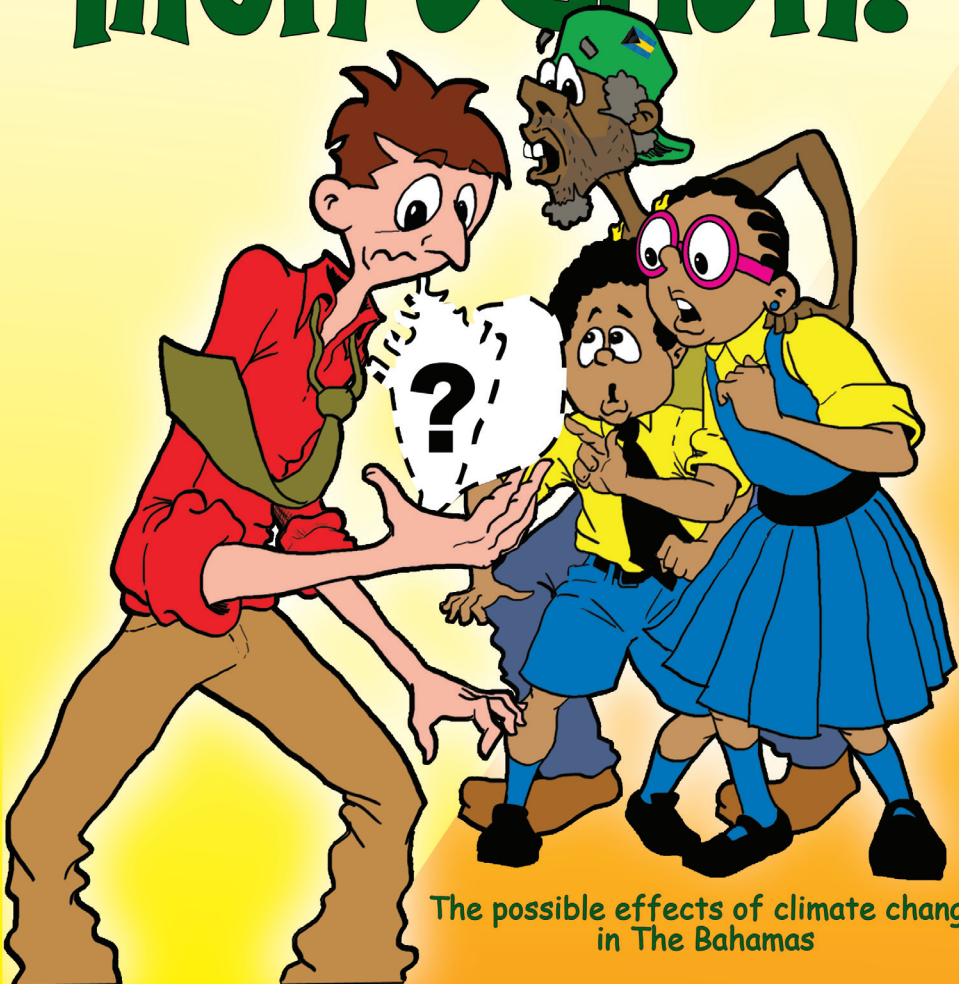


# Who tief muh conch?



The possible effects of climate change  
in The Bahamas

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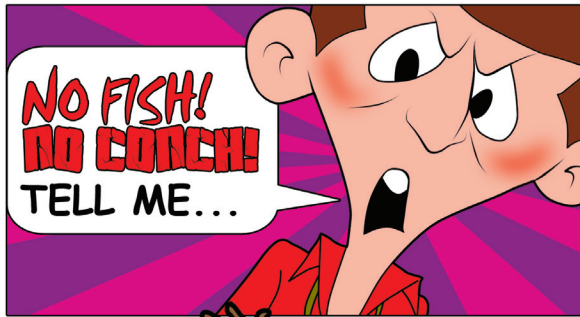
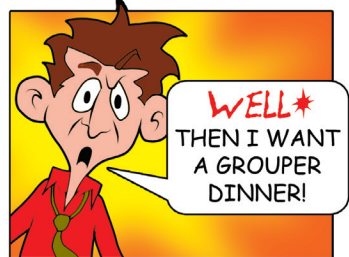
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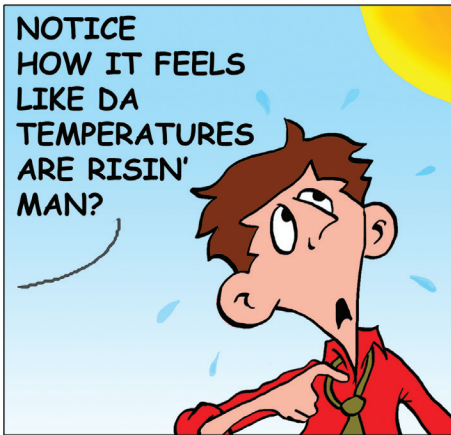
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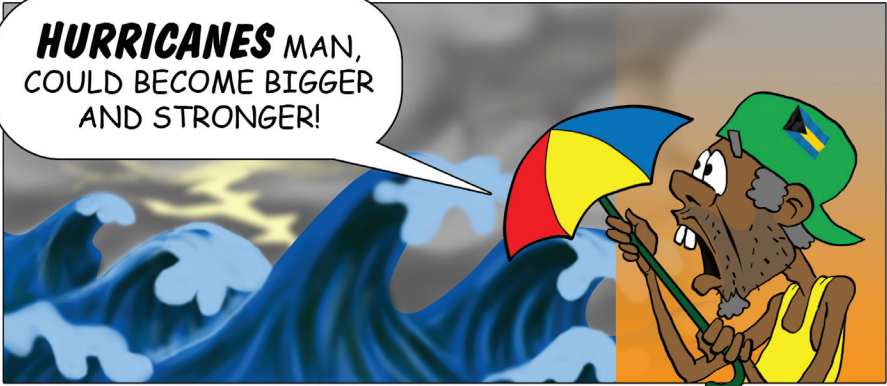
ISBN: 978-976-8205-15-6

# ONE DAY AT THE FISH FRY...

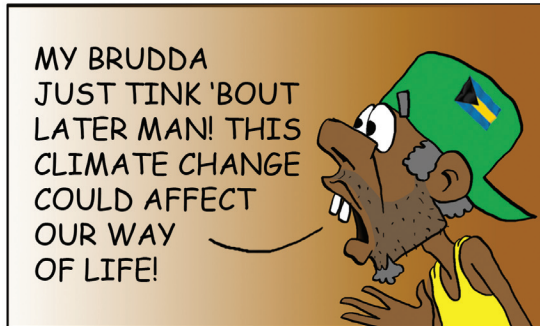




**HURRICANES** MAN,  
COULD BECOME BIGGER  
AND STRONGER!



MY BRUDDA  
JUST TINK 'BOUT  
LATER MAN! THIS  
CLIMATE CHANGE  
COULD AFFECT  
OUR WAY  
OF LIFE!

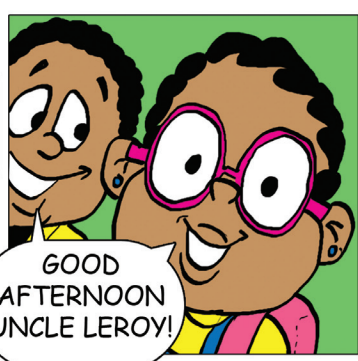
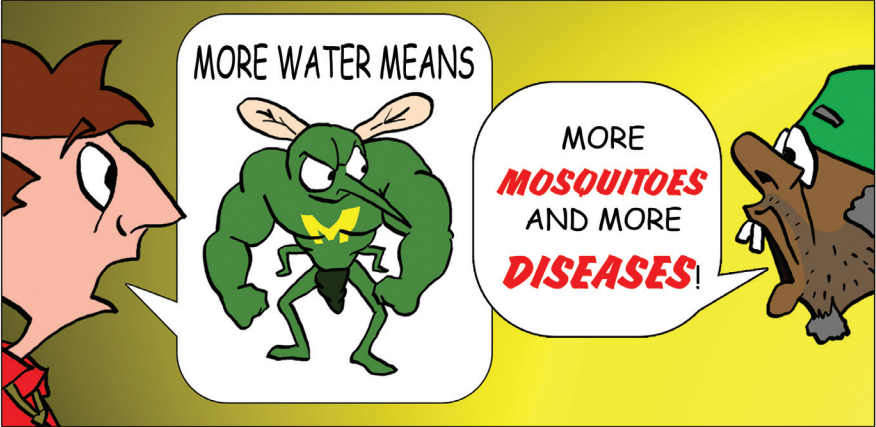


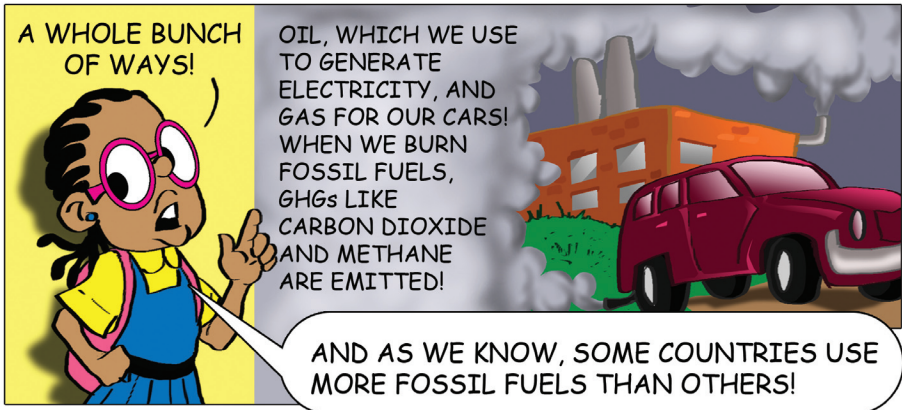
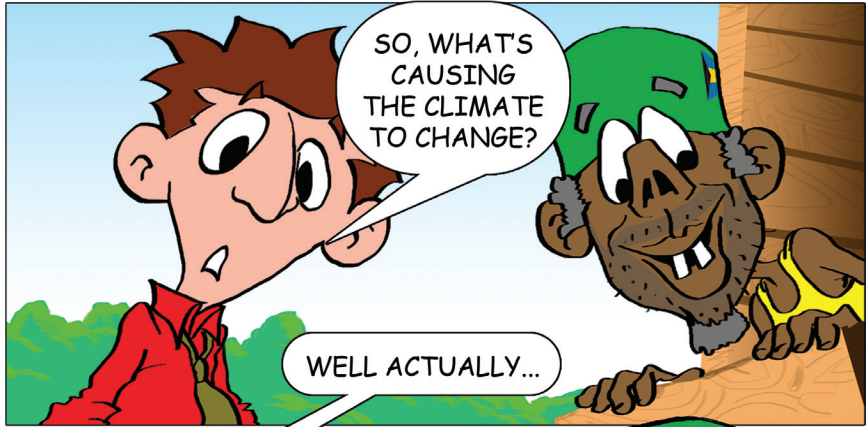
...WE COULD LOSE  
EVEN MORE  
CORAL REEFS!

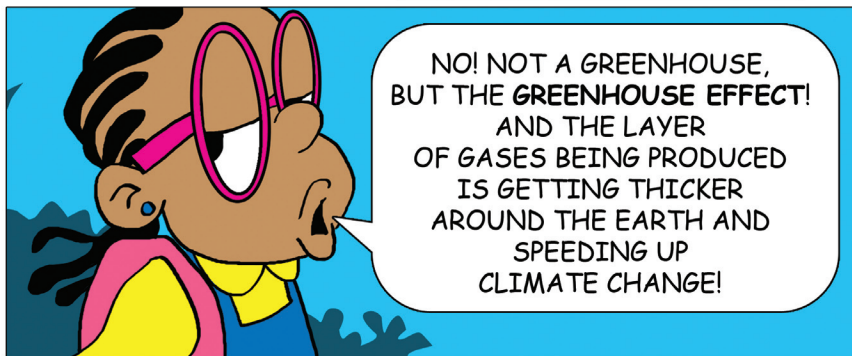
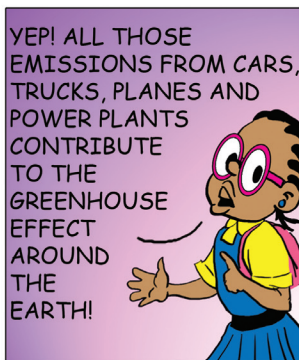
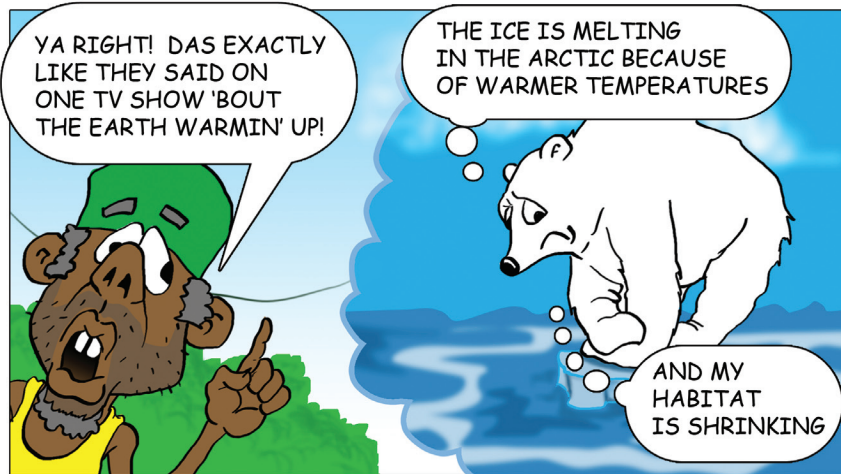


...THE BEACHES ARE ALREADY ERODING!  
AND THERE COULD BE  
MORE FLOODING!

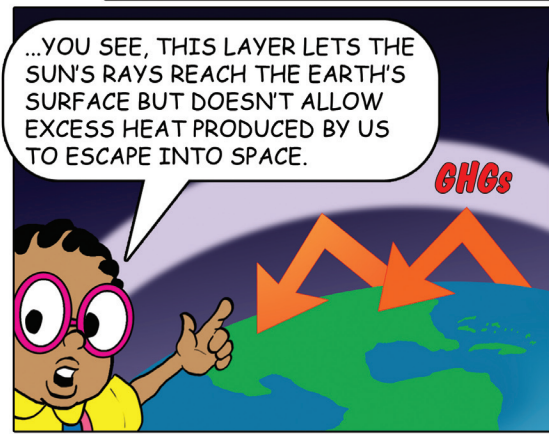
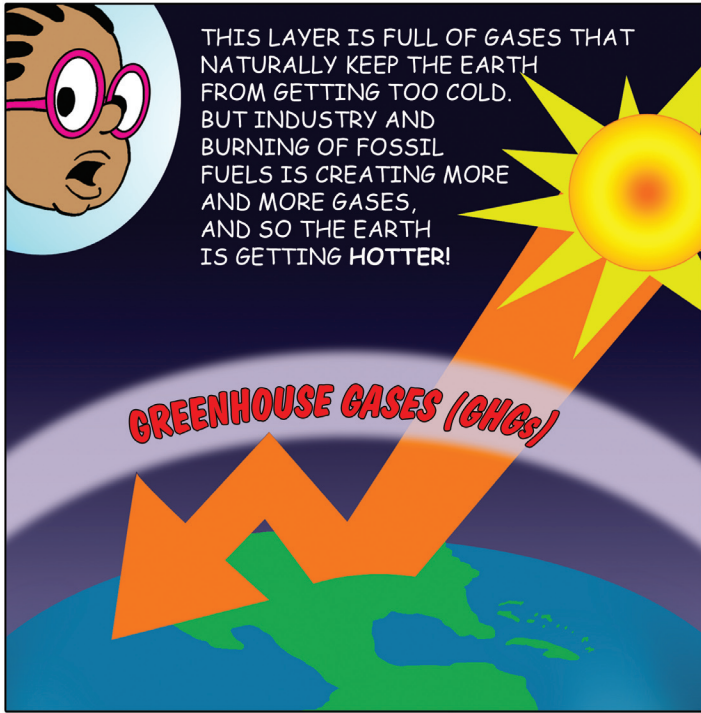












THE MOST COMMON  
ONE IS  
CARBON DIOXIDE  
(CO<sub>2</sub>)

**GHGs**

GHGs INCLUDE  
CARBON DIOXIDE  
METHANE  
NITROUS OXIDE  
HYDROFLUOROCARBONS  
SULPHUR HEXAFLUORIDE

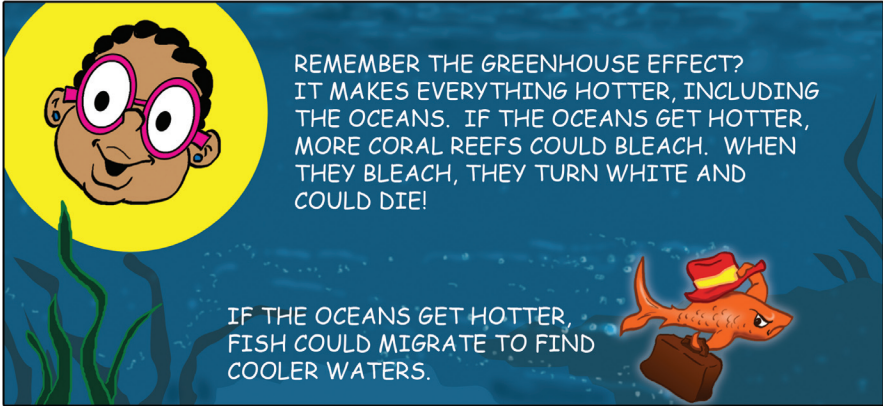
POWER  
PLANT

BUT,  
WHAT DIS  
GAT TO DO  
WITH ME  
NOT GETTIN'  
MY FISH  
OR CONCH?

YEAH TANYA!  
EXPLAIN  
DAT!

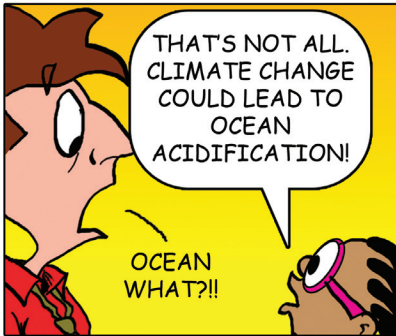
THE CORAL REEFS ARE STRESSED  
AND EVEN MORE OF THEM  
COULD DIE...NO CORAL REEFS  
NO FISH OR CONCH!

TANYA, WHY  
ARE THE  
REEFS SICK?



REMEMBER THE GREENHOUSE EFFECT? IT MAKES EVERYTHING HOTTER, INCLUDING THE OCEANS. IF THE OCEANS GET HOTTER, MORE CORAL REEFS COULD BLEACH. WHEN THEY BLEACH, THEY TURN WHITE AND COULD DIE!

IF THE OCEANS GET HOTTER, FISH COULD MIGRATE TO FIND COOLER WATERS.



THAT'S NOT ALL. CLIMATE CHANGE COULD LEAD TO OCEAN ACIDIFICATION!

OCEAN WHAT?!!

A-CID-I-FI-CA-TION. OCEANS, LIKE FORESTS, ABSORB GHGs, ESPECIALLY CARBON DIOXIDE! BUT THE MORE GHGs WE EMIT, THE MORE THE OCEANS ABSORB.

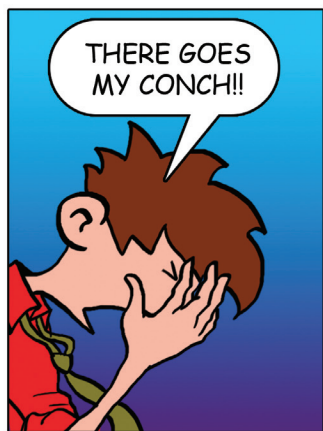
AND IT'S CHANGING THE CHEMISTRY OF THE OCEANS TO MAKE THEM MORE ACIDIC.

GHG

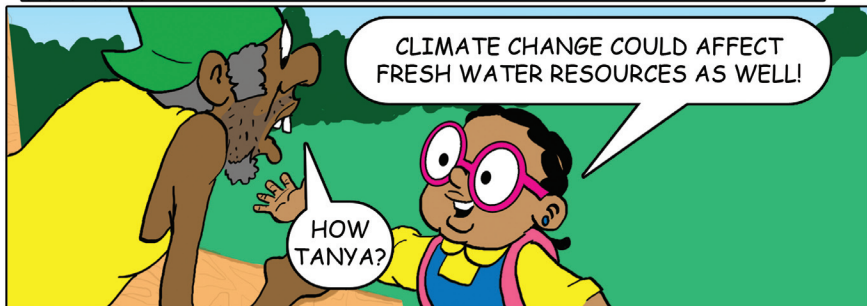
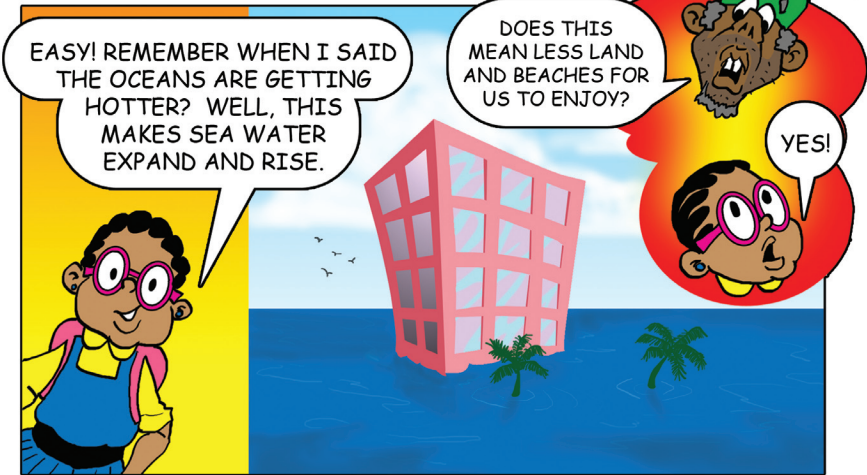
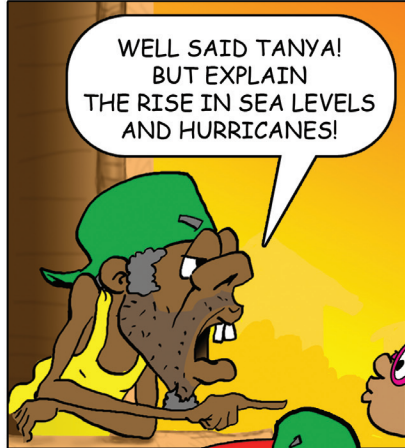
GHG

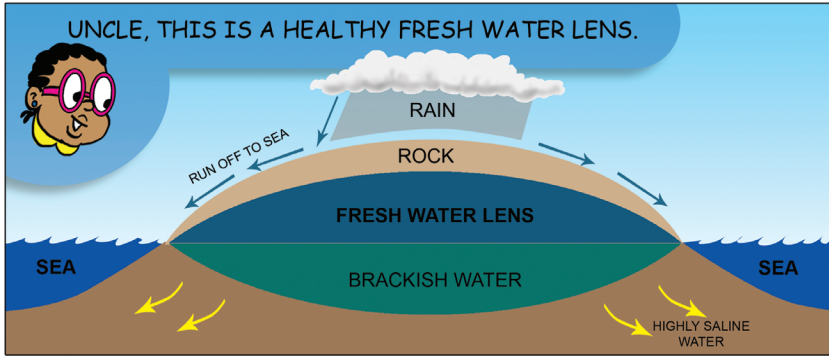


THIS IS MAKING IT HARDER FOR CORAL REEFS TO GROW, AND CONCHS, CRABS AND CRAWFISH TO GROW SHELLS!

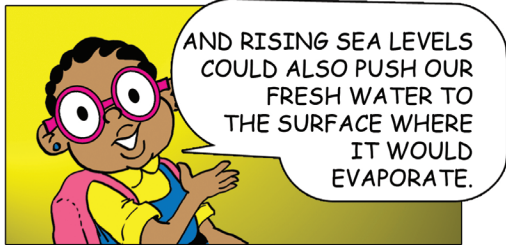


THERE GOES MY CONCH!!

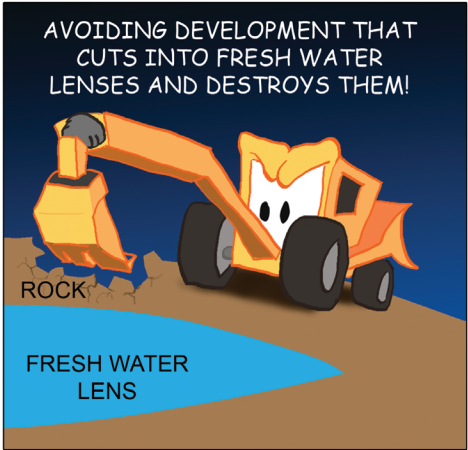
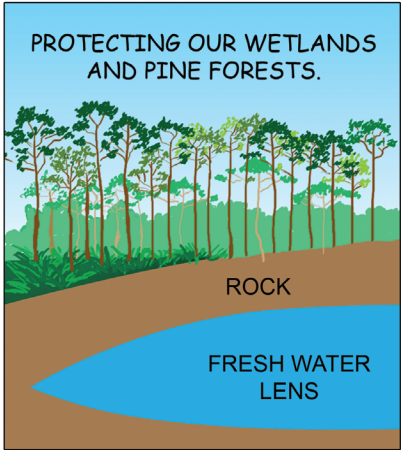




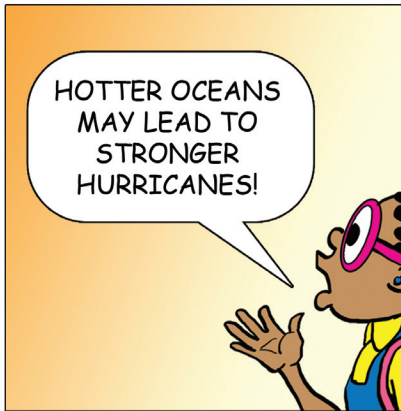
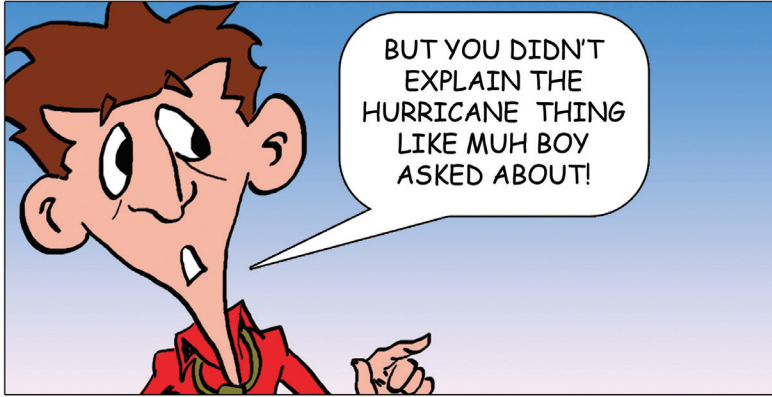
WELL, RISING SEA LEVELS COULD ENTER INTO AND MIX WITH THE FRESH WATER!



**BUT WE CAN ADAPT TO THE EFFECT ON FRESH WATER RESOURCES BY:**

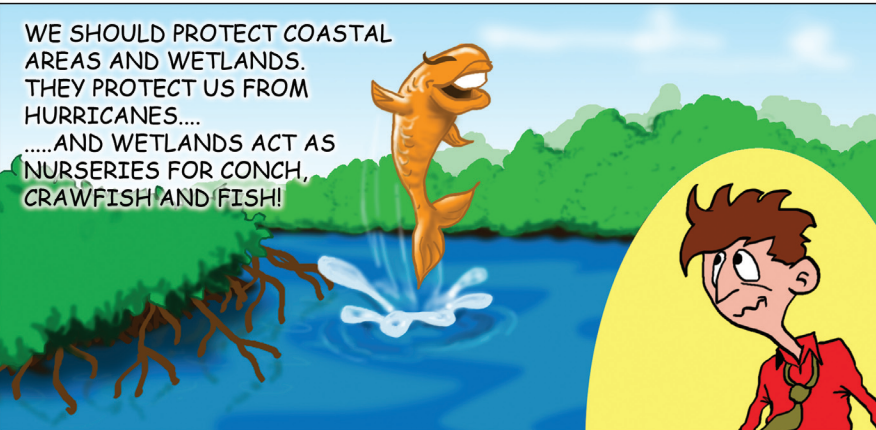
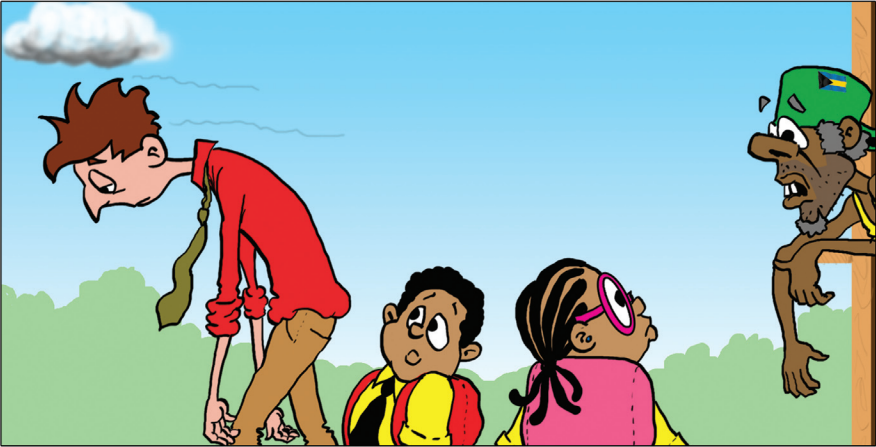


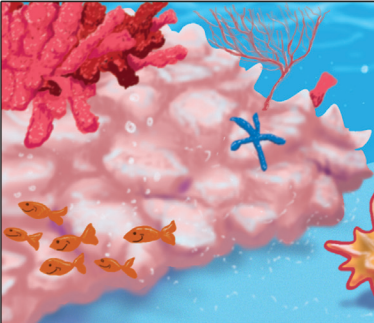
**AND DO NOT FORGET TO CONSERVE WATER!**



AND SMALL ISLAND DEVELOPING STATES LIKE THE BAHAMAS ARE VULNERABLE TO THESE EFFECTS!







AND DO NOT FORGET ABOUT OUR MARINE RESOURCES. CORAL REEFS ALSO PROTECT US FROM STORM SURGES, AND THEY'RE A SOURCE OF FOOD AND SHELTER FOR MANY TYPES OF MARINE LIFE.



WE NEED TO PROTECT CORAL REEFS AND KEEP THEM HEALTHY FOR EVERYONE TO ENJOY!



TREES ABSORB CO<sub>2</sub>, SO WE SHOULD PLANT MORE TREES, AND PROTECT OUR EXISTING FORESTS.



THERE'S MORE!



WALKING OR RIDING A BIKE TO WORK OR SCHOOL, OR CATCHING A JITNEY OR CARPOOLING ARE GOOD IDEAS AS WELL!

WE CAN ALSO START BUYING SMALLER, MORE FUEL EFFICIENT OR HYBRID CARS!





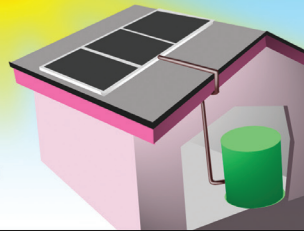
### CONSERVING ENERGY

- TURN OFF LIGHTS AND ELECTRICAL APPLIANCES WHEN NOT USING THEM.
- KEEP NATIVE TREES ON YOUR PROPERTY, DO NOT CLEAR YOUR LOT OF ALL IT'S VEGETATION.
- BUY LOCALLY GROWN PRODUCE AND LOCALLY MADE GOODS.
- CARRY GREEN BAGS TO THE GROCERY STORE, IT REDUCES THE USE OF PLASTIC.



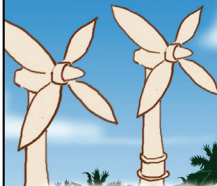
### BE ENERGY EFFICIENT

USE ENERGY EFFICIENT LIGHT BULBS AND SOLAR WATER HEATERS



THESE ARE IDEAS THAT CAN REDUCE OUR B.E.C. BILL!

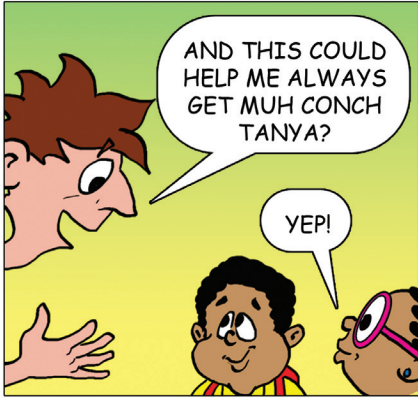
WE CAN WORK WITH OUR LEADERS TO FIND BETTER SOLUTIONS FOR REDUCING OUR USE OF FOSSIL FUELS AND USING CLEANER ENERGY SOURCES



WE NEED B.E.C. TO KEEP MOVING IN THE DIRECTION OF RENEWABLE ENERGY, LIKE THE USE OF WIND OR SOLAR POWER.



THESE ARE STEPS WE CAN TAKE TO PRESERVE NOT ONLY THE BAHAMAS, BUT LIFE ON THE PLANET.



**THE END**

# REACH



## Recycle

*Reduce your consumption, reuse and recycle aluminum cans, bottles, papers and containers.*



## Energy Efficiency

*Encourage others to reduce their use of cars by walking, biking or taking the Jitney.*



## Alternative

*Use alternative sources of energy like solar water heaters and energy efficient lightbulbs.*



## Conservation

*Find ways to use less water when washing up, showering and brushing your teeth.*



## Helping

*Plant trees and shrubs on a regular basis and tell your parents how they can **REACH** for a greener / bluer planet.*



Tick each box as you complete a task! REACH can be completed by individual students, but may be more interesting and effective as a group effort.

## Glossary

**Adaptation** - Adjustments in natural and human systems in response to actual or expected climatic changes or their effects; these adjustments minimize harm or take advantage of beneficial opportunities (UNFCCC website [www.unfccc.int](http://www.unfccc.int)).

**Carbon Sequestration** - the process of removing carbon from the atmosphere and depositing it in a reservoir.

**Carbon Sinks** - ecosystems capable of absorbing and storing carbon (e.g., forest, some wetlands); preservation of these ecosystems is of prime importance for reducing the human-caused increasing levels of carbon dioxide in the atmosphere which contribute to global warming (Wondrous West Indian Wetlands).

**Clear - Cutting** - the cutting of all the trees in an area, leaving only stumps or nothing. Although it is the most cost efficient method, clear cutting is also the most damaging to the environment (Environment - The Science Behind the Stories, Second Edition).

**Climate Change** - Climate change refers to a change in the earth's climate over time, which can cause, among other things, increases in average global temperatures and changes in rainfall patterns, and can lead to sea level rise, ocean acidification, more droughts, stronger hurricanes, more flooding, an increase in vector borne diseases, habitat loss, and heat stress. Climate change can be due to natural variabilities and human activity, specifically the buildup of greenhouse gases in the atmosphere that trap the sun's heat. Greenhouse gases of most concern are carbon dioxide, methane, and nitrous oxides (UNFCCC, IPCC, Bahamas Environmental Handbook). This term is commonly used interchangeably with "global warming" and "the greenhouse effect", but is a more descriptive term.

**Coastal Erosion** - The wearing away of soil by wind or water, intensified by land - clearing practices related to farming, residential or industrial development, road building, or logging ( Bahamas Environmental Handbook).

**Conservation** - Preserving and renewing natural resources. Clean lakes, wilderness areas, a diverse wildlife population, health soil, and clean air are natural resources worth conserving for future generations ( Bahamas Environmental Handbook).

**Coral Bleaching** - Occurs when corals lose their zooxanthellae, exposing the white calcium carbonate skeleton of the coral colony. Causes include disease, excess shade, increased levels of UV radiation, sedimentation, pollution, salinity changes, and increased ocean temperatures possibly due to climate change ( Bahamas Environmental Handbook).

**Energy Conservation** - the practice of decreasing the amount of energy used ( [www.energystar.gov](http://www.energystar.gov)).

**Energy Efficiency** - the practice of using less energy to do something as good as before or better ( [www.energystar.gov](http://www.energystar.gov)).

**Emission** - the release or discharge of a substance, usually a gas, vapour or particulate into the environment ( Bahamas Environmental Handbook).

**Freshwater Resources** - in the Bahamas, these consist of surface water, such as lakes and blue holes, as well as groundwater, such as underground freshwater lenses or aquifers.

**Fossil Fuel** - a nonrenewable natural resource, such as crude oil, natural gas, or coal, produced by the decomposition and compression of organic matter from ancient life ( Environment - The Science Behind the Stories, Second Edition).

**Greenhouse Effect** - the trapping and warming action of gases in our atmosphere ( Bahamas Environmental Handbook).

**Greenhouse Gas (GHG)** - any gas that traps heat in the atmosphere. Greenhouse gases include water vapor, carbon dioxide (CO<sub>2</sub>), methane (CH<sub>4</sub>), nitrous oxide (N<sub>2</sub>O), halogenated fluorocarbons (HCFCs), Ozone (O<sub>3</sub>), perfluorinated carbons (PFCs) and hydrofluorocarbons (HFCs) (www.energystar.gov).

**Hurricanes and Typhoons** - Hurricanes and typhoons currently form from pre-existing disturbances only where sea surface temperatures (SSTs) exceed about 26°C (80°F) and, as SSTs have increased, it thereby potentially expands the areas over which such storms can form. A recent U.S. Climate Change Science Program report (12 March, 2008) on [Weather and Climate Extremes in a Changing Climate](#): Regions of Focus: North America, Hawaii, Caribbean, and U.S. Pacific Islands concluded that “it is very likely (90% to 95% certainty) that the human-induced increase in greenhouse gases has contributed to the increase in sea surface temperatures in the hurricane formation regions”. According to the IPCC Fourth Assessment Report (AR4), it is likely (66 to 90%, certainty) that future tropical cyclones (typhoons and hurricanes) will become more intense, with higher peak wind speeds and more heavy precipitation associated with warmer tropical seas.

**Lionfish (Pterois spp)** - is an invasive species in The Bahamas, first reported in 2004. They are considered a significant threat to marine biodiversity in The Bahamas as they are known to be voracious feeders, eating crustaceans and other fish species, including the Nassau grouper (*Epinephelus striatus*). Lionfish are edible.

**Migration** - the movement of animals from one region to another, often seasonal in response to changing conditions of climate or food supply (Treasures in the Sea).

**Mitigation** - a human intervention either to reduce the sources of greenhouse gases or to enhance carbon sinks. Examples include using fossil fuels more efficiently for industrial processes or electricity generation, switching to solar energy or wind power, improving the insulation of buildings, and expanding forest and other “sinks” to remove greater amounts of carbon dioxide from the atmosphere (UNFCCC website [www.unfccc.int](http://www.unfccc.int)).

**Ocean Acidification** - the decreasing pH level (or increasing acidity) of the Earth's oceans due to the significant increase in the amount of carbon dioxide being dissolved in the ocean from human activities. Negative impacts of ocean acidification on marine life include inability to grow and maintain shells in conchs, other mollusks, crustaceans and shellfish. It may also negatively affect coral reefs (<http://www.youtube.com/watch?v=evfgbVjb688> The Threat of Ocean Acidification by Rob Dunbar).

**Pine Forest** - typically found in the northern islands of Abaco, Andros, Grand Bahama and New Providence. These forests consist of Caribbean pine (*Pinus caribea*) as well as other important plant species (e.g. sabal palmetto and ferns) and animal species (e.g. Bahama parrot, Kirtland's warbler ( Bahamas Environmental Handbook).

**Pollution** - any matter or energy in water, soil, or air that has a harmful or poisonous effect, such as degrades the natural quality of the environment, offends the sense of sight, taste, hearing or smell, or causes a health hazard ( Bahamas Environmental Handbook).

**Recycling** - reusing materials and objects in original or changed forms rather than discarding them as waste ( Bahamas Environmental Handbook).

**Renewable Energy** - energy made from fuels that can be easily made or "renewed". Types of renewable fuels are hydropower (water), solar, wind, geothermal, and biomass ([www.eia.gov/kids/energy](http://www.eia.gov/kids/energy)).

**Saltwater Intrusion** - occurs when sea level rise pushes saltwater into underground freshwater lenses or aquifers. Under normal circumstances, a freshwater lens consists of a layer of freshwater floating on top of a layer of saltwater.

**Small Island Developing States (SIDS)** - small island and low-lying coastal countries that share similar development challenges and concerns about the environment, especially their vulnerability to the adverse effects of global climate change. For some of these states, like the Maldives, Kiribati, and The Bahamas, the risk from sea level rise threaten their physical existence, as they would very easily be inundated by sea levels in excess of one metre above current levels. SIDS, along with other small island states, are recognized as a negotiating block within the United Nations system and given special recognition under the United Nations Framework Convention on Climate Change (Alliance of Small Island States [www.sidsnet.org](http://www.sidsnet.org)).

**Water - Stressed Country** - an area experiences water stress when annual water supplies drop below 1,700 cubic meters (m<sup>3</sup>) per person. When annual water supplies drop below 1,000 m<sup>3</sup> per person, the population faces water scarcity, and below 500 m<sup>3</sup> is called "absolute scarcity". Around 700 million people in 43 countries suffer today from water scarcity. Global climate change is predicted to increase the number of countries experiencing water-stressed conditions. ([www.un.org/waterforlifedecade/scarcity.html](http://www.un.org/waterforlifedecade/scarcity.html)). The Bahamas is considered to be a water-stressed country in the Caribbean (Assessment of the economic impact of climate change on CARICOM countries (2002) by Haites E, Pantin D., Attza, Bruce J., & Mackinnon J.).

**Wetland** - areas of marsh, fen, peatland or water, whether natural or artificial, permanent or temporary, with water that is static or flowing, fresh, brackish or salt, including areas of marine water the depth of which at low tides does not exceed six meters, including areas which may incorporate riparian and coastal zones adjacent to the wetlands, and islands or bodies of marine water deeper than six meters at low tide lying within the wetland (Ramsar Convention).

**For further information, see the websites below for kids, Teachers and Parents:**

[www1.eere.energy.gov/kids](http://www1.eere.energy.gov/kids)  
[www.energystar.gov/kids](http://www.energystar.gov/kids)  
[www.eia.doe.gov/kids](http://www.eia.doe.gov/kids)  
[www.epa.gov/kids](http://www.epa.gov/kids)  
[www.need.org/energy-infobook-activities](http://www.need.org/energy-infobook-activities)  
[www.epa.gov/students](http://www.epa.gov/students)  
[www.nrdc.org/greensquad](http://www.nrdc.org/greensquad)  
<http://kids.nationalgeographic.com/kids>  
[www.sidsnet.org](http://www.sidsnet.org)  
[www.climate4classrooms.org](http://www.climate4classrooms.org)

[www.wmo.int/youth](http://www.wmo.int/youth)  
[www.nsta.org](http://www.nsta.org)  
[www.unfccc.int](http://www.unfccc.int)  
[www.noaa.gov](http://www.noaa.gov)  
[www.best.bs](http://www.best.bs)  
[www.breef.org](http://www.breef.org)  
[www.reearth.org](http://www.reearth.org)  
[www.tnc.org](http://www.tnc.org)  
[www.glispa.org](http://www.glispa.org)  
[www.bnt.bs](http://www.bnt.bs) (see the treasures in the sea and the Wonderous Wetland Publication)

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