

HOW TO BECOME A GREENZ CLIMATE CHAMPION



**Appendix:
Worksheet Collection**



UNIT 1A

"What is Climate Change"

KNOW – What I already know	WANT – What I want to know	LEARN – What I learned

“What is Climate Change” - Time In A Bottle Document

QUESTIONS	CURRENT	YEAR 2050
What does the Earth look and feel like?		
What is the air temperature?		
What is the sea temperature?		
How much have we seen the sea rise?		
How many trees do we have?		
How many cars are driving on our roads?		
Which extreme weather events have happened in Grenada, Carriacou or Petite Martinique?		
What is the population in Grenada, Carriacou or Petite Martinique?		
How full is the garbage dump?		



UNIT 2A

Weather & Climate: "Who wants to be a meteorologist?"

Activity Overview

Be sure to collect your weather data at the same time every day for the next 20 school days. You can also do this exercise for several months, if your club is interested!

- Record the amount of rain collected in your rain gauge in millimetres in the rain column.
- Record the daily temperature in degrees Celsius in the sunny column.
- Record any clouds: research the various types of clouds and use the proper names. nimbus, cirrus, cumulus.
- Record any storms, such as tropical, wind, rain or hurricane.

Month: _____				
Day 20				
Day 19				
Day 18				
Day 17				
Day 16				
Day 15				
Day 14				
Day 13				
Day 12				
Day 11				
Day 10				
Day 9				
Day 8				
Day 7				
Day 6				
Day 5				
Day 4				
Day 3				
Day 2				
Day 1				
				
	Sunny	Cloudy	Rainy	Stormy
Total :				

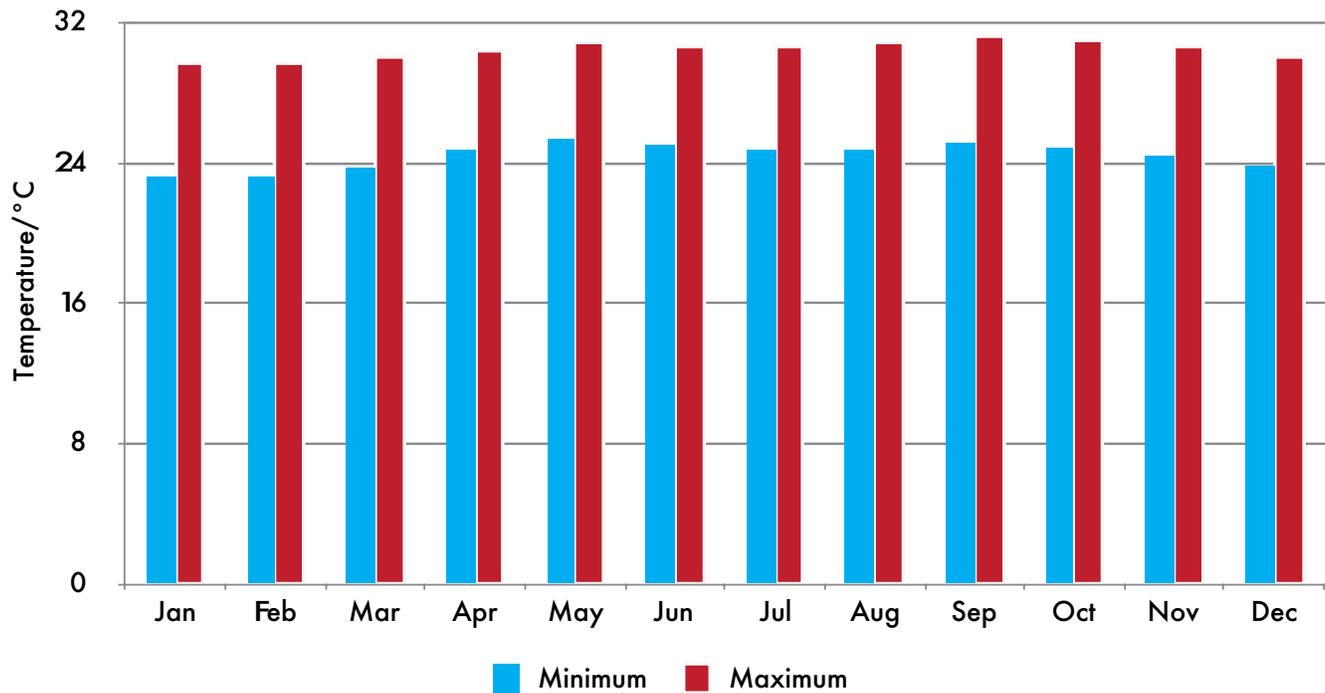
UNIT 2B

Weather & Climate: "Who wants to be a meteorologist?"

Average Maximum and Minimum Temperatures in Grenada (1985 - 2015)

*Point Salines Airport Weather Station

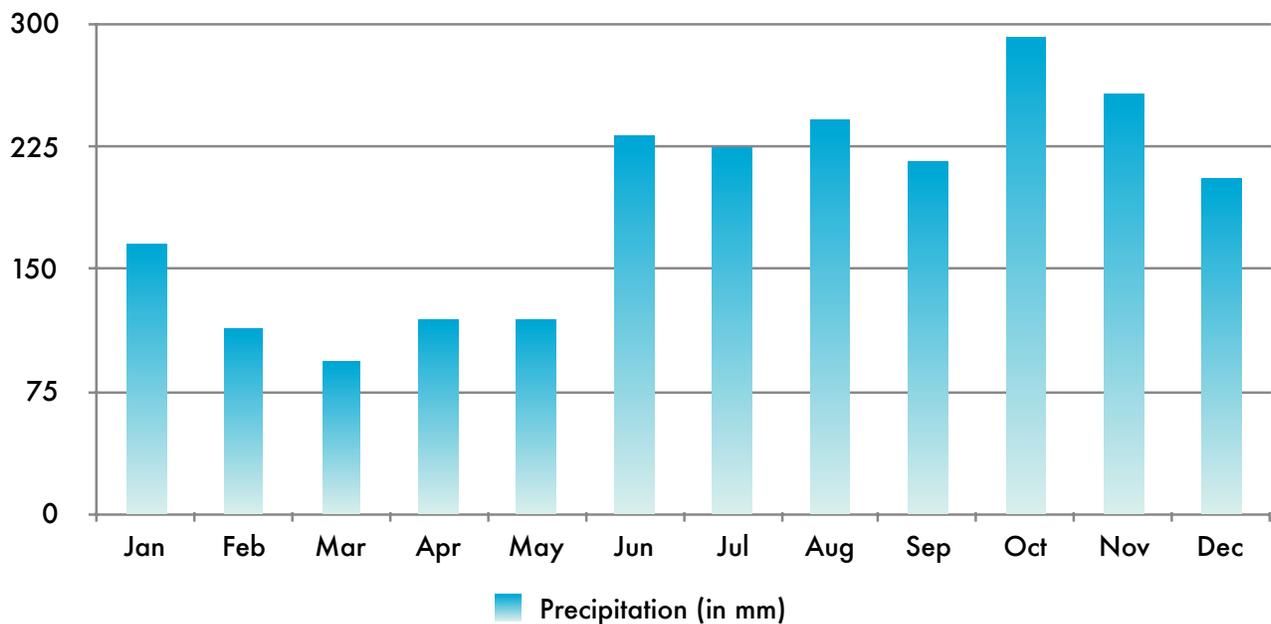
(Source: Grenada Meteorological Service)



Average rainfall in Grenada (1996 - 2015)

*excluding Carriacou and Petite Martinique

(Source: Land Use Division, Ministry of Agriculture)





UNIT 3A

Ocean Pollution: “8 Tips When on the Ocean and at the Beach”

1. Put Trash in its Place!

Protect our waters by using garbage and recycling receptacles and picking up garbage left by others. If necessary, bring waste home with you for proper disposal.

2. Remind the Adults to Hold onto their Butts!

Cigarette filters contaminate water and do not biodegrade. They can be lethal when eaten by birds and fish that mistake them for food. Use portable ashtrays or your pocket.

3. Slash Your Trash!

Avoid using disposable plastics and invest in re-useable containers and coolers. Plastic requires valuable resources to make and does not biodegrade. Avoid any plastic hooks and bait.

4. Respect Wildlife!

Stop, look and listen for wildlife before casting a line as birds and other wildlife can easily get hooked upon entangled in it.

5. Release Unwanted Fish!

Each species plays an important role in the ecosystem. Always practice “catch and release”. Use barbless single hooks and touch fish minimally. Barbs can be crimped with pliers.

6. Protect Habitat!

Stay on designated paths and avoid fragile areas including mangroves. These areas are important breeding and nesting areas for much wildlife.

7. Lead by Example & Educate Others!

Promote environmental stewardship. Together, we can become the solution to ocean pollution.

8. Hold the Line and Recycle!

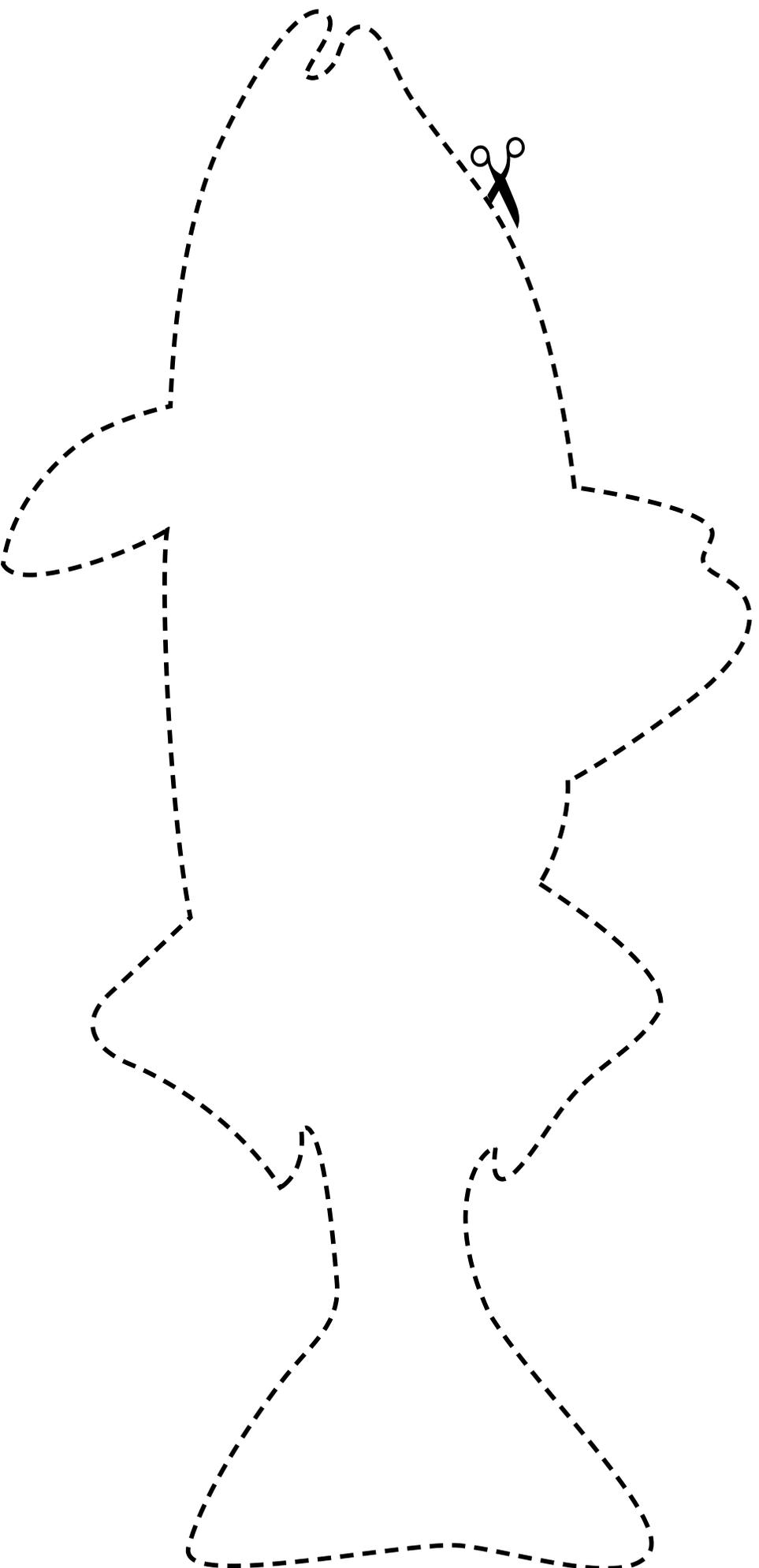
Fishing line can entangle and kill wildlife. Utilize fishing line recycling receptacles, or if one doesn't exist, incorporate and maintain a fishing line recycling station at your favorite fishing spot. If recycling is not possible, cut the line into small pieces and dispose of it in the garbage.



Worksheet

UNIT 3B

Ocean Pollution: "Storm Drain Stenciling"

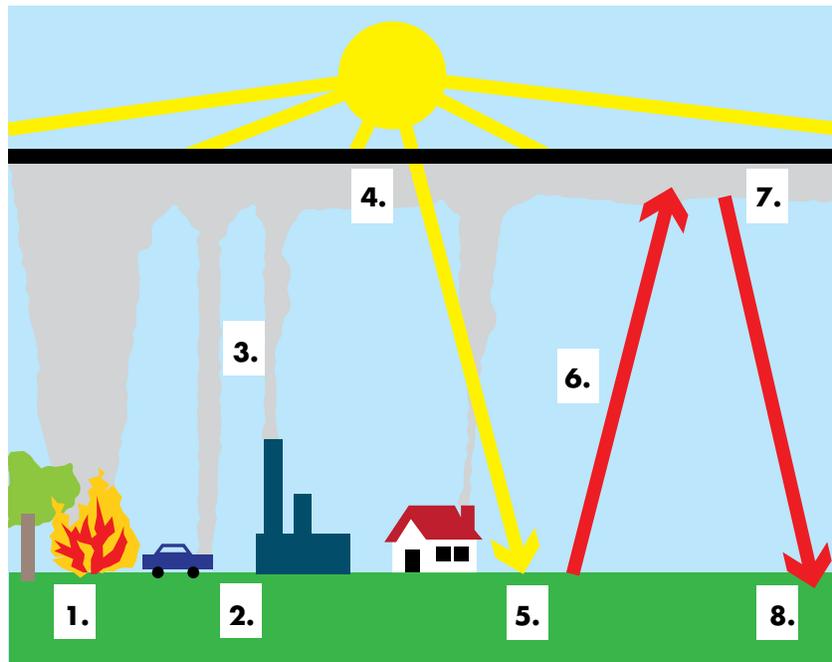


This is your fish stencil. Just cut it out and you are ready to go!



UNIT 4

The Greenhouse Effect - "Feeling hot, hot, hot..."



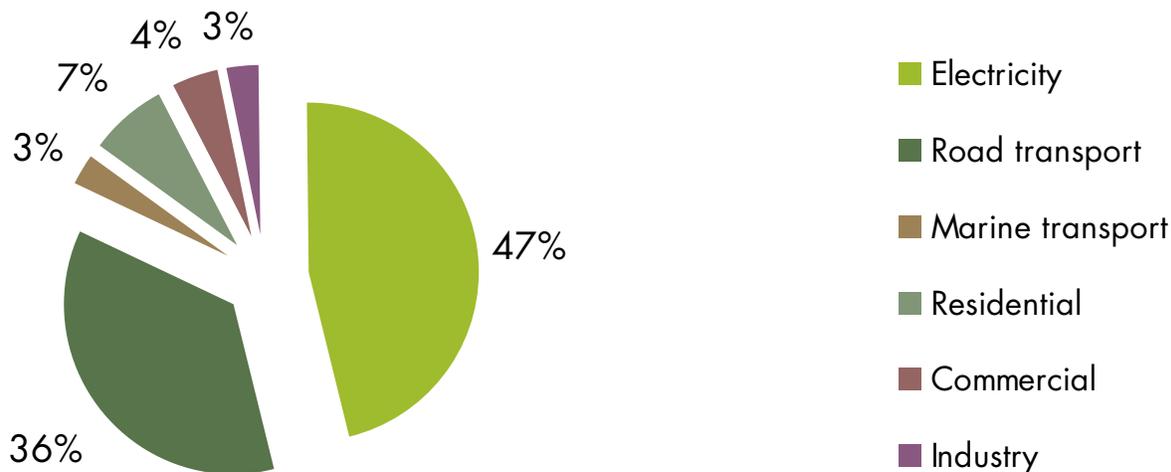
Task 1

In the picture you can see the different steps of the greenhouse effect. Look at the picture and find the correct action. Write the number from the picture into the circle:

- Greenhouse gases stop some of the heat from escaping into space and send it back to the Earth.
- The radiation enters through the Earth's atmosphere.
- Forest fires releases CO_2 into the air.
- Trapped heat travels back and reaches the Earth. Now, the Earth heats up more than usual.
- Exhaust fumes and gases from cars and factories contain large amounts of CO_2 that spread in the air.
- Radiation from the Sun hits our atmosphere.
- Greenhouse gases spread through the air.
- The Earth's surface warms up and emits heat into the air.

Task 2

CO₂ Emissions by Sectors (1994)



Take a look at the graph above. Can you name three of your daily actions that produce carbon dioxide or other greenhouse gases? Kindly write them down:

1.
2.
3.

And here is a list of actions that will help you to reduce greenhouse gases

- Energy produced by the Sun and the wind is good for the climate and helpful for reducing greenhouse gases.
- Eat more local vegetables and fruits. Vegetables and fruit do not produce greenhouse gases. If they come from Grenada or other Caribbean islands, they did not travel far, which is good!
- Plant more trees! Trees are important for clean air. Fruit and spice trees in Grenada produce a lot of food. The trees protect each other and houses from storms and strong rainfall.
- Save energy! Switch off electricity if you don't need it. Turn off computers or unplug your phone charger when not in use. Don't leave electronic devices on stand-by mode.
- Wear lighter clothes when it's hot instead of turning on a fan.
- Only do full loads of laundry.
- Try to use cars as little as possible! Walk, use a bike or take a bus, if possible.

TELL YOUR FAMILY AND FRIENDS ABOUT IT!



UNIT 5

Energy - "Light up my life"

How to build a solar oven

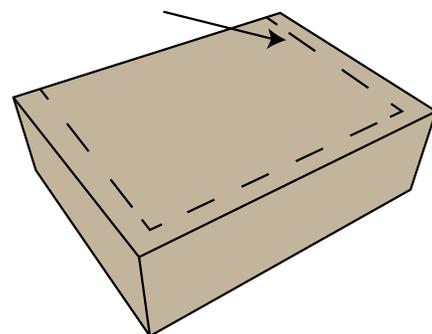
What you need

1) Cardboard box with attached lid. Lid should have flaps so that the box can be closed tightly, **2)** Box should be at least 3 inches deep and big enough to set a pie tin inside, **3)** Aluminium foil, **4)** Clear plastic wrap, **5)** Glue stick, **6)** Tape (transparent tape, duct tape, masking tape, or whatever you have), **7)** Stick (about 1 foot long) to prop open reflector flap. (Use a skewer, knitting needle, ruler, or whatever you have.), **8)** Ruler, and **9)** Box cutter (only with adult help!)

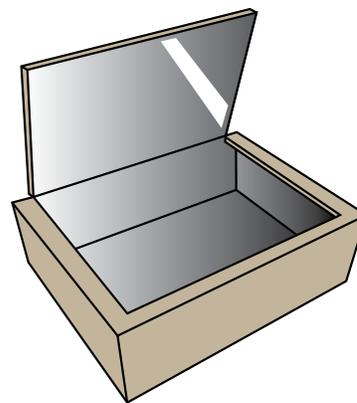
Procedure

- Using the straight edge as a guide, cut a three-sided flap out of the top of the box, leaving at least a 1-inch border around the three sides.
- Cover the bottom (inside) of the flap with aluminum foil, spreading a coat of glue from the glue stick onto the cardboard first and making the foil as smooth as possible.
- Line the inside of the box with aluminum foil, again gluing it down and making it as smooth as possible.
- Tape two layers of plastic wrap across the opening you cut in the lid - one layer on the top and one layer on the underside of the lid.
- Test the stick you will use to prop the lid up. You may have to use tape or find another way to make the stick stay put.
- Put the oven to work! Set the oven in the direct Sun, with the flap propped open to reflect the light into the box. You will probably have to tape the prop in place. Preheat the oven for at least 30 minutes. You can place a thermometer in the oven to check the temperature. Possible things to heat up: cheese sandwich, a cup of tea, chocolate, a soup, left-overs or anything else you would like to get warm!
- Place the pan/small plate with your snack in the preheated solar oven. Close the oven lid (the part with the plastic wrap on it) tightly, and prop up the flap to reflect the sunlight into the box.
- Enjoy!

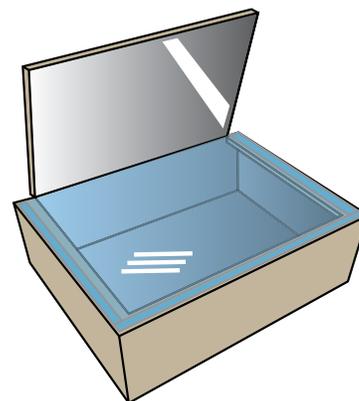
Cut here, 1 inch from the edge of the box top.



Make sure the foil inside the flap is very smooth, to make it like a mirror.



Two layers of plastic wrap over the opening will help keep heat in, while still letting all the light shine through.





WORKSHEET 6A

Mangrove Preservation - "Rules and Scavenger Hunt"

Rules for the Mangroves

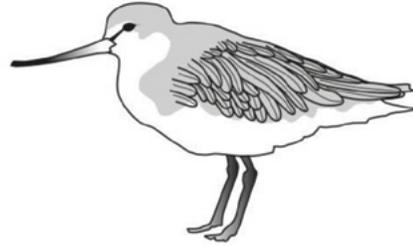
- Step softly and quietly when observing animals. Stay quiet, as yelling and shouting will scare animals away and may cause some to abandon their nests.
- Leave animals and plants where you see them. To help preserve a habitat, leave it as it was found. Trees are living things; do not pull branches off trees. Organisms will have a much better chance of surviving if left on their own (do not take living things home with you).
- Replace rocks and logs in their original position after looking under them.
- Leave the area cleaner than you found it. Pick up plastic bags, fishing line and any other garbage that is at the mangrove sites.
- Be aware that many birds nest on the ground. Watch where you are walking and keep pets leashed in mangrove-protected areas.
- Never chase or harass animals.
- Before leaving have a final look and assess the impact of your visit. Is this area as beautiful now as before my visit?

MANGROVE SCAVENGER HUNT DATA SHEET

It is your task to discover each of these items during your exploration. Remember to use all of your senses and put things back **exactly** where they were found. If you don't know the name of what you find, write down some observations to help you look it up when you get back to class.

Three different types of birds

- 1) _____
- 2) _____
- 3) _____



Three different types of aquatic creatures

- 1) _____
- 2) _____
- 3) _____

Three different types of terrestrial or land creatures (or animal signs such as tracks, scats or bones).

- 1) _____
- 2) _____
- 3) _____

What have you seen that might be food for a

- Heron? _____
 Crab? _____
 Turtle? _____
 Other _____

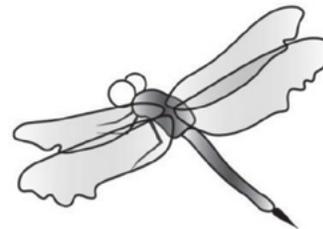


Three different kinds of plants.

- 1) _____
- 2) _____
- 3) _____

What did you touch that was

- Smooth? _____
 Rough? _____
 Sharp? _____
 Wet? _____
 Dry? _____



Something you didn't like the smell of: _____

Something that you notice smells pleasant: _____



UNIT 6B

Marvellous Mangroves

Mangrove Identification Cards (i)

BLACK MANGROVES (*Avicennia germinans*)

The name "black mangrove" refers to the color of the trunk and heartwood.

The wood of this tree is strong and heavy; hard quality

They grow just above the high tide in coastal lagoons and brackish water estuaries and are less tolerant of highly saline conditions than certain other species that occur in mangrove ecosystems. They can reach 10–15 m in height,

FEATURES

Long pencil-like pneumatophores (special breathing roots) form a dense carpet around the tree.



Leaves are opposite; long and thin, shiny above, salt crystals on back.



Fruit is smooth and flattened; tear-drop shaped.



White flowers





UNIT 6B

Marvellous Mangroves

Mangrove Identification Cards (ii)

RED MANGROVES (*Rhizophora mangle*)

The name *Rhizophora mangle* is Greek and Spanish. *Rhizophora* "rhizo" meaning root and "phora" meaning bear or carry in reference to the numerous prop roots growing from the trunk and branches of the mangrove.

It can handle changing humidity, salinity, air- and water temperature and the propagule lasts for up to one year floating in the ocean.

They grow closest to the sea and can grow up to eighty (80) feet tall.

FEATURES

Reddish colored arching and branching prop roots.



Leaves are opposite; large, bright green, leathery, shiny upper surface, and rounded.



Fruit germinates into an elongate, Torpedo-like seedling (propagule) while still on the tree.



Fruit is oval and brown in color, one inch long.



Yellow-cream flowers with four pointed petals (yellow sepals, white petals).





UNIT 6B

Marvellous Mangroves

Mangrove Identification Cards (iii)

WHITE MANGROVES (*Laguncularia racemosa*)

White mangroves are the least salt-tolerant of the three mangrove species. The white mangrove grows rapidly as either a spreading shrub or medium-sized tree that reaches heights of 50 feet (15 m) in rich soils. The bark is thick and scaly, reddish in color).

FEATURES

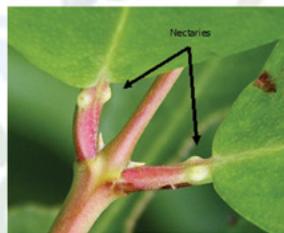
Fruit is green, ribbed and in clusters.



Small white flowers in a spike.



Leaves are opposite; rounded, yellow-green in color, sometimes with pinkish stems. Salt glands at base of leaf.



White mangrove often develop peg roots which are similar to pneumatophores except they are shorter and more stout in appearance.





UNIT 8

Sustainable fishing - "Fishing game"



Big Lobster

This lobster is matured to an acceptable size.

You WIN 1 Point 😊

ONLY CATCH LOBSTER IN MONTHS WITH AN "R"



Lobster with Eggs

This lobster has many babies to be born, only catch lobsters that don't have eggs.

You LOSE 1 Point ☹️

PUT IT BACK IN THE SEA



Lobster with Shell Intact

This is a healthy and edible lobster.

You WIN 1 Point 😊

TASTY-YUM-ENJOY!



UNIT 8

Sustainable fishing - "Fishing game"



Small Lobster

This lobster is too small.

You LOSE 1 Point 😞

PUT IT BACK IN THE SEA AND LET IT GROW



Lobster without Eggs

This lobster does not have eggs and is fine to catch.

You WIN 1 Point 😊

ONLY CATCH LOBSTERS IN MONTHS WITH AN "R"



Lobster Caught by Hand

This is a better way of catching lobsters than using a drag net, which can damage the seabed.

You WIN 1 Point 😊

ONLY CATCH LOBSTERS IN MONTHS WITH AN "R"



UNIT 8

Sustainable fishing - "Fishing game"



Mahi-Mahi Fish

There is plenty of Mahi-Mahi in the Caribbean Sea. It is not yet over-fished!

You WIN 1 Point 😊

YUM-YUM-ENJOY!



Large Sea Urchins

No sea urchins allowed! Sea Urchins eat algae, and prevent it from taking over the colorful coral reef.

You LOSE 1 Point ☹️

PUT IT BACK IN THE SEA. YOU ARE ONLY ALLOWED TO CATCH THEM IN SEPTEMBER!



Lobster Caught with Pot

This is a better way of catching lobsters than using a drag net, which can damage the seabed.

You WIN 1 Point 😊

ONLY CATCH LOBSTERS IN MONTHS WITH AN "R"



UNIT 8

Sustainable fishing - "Fishing game"



Marine Protected Area

You are in a protected area, which means the animals and plants are protected!

You LOSE 2 Points 😞

GO AND FISH SOMEWHERE ELSE



Marine Protected Area

You are in a protected area, which means the animals and plants are protected!

You LOSE 2 Points 😞

GO AND FISH SOMEWHERE ELSE



Large Conch

This conch has an acceptable size. It is greater than 5 inches (18 cm).

You WIN 1 Point 😊

YOUR LAMBI IS READY TO EAT,
ENJOY!



UNIT 8

Sustainable fishing - "Fishing game"



Conch with Flared Lip

A flared lip signifies maturity and age.

You WIN 1 Point 😊

YOUR LAMBI IS READY TO EAT,
ENJOY!



Grouper

There is not a lot of Grouper left in the Caribbean Sea.

You LOSE 1 Point 😞

PUT IT BACK! IS THERE AN
ALTERNATIVE AVAILABLE, LIKE
MAHI-MAHI OR LIONFISH?



Small Conch

This conch is too small. It is less than 5 inches (18 cm).

You LOSE 1 Point 😞

PUT IT BACK IN THE SEA AND LET
IT GROW!



UNIT 8

Sustainable fishing - "Fishing game"



Conch without Flared Lip

No flared lip signifies immaturity. This conch is still too young.

You LOSE 1 Point 😞

PUT IT BACK AND LET IT MATURE



Snapper

There is not a lot of Snapper left in the Caribbean Sea.

You LOSE 1 Point 😞

PUT IT BACK! IS THERE AN ALTERNATIVE AVAILABLE, LIKE MAHI-MAHI OR LIONFISH?



Turtle Eggs

It is against the law to take any turtle eggs.

LOSE ALL YOUR POINTS! 😞

THE CHOICE IS YOURS: WALK CAREFULLY ON THE BEACH AND DO NOT DISTURB



UNIT 8

Sustainable fishing - "Fishing game"



Nesting Leatherback Turtle

This turtle is an endangered species and almost extinct!

You LOSE 1 Point 😞

LEAVE NESTING TURTLES UNDISTURBED



Parrot Fish

They spend up to 90% of their day cleaning coral reefs by eating algae with their teeth.

You LOSE 1 Point 😞

LEAVE HIM ALONE SO HE CAN KEEP OUR REEFS COLORFUL AND HEALTHY



Dropping Anchor in a Coral Reef Area

You damage the reef and destroy the habitat of fish.

You LOSE 2 Points 😞

TIE YOUR BOAT TO A MOORING BALL



UNIT 8

Sustainable fishing - "Fishing game"



Lion Fish

This invasive fish has only very few predators. As a carnivore, it is a threat to many of our fish species.

You WIN 2 Points 😊

SAVE A REEF AND EAT A LIONFISH. IT IS YUMMY!



Lion Fish

This invasive fish has only very few predators. As a carnivore, it is a threat to many of our fish species.

You WIN 2 Points 😊

SAVE A REEF AND EAT A LIONFISH. IT IS YUMMY!



Lobster with Shell Intact

This is a healthy and edible lobster.

You WIN 1 Point 😊

TASTY-YUM-ENJOY!



Worksheet

Imprint

Published by

The Government of Grenada and Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH on behalf of the German Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety (BMUB) under its International Climate Initiative (IKI). As a federally owned enterprise, GIZ supports the German Government in achieving its objectives in the field of international cooperation for sustainable development.

www.international-climate-initiative.com

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Layout/Design

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Depositphotos Inc. (Fishing Game)

Place and Date of Publication

St. George's, Grenada, June 2016

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(teaching manual with worksheets, student passport, stickers and posters)

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This publication was produced by the Grenada Ministry of Agriculture, Lands, Forestry, Fisheries and the Environment, the Grenada Ministry of Education and Human Resource Development and the Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH as part of the “Integrated Climate Change Adaptation Strategies in Grenada” (ICCAS) Programme. ICCAS is funded by the German Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety (BMUB) as part of its International Climate Initiative (IKI). The Programme is jointly implemented by the Grenada Ministry of Agriculture, Lands, Forestry, Fisheries and the Environment, GIZ and the United Nations Development Programme.



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