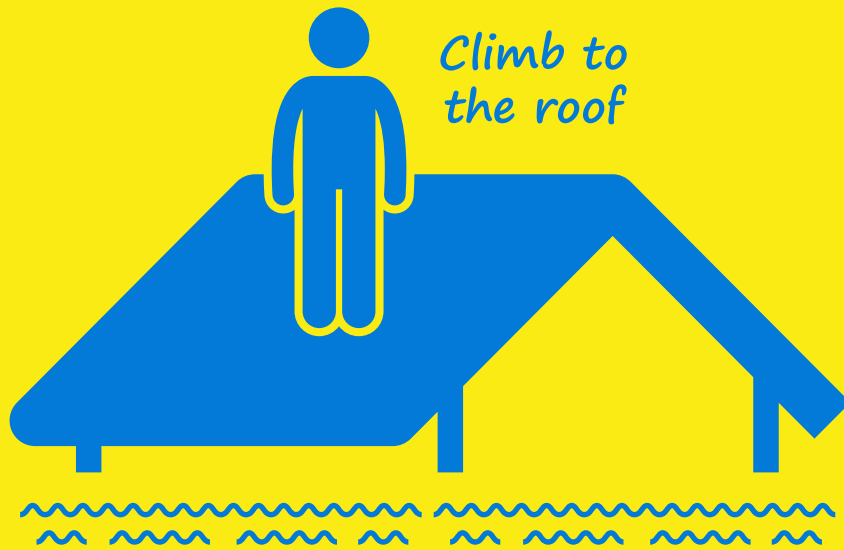
low-lying area when heavy rains (or hurricanes) are coming, it is often best to get away to a safe spot in a shelter or with family and friends whose homes are on higher ground.

Flood Checklist

Before a Flood

- Find out whether you live in a flood plain. The disaster management agency in your country will have this information. Just because an area has not flooded for many years does not mean it is outside the flood plains. Most flood plains are “100-year” plains, meaning that on average once in every hundred years a flood is likely to take place, and it could be devastating
- Establish the nearest “high-ground” location accessible to you and your family, preferably by automobile — but don’t count on having a car if a massive flood hits. The very best refuge from a flood is high ground
- If there is any chance of you being affected by a flood, stockpile plastic sheeting, plywood, nails, a hammer, saw, and pry bar and plenty of sandbags. Stock up also on emergency supplies — food, water, and first aid kits
- Have an escape plan prepared if your community looks like it will flood. Check alternate routes to safe places. Trees, debris or floodwaters could block your way and you may have to change plans. Before you leave, eat a good meal. Shut off the water, electricity and gas at the metres. Leave a few windows slightly ajar to relieve the pressure if it is a hurricane. Make sure nothing that could be water damaged is near those windows. Put computers and other electronic equipment in plastic sheeting, well secured, in case the roof goes. Lock the doors

In Case of a Flood





Tips - During a Flood

- 1** Stay tuned to your portable radio for official warnings and all-clear signals
- 2** Climb to high ground and stay there
- 3** Avoid stepping into moving water — even if it is shallow it can knock you down and carry you away

Tips - After a Flood

- 1 Do not return home until the all-clear announcement is made
- 2 When you get home, fully inspect for damages. Do not enter a building that is still surrounded by floodwater
- 3 Be very careful to make sure that electrical services have been shut off. If you are unsure, find your main electrical box and turn your main switch to "off". Do not do this while standing in water or on wet ground. Find a dry, non-conducting object (like a tyre or wooden bench) to stand on while you flip the switch

4

Check for any animal that might have been washed into your home during the flood. These include snakes, crocodiles, insects and other potentially dangerous creatures. Use a tool like a hoe or rake to probe under the water and throw out rubbish that may have come in with the flood waters

5

Carefully, look for fire hazards, like leaking gas (submerged pilot lights will be out), flooded electrical conduits, and hazardous material that may have been carried from elsewhere

6

Dispose of any food and beverage including canned and bottled goods that have come into contact with floodwater

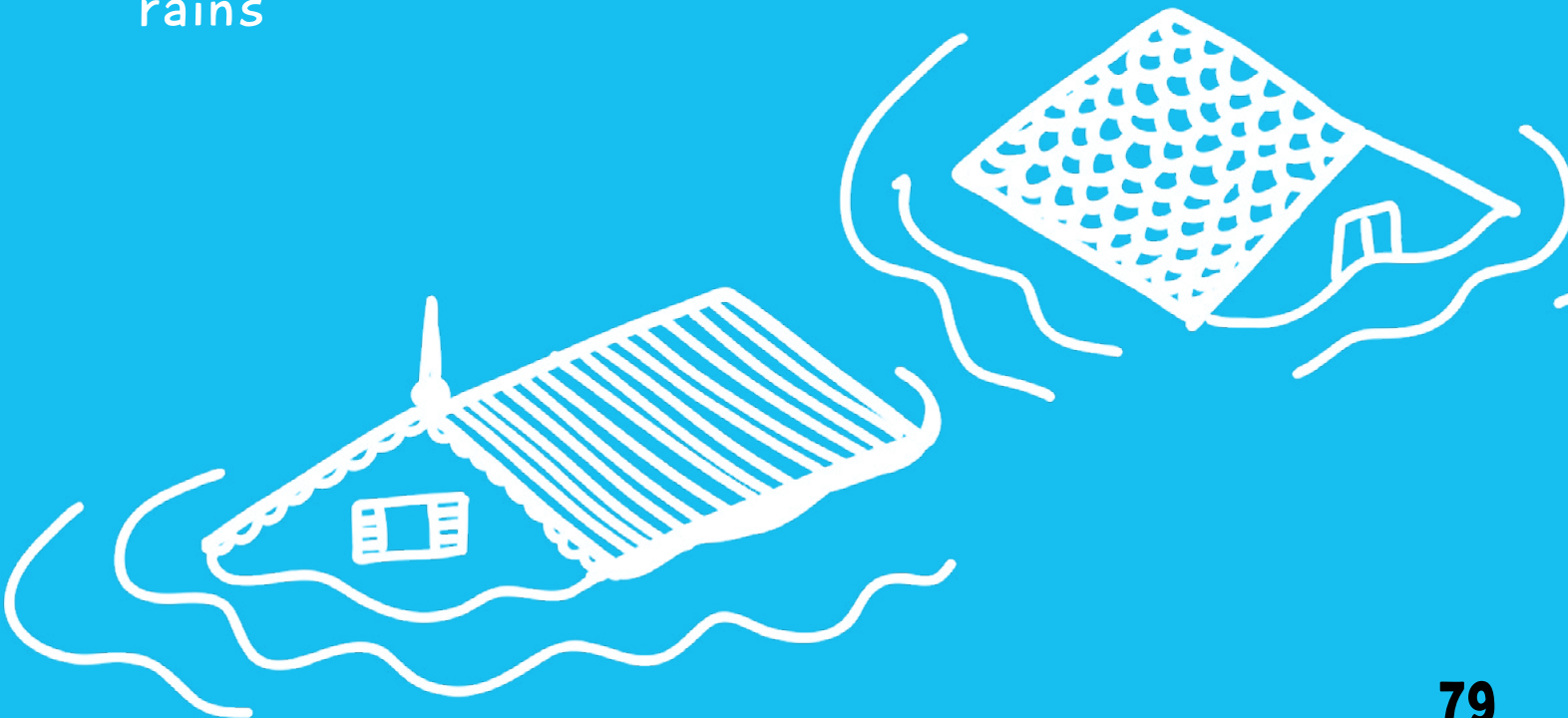
7

Do not drink tap water until the authorities assure you it is safe

Know the following terms:

- Flood Watch - High flow or overflow of water from a river is possible in the given time period. It can also apply to heavy runoff or drainage of water into low-lying areas. These watches are generally issued by the national disaster management agency or department for flooding that is expected to occur at least 6 hours after heavy rains have ended
- Flood Warning - Flooding conditions are actually occurring or are imminent in the warning area

- Flash Flood Watch - Flash flooding is possible in or close to the watch area. Flash Flood Watches are generally issued for flooding that is expected to occur within 6 hours after heavy rains have ended
- Flash Flood Warning - Flash flooding is actually occurring or imminent in the warning area. It can be issued as a result of torrential or heavy rains



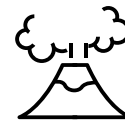
I am Peter from St. Vincent and the Grenadines, and I will be sharing information with you on volcanoes. In my country, we have been affected by the eruption of the La Soufrière volcano. The last time that La Soufrière erupted was in 1979 - the year my mom was born! But in late December 2020, it began squeezing out lava and then erupted on April 9th, 2021, spewing out hot lava, rocks and many dangerous gases.

Before the volcano began erupting we had to leave our home. We went to our aunt and cousins in the south of the island, but some of our neighbours had to go to shelters. We live in the north, where the volcano is located, in Georgetown which is in the Red Zone or the most dangerous area - the area that would be most impacted by the eruption. You can imagine how scared we were. We had been anxious since December when we first heard that the volcano was getting active and may erupt soon.





Volcanoes



A volcano is an opening in the Earth's crust that allows magma, ash, and gases to escape. Volcanoes can be above or below ground and can range in size from small hills to mountains. Volcanoes blast hot, solid and molten rock and gases into the air. As a result of this blast, ash can fall hundreds of miles downwind of a volcano.

In the Caribbean, live volcanoes can be found in the islands of Grenada, St. Vincent, Saint Lucia, Martinique, Dominica, Guadeloupe, Montserrat, St. Kitts, Nevis, St. Eustatius, and Saba. Other islands such as Anguilla, Antigua, Barbuda, Barbados, the British Virgin Islands, most of the Grenadines, and Trinidad and Tobago do not have live volcanoes but are located close to volcanic islands and can be affected by volcanic hazards such as ash fall and

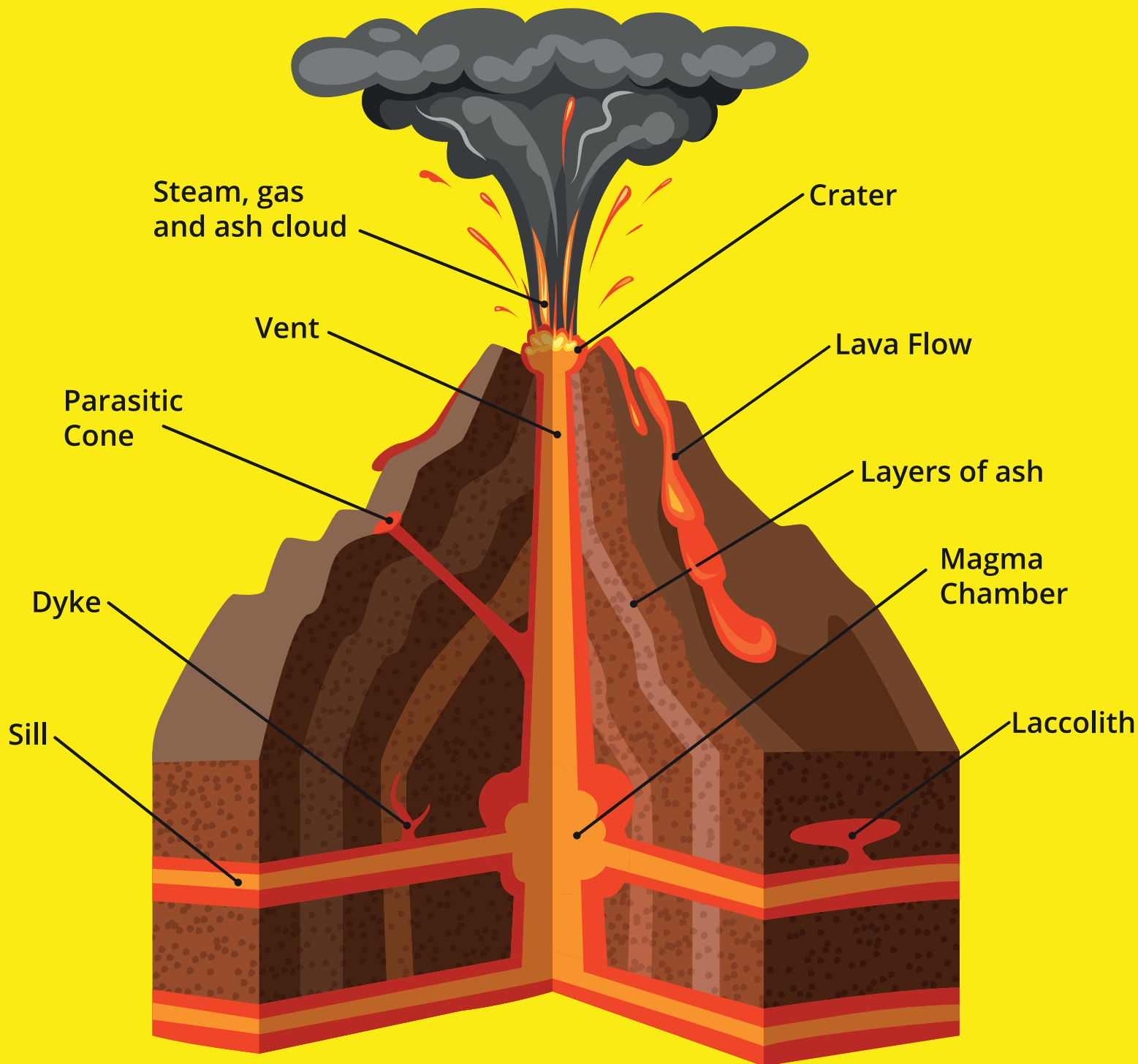
volcanically generated tsunamis. There also is an active submarine (underwater) volcano in the Caribbean called Kick-em Jenny, located 6.2 miles north of Grenada.

Volcanic ash is made up of tiny fragments of rock and shards of glass. It's damaging to the lungs and can form a thick blanket over the area close to the volcano sometimes causing roofs and houses to collapse. Ash can also shoot miles high into the sky and rain down for many miles around, posing a danger to people quite far from an active volcano. Following the eruption of La Soufrière in St. Vincent, islands such as Barbados received a lot of ash even though they are far away from St. Vincent.

The falling ash from a volcano can cause breathing problems, especially for those who may already have asthma and other respiratory illnesses. The toxic gases that come out of a volcano include carbon dioxide, carbon monoxide, sulfur dioxide, and hydrogen chloride. Some of these, like sulfur dioxide, can irritate the skin, eyes, and respiratory systems.

Did you know that there are 19 live volcanoes in the Eastern Caribbean, and that every island from Grenada to Saba can experience a volcanic eruption?





Another volcano, the Soufrière Hills Volcano on the island of Montserrat, erupted explosively in 1997 destroying the south of the island and burying the capital, Plymouth. More than half the population left the island following the eruption. As Montserrat is a British Overseas Territory, many persons left and went to the United Kingdom to live. The Soufrière Hills Volcano also erupted between July 12 and 14, 2003, causing the collapse of portions of the volcanic dome and creating huge fast-moving clouds of hot ash and rock that spread 2 kilometers out over the ocean. These fast-moving clouds are called py-ro-clas-tic flows.

The largest volcanic eruption in the Caribbean occurred in 1902 on Mount Pelée on the island of Martinique, resulting in over 30,000 persons losing their lives.

Did you know that in the Caribbean there are at least 5 volcanoes with the word Soufrière in their name? For example, in Dominica there are the Grande Soufrière Hills; in Guadeloupe there is La Grande Soufrière; and in Montserrat there are the Soufrière Hills. Soufrière is a French word meaning sulphur. Sulphur is usually a natural deposit caused by volcanic eruptions.



Volcano Checklist

Tips - Before the Volcano Erupts

- Talk about volcanoes with your family so that everyone knows what to do in case of a volcanic eruption. Discussing ahead of time helps reduce fear and uncertainty
- Have a disaster plan
- Know whether or not you are at risk of danger
- Be prepared for mudslides, flash floods, earthquakes, ash falling, acid rain and tsunamis
- Prepare a disaster supplies kit for your home and car. Include a first aid kit, canned food with a can opener, bottled water, battery-operated radio, flashlight, protective clothing, dust mask, goggles and sturdy shoes
- Know evacuation routes
- Talk to your insurance agent. Find out if your insurance policy for your home has coverage in the event of a volcanic eruption

Tips - During a Volcanic Eruption

- 1 Follow the evacuation order issued by authorities
- 2 Avoid areas downwind and river valleys downstream of the volcano
- 3 If you are caught indoors, close all windows and doors, bring animals inside the house
- 4 If you are outdoors, seek shelter indoors
- 5 If you are caught in falling rocks, roll into a ball and protect your head
- 6 If you are caught near a stream, be aware of mudflows. Move to higher ground
- 7 Protect yourself when ash falls. Wear long-sleeved shirts and long pants
- 8 Use goggles to protect your eyes
- 9 Wear a dust mask and keep car engines off

Protecting Yourself from Falling Ash

- If you are unable to evacuate or move to a shelter or another family member, remain indoors with doors, windows and ventilation closed until the ash settles
- Only if there is a danger of your roof collapsing should you venture outdoors
- If you have a respiratory ailment such as asthma, avoid contact with any ash. Stay indoors until local health officials advise it is safe to go outside
- Close doors, windows, and all ventilation in the house (vents, air conditioners, fans)
- Listen to a battery-powered radio for the most up-to-date emergency information
- Wear long-sleeved shirts and long pants
- Use a dust mask or hold a damp cloth over your face to help with breathing
- Use goggles and wear eyeglasses instead of contact lenses
- Stay away from areas downwind from the volcano to avoid volcanic ash
- Clear heavy ash from flat or low-pitched roofs and rain gutters
- Avoid starting car or truck engines
- Avoid driving as this can stir up volcanic ash that can clog engines, damage moving parts, and stall vehicles
- Avoid driving in heavy ash fall unless absolutely required. If you must drive, keep speed down to 35 mph

Tips - After A Volcanic Eruption

1

Cover your mouth and nose. Volcanic ash can irritate your respiratory system

2

Wear goggles and protect your eyes

3

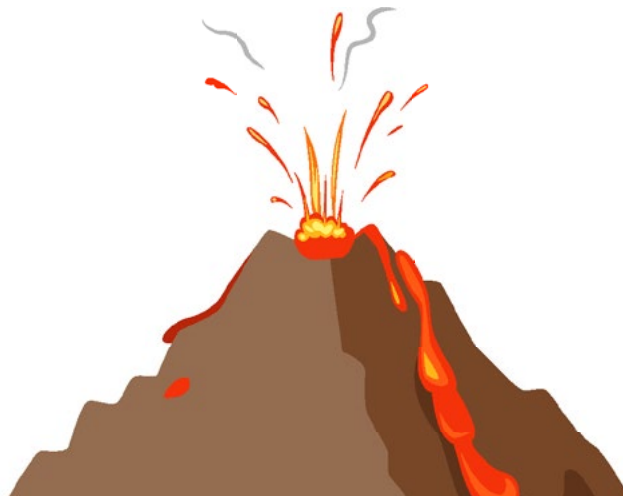
Keep your skin covered

4

Clear roofs of ash. The ash is very heavy and can cause the building to collapse

5

Let friends and family know that you are safe





Fires



Isha again here. This time I will be leading the discussion on fires. Most fires are an example of a manmade hazard. I think we have all heard about fires. The year I was born — in 2009 — there was a huge fire that destroyed the main hospital in my beautiful country of Saint Lucia. My mom told me all about it.



And in my country, Jamaica, a major fire occurred at the Riverton City Dump in 2015. That fire lasted for 13 days and caused many schools and businesses to close. The fire resulted in many human health impacts with more than 3,000 persons reporting that they had to go the doctor for illnesses such as asthma. That fire caused a lot of air pollution.



And of course, we hear about and read about house fires or fires that destroy businesses or public buildings. And we also sometimes see forest fires especially in the dry season. One match can destroy a whole house or even a forest as fires spread very quickly, especially if it is dry or windy.

Tips - Fire Prevention and Ensuring Safety if there is a Fire

Share these tips with your family as well as persons in your community:

- Do NOT play with matches or fire
- Do not leave the stove unattended when cooking and if a fire starts in a pot on the stove from extra hot oil, cover that pot quickly with a cover to cut off the oxygen that fuels the fire
- Keep lamps away from curtains, bedding or any materials as they can catch fire
- Check that there are no exposed electrical wires in your house
- Store any easily inflammable materials (kerosene, spray, paint) safely away from fires
- Keep candles, kerosene lamps and mosquito coils away from anything that could catch fire, such as curtains and bedding
- Clear away dead leaves, twigs and rubbish from around your house
- Conduct fire drills at least once a year with your family and practice evacuating your home if there is a fire; use blindfolds, because if there is a fire the smoke reduces your ability to see
- If you live in a two-storey house, have a fire exit – usually a window in one of the bedrooms
- If possible install at least one smoke detector in your home and purchase a fire extinguisher; check your fire extinguisher at least once per year to ensure it is working

Tips - After a Fire

- 1 Get out as quickly and as safely as possible and determine a safe meeting point outside the house
- 2 When evacuating, stay low to the ground
- 3 If possible, cover mouth and nose with a cloth to avoid inhaling smoke and gases
- 4 Close doors in each room after escaping to delay the spread of the fire
- 5 If smoke is coming in the room through the bottom or top of the door or it feels hot, keep the door closed

6

Open a window to escape or for fresh air while awaiting rescue

7

If there is no smoke at the bottom or top and the door is not hot, then open the door slowly

8

If there is too much smoke or fire in the hall, get back in the room and slam the door shut

9

Call the fire department from a location outside the house

10

Give first aid where appropriate



You know that in addition to the tips that we have provided for hurricanes, earthquakes and fires, there are some life skills and other key actions that we should undertake to #prepare and #keepsafe.

We need to share information on hazards and how to prepare for them – before they occur, when they happen and after. We want to share information with our family, community members and friends at schools. We can make signs. We can also use social media to share stuff – like Snapchat and Instagram for us young persons and we can make videos about hazards on TikTok and share. Our older brothers and sisters can use Facebook and Twitter.



We can spread the word in so many ways, at community meetings, in our environmental clubs, in some of our class projects, through song and drama. You know what, I am thinking that we should rename all environmental clubs in schools, “Environment and Resilience Clubs” so that greater effort can be made to share more information about disasters.



And we also need to do more drills — for all hazards: earthquakes, fires, and floods. It is all part of being prepared. We can organize drills at home, in our communities, at school and in our environmental clubs or should I say our **environment and resilience clubs**.

And this may sound silly, but we should all learn to swim. Many of these hazards involve water. Most of us live on islands so it is good if we can swim.



And I think it would be cool if we put together a family disaster preparedness plan!

Tips for Developing a Family Disaster Preparedness Plan

Share these tips with your family as well as persons in your community:

- Take your time as a family and make sure that all family members join the discussion and have a say in preparing the plan
- Discuss which natural and manmade hazards are likely to affect your family whether you are at home or school, at the work place or play sites
- Make a 'Where? When? How?' plan for each family member
- Discuss how safe your house is. Discuss if it can withstand different disasters
- Discuss if it is safer to stay inside the house or to go to other family members or friends or a shelter in case a certain disaster happens
- Check all rooms in the house for things that could be hazardous in case a disaster occurs (for example, things that could cause a fire or could fall down and block exit ways). Make sure that any dangerous materials are stored safely. Make sure heavy furniture is secured to the walls so they do not tip over – e.g. bookshelves. Move paintings from over beds as these can fall during an earthquake
- Know where the main electricity box is and where the gas and water lines are in your house so that they can be shut off if necessary
- Discuss and agree on the safest evacuation routes from each room in the house. Ideally, you should have two separate routes planned from each spot in the house. Discuss who is responsible for helping family members who need assistance and how to help them evacuate

- Agree on two meeting points - one right outside your house in case of a sudden emergency, such as a fire; and one outside your neighborhood, in case you cannot return home or are asked to evacuate
- Discuss ways to make your house more resistant against hazards and what you could do to prepare your house before a hazard strikes
- Prepare emergency supplies, a preparedness bag, or at least a list of important things you need to bring in case a disaster strikes and you need to evacuate
- Decide on the best evacuation routes from your home and where to evacuate for each hazard. Have more than one option for evacuation
- Discuss what to do with your pets in case a disaster happens
- Make a list of people and institutions that can help in case a disaster strikes. Write down important phone numbers (fire fighters, police, ambulance, relatives, neighbours, doctors, utilities and others) and have it copied for each family member. Save the numbers in your cellphones but also have them on paper
- Decide on where to meet or how to contact each other in case you get separated
- Write down your plan. Make sure each family member is clear on their responsibilities, and make sure that there is always someone to back up in case someone is away
- Review your plan every year and, if needed, revise your plan



And don't forget your emergency bag. Have an emergency bag already prepared.



Remember: Whatever you do, if your house is in the hazard zone and you are already in a safe place, you should NOT head home for the emergency bag if it is unsafe.

The emergency bag should include:

- Important medicines and first aid items
- A source of light: flashlight, candles and matches
- Some water and food — tinned foods, crackers
- Important documents or copies of those documents stored in plastic bags (decide which important documents you would bring)
- Some money
- A change of clothes and a towel
- Some soap, a toothbrush and other hygiene items such as sanitary pads for girls
- If not too big and heavy, you can always pack one of your favorite toys, books or small board games
- A small battery-powered radio might be helpful to get information in case there is no electricity after the disaster

Create an
EMERGENCY PLAN!



Emergency Preparedness



Make a Plan



Build a Kit



Be Informed

Hi everyone, remember me from Chapter 1. I am Éla from Barbados and I know we have all heard about climate change. So my job will be very easy. I will be sharing with you a bit on global warming and climate change and the linkages with natural disasters, helping to strengthen what you already know. Suzie, Jean and Alicia will be helping me along the way.



Chapter 3

Global Warming, Climate Change, and Disasters

Global warming relates to the emission or release of greenhouse gases into the atmosphere, which affect our climate. Greenhouse gases are naturally occurring gases such as carbon dioxide, methane and even water vapour. You already know that carbon dioxide (also referred to as CO_2) is emitted from factories, plants that

supply us with electricity, cars, and that trees and vegetation use carbon dioxide for photosynthesis which helps them to grow. Methane is another gas, which is released from cattle and pigs and even us humans when we “pass gas” lol. Water vapour is released in large quantities from factories.



So, hold on, we know that global warming is causing a lot of problems but we are also saying that it is caused by greenhouse gases which are naturally occurring. So, then it means that greenhouse gases are bad.

Oh no Suzie, greenhouse gases are not bad. In fact, greenhouse gases act as a blanket around the Earth, and without them the Earth's surface would be 30 degrees Celsius colder than it actually is. What that means is that if we did not have greenhouse gases acting as a blanket, countries like Barbados would have temperatures like 0 degrees and be very cold all the time. People would not be able to live in places like New York for example as it would be very, very cold.



That's correct Alicia. But something very interesting is happening. That blanket you mentioned is getting thicker. I am sure you are going to ask me why or how come. So let me tell you. We – that is humans – are producing a lot of greenhouse gases – we are using more electricity; there are many more cars; more planes are flying in the sky; there are larger cattle ranches; more factories are using old technologies to produce goods and using more energy to do so; and we are cutting down trees (living trees use CO_2 during photosynthesis and produce oxygen – so removing them leaves more CO_2 in the air). The situation is a very bad one for us!



GREENHOUSE EFFECT

SUN

Reflected back to space
by the atmosphere

ATMOSPHERE

Greenhouse gases
trap the heat from the sun

Sunlight reflected
by the surface

Sunlight absorbed
at surface

Human activities release
Greenhouse gases



CFCs and Haloalkane
Refrigerators
Aerosols



Nitrous oxide
Gasoline
Agriculture



Methane
Cattle
Fertilizer



Carbon dioxide
Oil
Coal

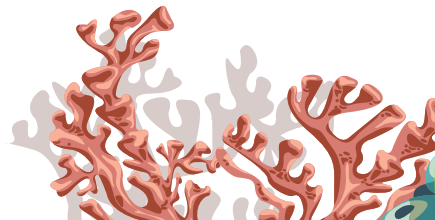
Ah, so now I am getting it. That is where the greenhouse effect comes in. And I have the perfect picture to show the greenhouse effect. Simply put, the greenhouse effect is the way that gases such as carbon dioxide trap the heat from the sun. This causes a gradual rise in the temperature of the Earth's atmosphere.



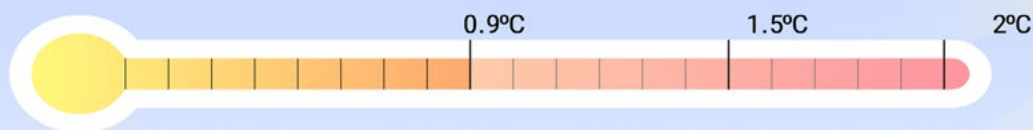
Perfect, Suzie. Of course, persons may ask if global warming is really happening. Scientists will tell you yes as there is evidence of melting ice caps which are causing sea levels to rise, there is more intense rainfall in many parts of the world and more areas are experiencing droughts.

**Global warming is leading to climate change.
And I have the perfect picture to explain
some of the impacts of climate change.**

Climate change is causing changes in weather patterns, where there are more frequent and intense hurricanes, and longer periods of drought and excess rainfall. In addition, we also have the loss of plants and animals because of climate change and an increase in certain types of insects such as mosquitoes especially during periods of heavy rainfall, resulting in the increase in the number of cases of certain mosquito-borne illnesses such as dengue. Climate change is causing us to lose some of our beautiful beaches and also making our coral reefs sick by causing them to be “bleached” and turn white and die.



GLOBAL WARMING CLIMATE CHANGE



The planet's average surface temperature has risen about 0.9°C since the late 19th century. The temperature is rising at a rate faster than ever before

Arctic sea ice is now declining at a rate of 12.8 percent per decade, relative to the 1981 to 2010 average



About 30 new infectious diseases have emerged in the past 20 years



21.5 million people have been forcibly displaced due to climate changed-related weather hazards



The waters are more acidic now that at any other point in the last 300,000 year

2/3 of Australia's Great Barrier Reef has been severely damaged by coral bleaching



From 1901 to 2010, the global average sea level rose by 19 cm as oceans expanded due to warming and ice melted



Climate Change is causing excess rainfall in some places, leading to floods

This is Suzie again! So, in addition to being a kid expert on earthquakes, I also know a bit about floods. In Trinidad I experienced my first major flood in October 2017, and do you believe that 1 year later, on the same date in October 2018, we had another major flood? There was a lot of damage and scientists say that the increased intensity and frequency of these types of events are because of climate change.



**Water, Water
everywhere!**

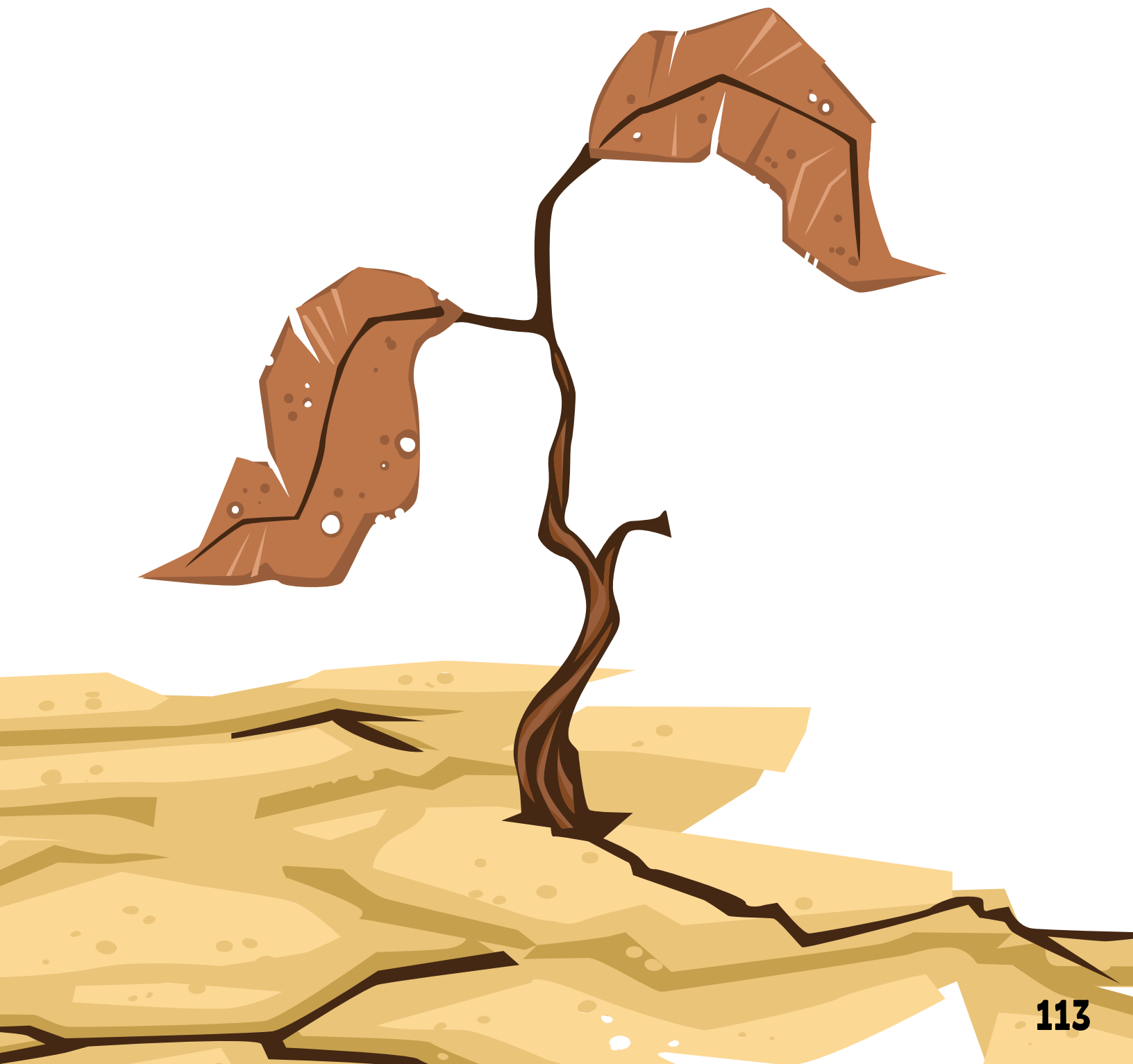


Climate Change is causing little or no rainfall in some places, leading to severe drought

Not all hazards happen suddenly and some creep in slowly, without us really noticing what is happening. Remember those hazards we mentioned in Chapter 1 called slow onset events. Well drought is an example of a slow onset event. Drought occurs when there is less rain than a country would normally receive. In the

Caribbean, drought conditions are happening more frequently in several islands and this is having a negative effect on the soil and crops. In many countries there are water lock-offs as water is becoming scarce because of a lack of rainfall.





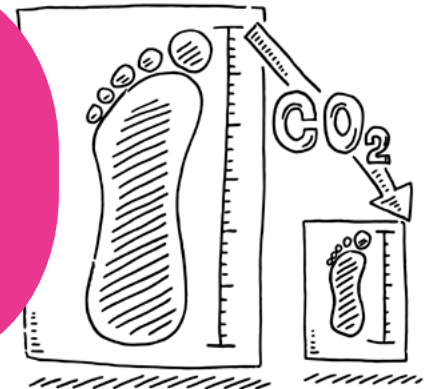
But can we do something to reduce global warming and climate change?



Of course, Suzie. We need to start by reducing our carbon footprint.



That sounds funny Alicia. Should we be using our feet to determine how much carbon dioxide we are all using? I am thinking that if we want to reduce the amount of carbon dioxide that we are emitting individually, we need to reduce our footprint like this.



Exactly, Suzie. There are many actions that we can take to reduce our carbon footprint. I will share some with you now. We can:

- Turn off lights when not in use
- Turn off the TV and computers when not in use
- Reduce, reuse and recycle
- Buy locally grown fruits and vegetables
- Plant a tree in our backyards
- Save water by turning off the water when we are brushing our teeth
- Teach others what they can do

**Going green is easy and we can all do it.
Let us get moving to make our planet clean and green.
We all have a part to play!**





So here I am once again. And along with Isha, Lily-Rose and Thomas, we will be discussing how our natural environment is important for protecting us when natural hazards strike.

We will look at two ecosystems - coral reefs and wetlands - and the roles they play. Look at the picture on the next page. It is the 2nd largest coral reef system in the world, and it is in my beloved country Belize.

Chapter 4

Protecting our Natural Environment will Protect us and Prevent Hazards from becoming Disasters



The Belize Great Barrier Reef is part of the Mesoamerican Barrier Reef System, which is the largest in the western hemisphere, spanning 900 kilometers. With its size, the Belize Barrier Reef is second to only the Great Barrier Reef in Australia and is one of the most popular tourist attractions for those who are planning a trip to Belize.

Corals

Corals are small animals that live in the sea, usually occurring together in the form of colonies, forming coral reefs. Coral reefs are important because they:

- Provide habitat or a home for fish and other marine life
- Protect the coastline from storm damage, erosion and flooding
- Provide sand for beaches
- Provide for recreational activities e.g. SCUBA diving and snorkeling
- Represent sources of income and resources e.g. tourism, fishing, building materials, medicines, etc.



Did you know that a healthy coral reef can zap the energy from a hurricane and prevent dangerous waves and storm surges from causing flooding on land? We need to ensure that we keep our coral reefs healthy so that they can help to protect us from tropical storms and hurricanes and prevent damage on land from these hazards.

Let us protect our coral reefs and work with our governments and local NGOs to spread the word about how to protect our reefs.

- Do not remove pieces of coral reefs when you go snorkeling
- Make sure that you use mooring buoys and do not anchor fishing boats or any boats on the reef
- Protect our watersheds — plant trees, do not litter, etc.
- Lobby governments, hotels and communities to dispose of and treat sewage — untreated sewage can destroy our reefs; and treated sewage must fall beyond the reef waters as this can also damage our reefs
- Practice proper waste disposal and do not litter even if it is a small piece of paper. These eventually end up in rivers and streams



I am going to discuss wetlands. Wetlands or swamps are really more than a nice cozy place for mosquitoes.



Wetlands

Wetlands are important because they:

- Filter pollutants and soil run-off from the land and allow clean water to go into the sea – in this way they act as a kitchen strainer keeping the pollutants in the wetland
- Control flooding on land – because they act just like a piece of sponge by quickly soaking up excess water that could cause flooding
- Break up waves along shorelines
- Create a spawning and feeding ground for some fish and shellfish
- Are habitats for plants and animals
- Protect coral reefs

Chapter 5

Disaster Management Organizations in the Region

There are a few disaster-related organizations working in the Caribbean. We will introduce you to CCRIF, CDEMA, CCCCC, CSGM and the SRC and we will share some important information. We will first start off with CCRIF SPC (which was formerly the Caribbean Catastrophe Risk Insurance Facility). The SPC part is just the type of organization it is so we will leave it at CCRIF.

CCRIF has really helped my country after a few disasters and my mom always says that CCRIF provided us with monies to help immediately after the 2010 earthquake and it was the first set of money to get to our government to help the people of Haiti. In fact that payout from CCRIF really helped support the government to pay salaries of health workers – and my dad was one of those workers who was able to receive his pay.





Wow Jean, CCRIF sounds interesting. Tell us more. What is CCRIF?

Ok it is this organization that provides the governments of countries with monies very quickly after a natural disaster — in as little as 14 days after the disaster.



But how are they able to do that? I have always heard that it takes some time for countries to get help.

Countries that are part of CCRIF purchase a unique type of insurance called parametric insurance. Before a disaster actually happens the governments of the countries meet with CCRIF and purchase insurance to cover losses for a hazard of a certain strength and the possible impact of that hazard. So, if there is a hurricane or earthquake or severe rainfall that reaches a certain level or as CCRIF says a certain “threshold”, CCRIF can make a quick payout.

So it is a bit different from car insurance then — it would appear that a government signs a contract with CCRIF based on the intensity of an event (such as wind speed for a hurricane or ground shaking for an earthquake) and the loss caused by an event. The amount of loss is calculated in a model agreed on beforehand.

And did you know that CCRIF was the first such facility in the world? It came about as a result of Hurricane Ivan in 2004 which also was very devastating, affecting about 9 countries in the Caribbean and completely destroying Grenada and the Cayman Islands.



And CCRIF has 39 members in the Caribbean and Central America. CCRIF provides parametric insurance products for tropical cyclones (hurricanes and tropical storms), earthquakes, excess rainfall, fluvial flooding, and for sectors such as the fisheries sector and water and electric utilities sectors. CCRIF also has a product called the

Livelihood Protection Policy (LPP) for persons such as farmers, fishers, day labourers, and market, food and craft vendors, whose livelihoods are impacted by rain and wind events. And my mom told me that in the next year or so, they plan to have products for other sectors.





Many countries in the Caribbean and Central America are members of CCRIF and can benefit from payouts. I remember now that I saw my Minister of Finance, Honourable Dennis Cornwall (3rd from right in the photo), with the CEO of CCRIF (Mr. Isaac Anthony, 3rd from left) receiving US\$44 million after Hurricane Beryl in 2024. In addition to the monies paid to the Government of Grenada, CCRIF also made payouts to the electric and water utility companies in Grenada. The country used the payouts from CCRIF to provide financial support to vulnerable groups and repair infrastructure.



My country, The Bahamas, also received a payout after Hurricane Dorian - of almost US\$13 million! And Lily-Rose, your country, Jamaica, received US\$91.9 million following Hurricane Melissa in October 2025, which was a category 5 Hurricane. That is incredible!

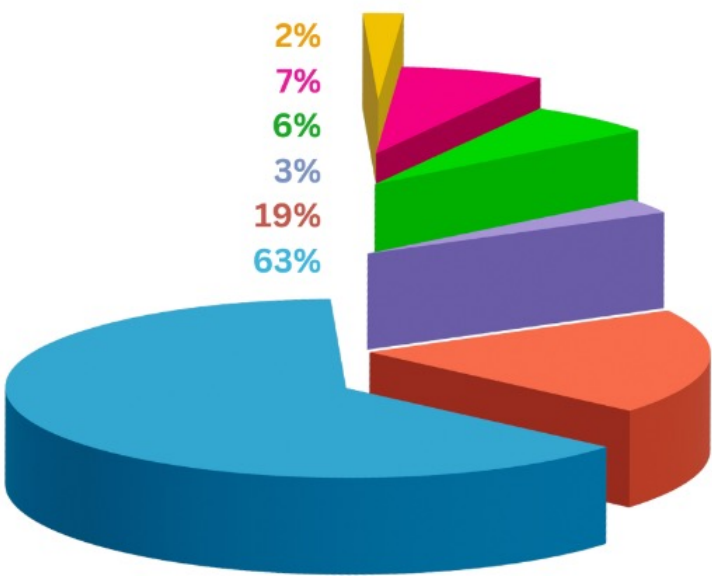


And I just went on www.ccrif.org and found a lot of information. Since CCRIF started in 2007, the organization has made 82 payouts, totalling US\$483 million (June 2007 - June 2026) - all within 14 days of the disaster.

The truth is Lily-Rose, governments are in need of monies after a disaster. After a disaster, governments are not able to collect monies to keep "the wheels of government turning", so funds from CCRIF come in very handy.



Interestingly, I too went on www.ccrif.org and found some interesting information. More than 5 million people in the Caribbean and Central America have benefitted from CCRIF payouts, and governments have used these payouts in interesting ways. See the chart below. So, we know that CCRIF is about providing quick monies (they call it liquidity) after a natural disaster to help governments in our region help their people.



USE OF CCRIF PAYOUTS

- Immediate post-event activities
- Long-term Infrastructure Work
- Risk mitigation activities to reduce vulnerability to future natural hazard events
- Economic sectors e.g. agriculture
- Allocated contribution to the national budget
- Capitalization of a recovery fund

Do you realize that the countries that we are from have gotten payouts? My country, Dominica, received 3 payouts so far, while Suzie, your country Trinidad and Tobago has received the most payouts – 9 of them; and Ela, your country, Barbados received the second highest number of payouts, 8 in total.



I found a really fun fact: CCRIF also helps countries with scholarships and disaster risk management projects. Lily-Rose and Alicia, I found some interesting stuff that CCRIF has been helping your countries with. As shown in the pictures on the next page, CCRIF supported a project to increase resilience to drought and dry spells by supplying water tanks for rainwater harvesting and storage in the Bethel Isle community in central Jamaica. In the Toledo District in southern Belize, near the Guatemalan border, CCRIF supported women farmers and their families to create climate-smart farms and improve their livelihoods.





And Jean I saw many disaster risk management projects in Haiti. Isha, there was an interesting project in Anse-La-Raye in Saint Lucia. It was a flood mitigation project that was designed to reduce flooding in Anse-La-Raye by rehabilitating mangroves. This is what the community leader had to say about the project:



“ Immediately upon completion of the project, the village experienced heavy rains and the river reached flooding level. Residents in the flood-prone zone in the northern part of the village were happy and relieved that they had no issue with flooding as would have been the case if the work had not been undertaken.

”



This has been a lot of good info on CCRIF.



Let us share a bit on CDEMA, CCCCC, CSGM and SRC before we close off this chapter.



The Caribbean Disaster Emergency Management Agency (CDEMA) is the regional inter-governmental agency for disaster management in the Caribbean Community (CARICOM).

The Agency was established in 1991 as CDERA (Caribbean Disaster Emergency Response Agency) with primary responsibility for the coordination of emergency response and relief efforts to Participating States that require such assistance. It transitioned to CDEMA in 2009 to fully embrace the principles and practice of Comprehensive Disaster Management (CDM). CDM is an integrated and proactive approach to disaster management and seeks to reduce the risk and loss associated with natural and technological hazards and the effects of climate change to enhance regional sustainable development. Visit their website at www.cdema.org.



CARIBBEAN COMMUNITY CLIMATE CHANGE CENTRE

Building Resilience. Securing Our Future.

Through its role as a Centre of Excellence, the Caribbean Community Climate Change Centre (5Cs) supports the people of the Caribbean as they address the impact of climate variability and change on all aspects of economic development through the provision of timely forecasts and analyses of potentially hazardous impacts of both natural and man-induced climatic changes on the environment, and the development of special programmes which create opportunities for sustainable development. Visit their website at <https://caribbeanclimate.org>.



CSGM

The Climate Studies Group Mona (CSGM), located in the Department of Physics at The UWI, Mona, explores Caribbean climate and the ocean and atmospheric influences that affect our climate. The CSGM examines historical and future climate change and the potential impacts on the lives and livelihoods of the Caribbean. Visit their website at:
<https://www.mona.uwi.edu/physics/csgm/home>



The Seismic Research Centre (SRC) at The University of the West Indies St. Augustine Campus is the official source of information for earthquakes and volcanoes in the English-speaking Eastern Caribbean. Visit their website at <http://uwiseismic.com>.

National Disaster Management Agencies and Departments

Almost all countries in the region have a national disaster management agency that has responsibility for disaster preparedness and emergency management and response. In Jamaica there is the Office of Disaster Preparedness and Emergency Response. In Barbados there is the Department of Emergency Management. Do you know the name of the disaster management agency or department in your country?

Chapter 6

Mark your Calendars - Important Environmental and Disaster Risk Reduction Dates to Remember each Year

The table on pages 138-139 shows a listing of significant international days/weeks that focus on environmental or disaster risk management issues. Check the special days in your own country – including national days like Independence Day, Labour Day, etc. Use the opportunities to learn more about the environmental issue on these days and celebrate the day with friends in your environmental club or at school.

Share information, tell stories and enjoy the day!



Month	Significant International Days for the Environment and/ or Disaster Risk Reduction
January	
February	2nd – World Wetlands Day
March	3rd – World Wildlife Day 21st – International Day of Forests 22nd – World Water Day 23rd – World Meteorological Day Last Saturday in March – World Wildlife Fund (WWF) Earth Hour (8:30 pm - 9:30 pm)
April	22nd – Earth Day
May	11th – International Migratory Bird Day 20th – World Bee Day 22nd – International Day for Biological Diversity
June	5th – World Environment Day 5th – International Day for the Fight Against Illegal Unreported and Unregulated Fishing 8th – World Oceans Day 17th – World Day to Combat Desertification and Drought 29th – International Day of the Tropics

Month	Significant International Days for the Environment and/ or Disaster Risk Reduction
July	26th – International Day for the Conservation of the Mangrove Ecosystem 28th – World Nature Conservation Day
August	
September	14th – World First Aid Day 16th – International Day for the Preservation of the Ozone Layer 3rd Saturday in September – International Coastal Clean-up Day
October	4th – World Animal Day 13th – International Day for Disaster Risk Reduction
November	21st – World Fisheries Day
December	5th – World Soil Day 11th – International Mountain Day 14th – World Energy Conservation Day



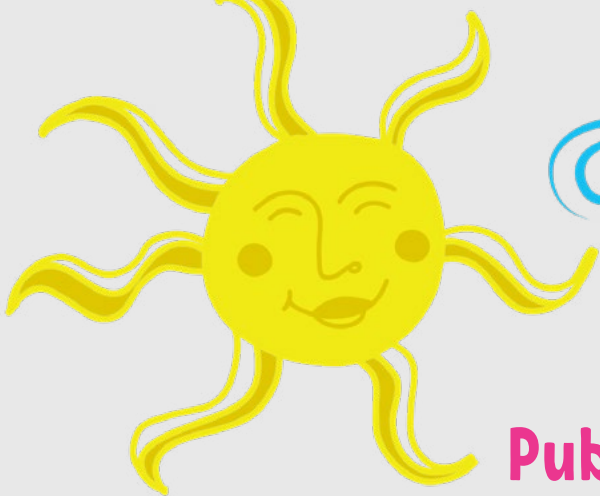
HOW I FEEL ABOUT NATURAL HAZARDS AND DISASTERS:

ACTIONS I INTEND TO TAKE TO BE SAFE:

[illegible]

DRAWING MY THOUGHTS:





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