



Grade 10- Climate Change Package

Climate Change

for Grade 10 Science

at the Toronto Zoo



Save Animal Habitat by
Printing Double Sided



Grade 10- Climate Change Package

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INTRODUCTION

Dear secondary school teacher,

The Toronto Zoo is pleased to provide you with this document, a complete field trip resource for use with a grade-ten science class. The focus of this resource is climate change from the Earth and Space Science unit.

Included in this document you will find two activities that can be completed before your trip to the Zoo, an assignment for students to complete at the Zoo, and two follow-up activities for after your visit. These can all be completed or you can choose which to do based on your class and the time you have available.

We hope your visit to the Zoo is both educational and memorable, and that these resources are a success. In order for us to best serve our visiting school groups, please fill out our feedback form, which can also be found in this package.

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REMINDERS FOR YOUR SCHOOL VISIT



Zoo hours are:

- May 19th to September 3rd
9:00 am—7:30 pm (last admission 6:30 pm)
- September 4th to October 8th
9:00 am—6:00 pm (last admission 5:00 pm)
- October 9th to December 31st
9:30 am to 4:30 pm (last admission 5:30 pm)



Admission for school groups is:

- \$8 per student/supervisor (elementary)
- \$9 per student/supervisor (secondary)
- \$10 per student/supervisor (post-secondary)

***all rates are subject to change without notice. Please visit www.torontozoo.com for current rates.**



Please call Toronto Zoo Group Sales at **416-392-5932** to book your school group



Supervisor to student ratios are:

- **Grades K-3:** one supervisor per 5 students
- **Grades 4-12:** one supervisor per 10 students



The Toronto Zoo is wheelchair accessible. For more information please visit our website at: <http://www.torontozoo.com/AboutTheZoo/SpecialNeeds.Services.asp>.



On the day of your visit please remember to bring your group confirmation and payment can be made at Guest Services at the main entrance of the Zoo. Payment can be made by cheque payable to "Toronto Zoo", cash, MasterCard, VISA, or American Express.

PRE-ZOO ACTIVITY: NEWS BROADCAST FROM THE FUTURE

Time Needed: 75 minutes

Type of Activity: Drama-based group learning (approximately 5 students per group)

Purpose: To make students aware of the consequences of global warming and climate change on a global level, in an engaging and creative way. Also serves to demonstrate to students the need to reduce greenhouse gas emissions by human beings.

Curriculum Expectations:

ESV.01D: demonstrate an understanding of the greenhouse effects and its influence on climate change

ESV.03D: assess the global and regional consequences of climate change

ES2.06D: describe the natural and human causes of climate change on the planet and in particular to Canada (e.g., forest fires, deforestation, combustion of fossil fuels in transportation, utilization of fertilizers and industrial emissions)

ES1.07D: identify and describe global indicators of climate and climate change (e.g., glacial and polar ice, sea levels, wind patterns and global carbon budget)

Materials Required:

- multiple copies 2xCO₂ fact sheet (attached)
- you may want to rearrange classroom to have a stage-type area, or just use the front of the class

Prior Knowledge: Students should understand the basics of global warming and a general understanding of the human consequences of consuming fossil fuels around the world.

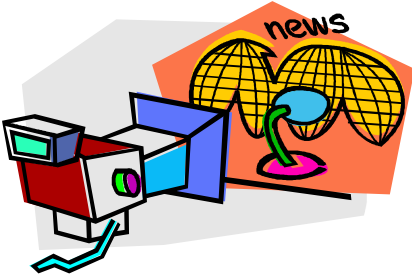
Task: Students will par-take in a role-playing exercise to be performed in front of their peers. Their task is to create a simulated news broadcast skit, which takes place in the world described on the fact sheet.

1. Introduce the activity by asking the students how old they will be in 2040.
2. The role-play should be done in groups of 4-6 students. Students will receive copies of the assignment sheet and the fact sheet that details how climate change will affect our world in the near future.
3. The students will have to incorporate what they learned from the fact sheet and their creative skills to prepare a drama skit. Students should have approximately 10 minutes to prepare their skit (which can be mainly improvised)
4. Students should be encouraged to have a variety of roles in their skit, including one or two main news anchors, a weatherman, on the scene reporters, interviewers with victims of global warming and any other relevant characters students wish to create.
5. The performance aspect should be no longer than 8 minutes per group.

Debrief: At the end, students should be reminded that these changes will happen in their lifetime! Students should be asked what they think the impact might be on wildlife in different regions of the Earth (i.e. what will happen to the polar bears if the ice sheets melt? Etc.) Students can also be instructed to take their fact sheet with them to the Zoo and compare them to the big globe outside the main entrance of the Zoo.

MAKE A NEWS BROADCAST... In the Future!

"Good Evening... world of 2040 and welcome to Earth News!"



The year is 2040 and greenhouse gas emissions have not slowed down since the 1850s! In fact, the amount of carbon dioxide is double its level in 1850! The world has changed in many ways, as you will find out by reading the fact sheet on climate change.

It will be **your job** to report the changes in a news broadcast. In groups of 4-6 you will become an action news team and you will perform a 5-8 minute news broadcast in front of your class!

To prepare this broadcast you will need to assign everybody in your group a character or role to play. Here are some suggestions:



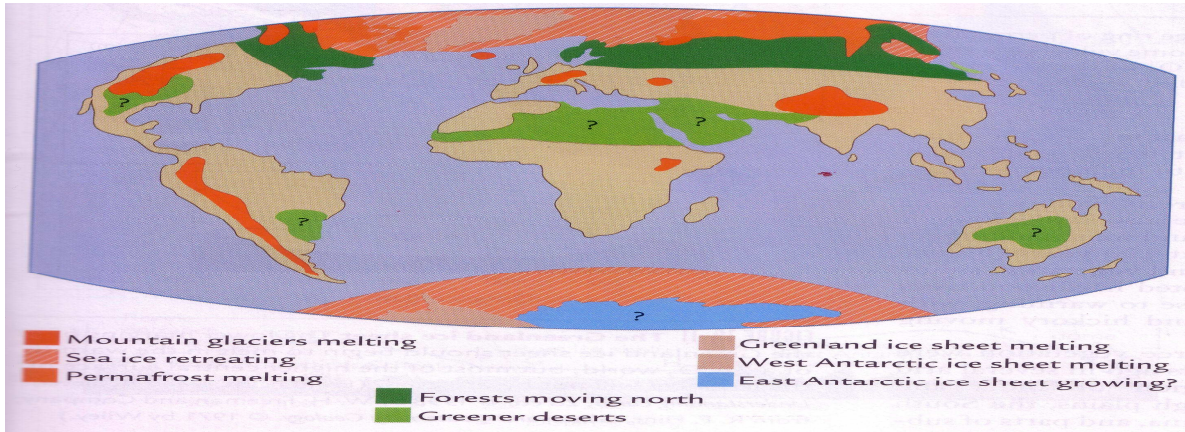
- 1 or 2 news anchors (a must have!)
- A weatherman
- News reporters on the scene (in the field!)
- Victims of climate change being interviewed
- and many more! Use your imagination! Creativity is an asset for this activity!

A Few Reminders:

- Your goal is to include as much information from the "fact sheet" as possible in your broadcast in a creative, dramatic way.
- Everybody in your group **MUST** be involved!
- Keep it fast, and less than 8 minutes long!
- Be creative and have fun!

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A 2xCO₂ World: Our Future Environment (Fact Sheet)



Intro: This map represents what scientists believe the world will look like if the carbon dioxide levels double from their pre-industrial level (before the Industrial Revolution of the 1800s and the rapid creation of factories, trains, and later cars). Since it is unlikely that humans will slow the input of greenhouse gases before reaching a 2xCO₂ world, it is likely our world will change in the following ways in the next 30-60 years (Your lifetime!).

Global temperature will rise 2.5°C and winters will be 4-5°C warmer. The warmer winters will result in the permafrost that surrounds the northern part of the globe to melt.	In heavily populated areas such as Bangladesh, a sea level rise of 0.5 m would displace millions of people currently living within 1 m of the present-day sea level.	Ski resorts in the southern parts of Ontario & elsewhere will close.
		Agriculture will suffer due to more frequent droughts.
The Tundra region will be replaced by forests of coniferous trees that will move north. Trees will move north of the Arctic circle, resulting in a radically altered landscape.	Tropical diseases (cholera, malaria...) will spread north as the climate becomes more hospitable to them.	This melting of ice will double the rate of sea level rise from 1.5 mm a year to 3mm per year.
Evaporation will increase worldwide, as warmer air and temperatures permit air to hold more water vapor. This will result in accelerated global warming.	Most mountain glaciers will completely disappear in this future world, and will contribute to the global rise in sea level. Africa, South America will all lose their glaciers.	Higher CO ₂ levels will allow for trees and scrub to live in arid regions such as Saharan Africa and Argentina.
Hurricanes and typhoons will be more frequent with warmer and larger oceans.		
Precipitation patterns will vary region to region. Some areas will become drier and experience severe droughts, while other areas become wetter and experience floods. 80% of the world's population could face water shortages.	Antarctica ice sheets will also begin to melt rapidly, resulting in rising sea levels.	In Canada/USA the CO ₂ will make the months shift. Aprils will feel like modern-day Mays and future Novembers will feel like modern Octobers.
	The Great Barrier Reef in Australia will become functionally extinct, due to warmer temperatures	

PRE-ZOO ACTIVITY: EXAMINING ATTITUDES TOWARDS ZOOS

Time Needed: 35-40 minutes

Type of Activity: small group discussion with manipulatives, whole-class discussion

Purpose: This activity is designed to get students thinking about the purpose of the Toronto Zoo and to get them to explore their attitudes towards the treatment of animals in general. It is an appropriate activity to complete before a trip to the Zoo, since through considering different views and opinions ahead of time; students will be able to keep these in mind while they experience the Zoo. They will then be able to employ higher-order thinking skills while viewing the animals, and are more likely to analyze and evaluate what they are observing.

Materials Required:

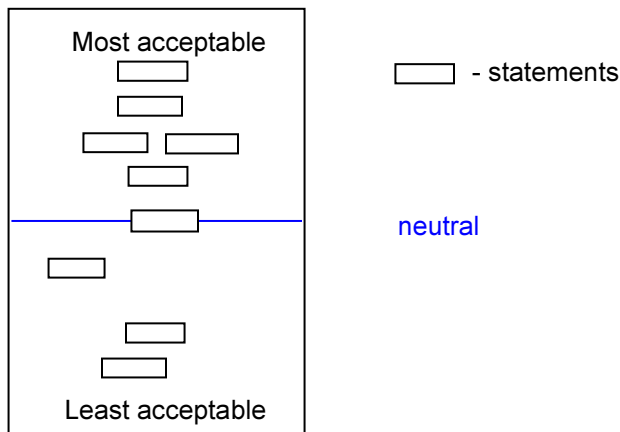
- set of statements about treatment of animals (included below)
- masking tape
- class set of scissors
- four signs labelled “Strongly Agree”, “Agree”, “Disagree”, and “Strongly Disagree”

Task: The first part of the activity allows students to get comfortable with their opinions surrounding the role of and treatment of animals, and the second part gets the class to express these opinions and compare them with the rest of the class.

Part One (25 minutes)

Above-the-Line, Below-the-Line

1. Put class into partners or groups of three.
2. Distribute the statements to each pair. One partner can cut them out, and the other can obtain a piece of masking tape to divide the desk in half. The teacher may wish to draw a diagram on the board, such as the one below, to illustrate how the desk should be divided.



The top half of the desk represents the students’ opinions as “Most Acceptable”, the middle line is neutral, and the lower half of the desk is “Least Acceptable”.

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3. Allow students time to read over the statements, then to discuss them with their partners. Students then must rank the statements, deciding which ones they feel are the most positive or acceptable uses of animals, and which they disagree with. Encourage the students to discuss and defend any differences of opinion that may arise.
4. Once students are finished ranking the statements, get them to join another group and compare the order of their statements.
5. Now, bring the class back together. Ask them which statements they felt most strongly about, and why; and encourage them to defend their positions. You may need to mediate the tone of the discussion, as it can become quite lively.
6. When the discussion is dying down, students can clean up the statements and remove the tape from the desk, while the teacher hangs up the signs to prepare for the next activity.

Part Two (10 minutes)

Four Corners

1. Post the signs labelled with “Strongly Agree”, “Agree”, “Disagree”, and “Strongly Disagree” throughout the room, such as at each corner.
2. Let students know that you will be reading statements aloud, and they need to choose which corner to go to based on how they feel about the statement. Students need to decide for themselves, and move in an orderly fashion to the corner of their choice.
3. Read each statement aloud. The ones provided below are the Zoo’s four objectives, and you can precede each statement with “It is acceptable to...”. You may want to add more of these statements, based on the class. Allow students time to move to the corners, and to observe where their classmates stand. Stress that there are no right or wrong answers, but that this exercise is designed to allow them to see that these are complex issues and that a variety of opinions exist.

You may want to consider doing this activity with the class both before and after your visit to the Zoo, to allow students to re-examine their opinions after they have experienced the Zoo.

Four Corners Statements

Zoo’s objective	Statement from list
Research	Exchange of animals in zoos for breeding purposes and research that ensures genetic diversity for future generations
Education	Educating the public through captive animals and confiscated trade items
Conservation	Keeping animals in cages to study breeding strategies, nutrition, and behaviour in order to reintroduce animals back into the wild
Recreation	Keeping wild animals in zoos, circuses, aquariums and aviaries for purposes of amusement

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Above-the-Line, Below-the-Line Statements

Using animals for scientific experiments to test whether cosmetics and toiletries (perfumes, shampoos, etc.) are safe for human use	Hunting and trapping fur animals so their skins can be used to make fur coats and hats
Keeping wild animals in zoos, circuses, aquariums and aviaries for purposes of amusement	Using animals for military experiments to test the effects of new weapons of chemical, gas and biological warfare
Intensive rearing of animals inside factory farms for eventual slaughter and consumption as food	Using animals in scientific experiments to find cures for human diseases such as AIDS and cancer
Using animals as beasts of burden for riding and pulling carts, carriages and ploughs. Riding animals in zoos.	Exchange of animals in zoos for breeding purposes and research that ensures genetic diversity for future generations
Educating the public through captive animals and confiscated trade items (ex: gorilla hand ashtray, ivory items)	Keeping animals in cages to study breeding strategies, nutrition, and behaviour in order to reintroduce animals back into the wild
Using specifically-bred and purpose-trained dogs to assist disabled people	Hunting and fishing for pleasure: the thrill of the chase and catch
Using specially bred and freshly killed animals for dissection in school biology lessons	Rearing of animals in free-range conditions (open yards and fields) for eventual slaughter and consumption as food
Using animals in television commercials as a means for promoting products	Neutering and spaying animals (pets)

ZOO ACTIVITY: CLIMATE CHANGE AND THE TORONTO ZOO

Time Needed: The handout itself should take no more than an hour to complete, but is expected to be done as students explore the Zoo, thereby taking longer.

Type of Activity: Handout, to be completed individually or in partners.

Purpose: To reinforce and build upon students' understanding of climate change and global warming, and to relate these topics specifically to animals that are found at the Toronto Zoo.

Curriculum Expectations:

ESV.03D assess the global and regional consequences of climate change

ES3.01D research and propose a course of action related to individual, regional or national initiatives (e.g., community action with industry, non-governmental organizations) to address climate change

NEW_666666 0010208 describe the greenhouse effect and recognize its importance for life

ES2.06D describe the natural and human causes of climate change on the planet and in particular to Canada (e.g., forest fires, deforestation, combustion of fossil fuels in transportation, utilization of fertilizers and industrial emissions)

Specific Prior Knowledge: Students should be familiar with the concepts surrounding climate change and global warming, such as their causes and consequences. Students should be able to analyze scenarios and make predictions based on their knowledge of climate change.

Teacher Preparation Required: Ensure prior knowledge has been covered in class. Students can also complete pre-Zoo activities (included). Distribute and read activity through with the class to ensure complete understanding of the assignment.

Materials Required:

- A photocopy of the Zoo Activity Sheet for each student
- Clipboards or hard surfaces to write on
- Writing implements
- Map of the Zoo for each student (can be obtained upon arrival)

Notes:

1. If time constraints are an issue, assignment sections such as "Pavilion Climate" and "Insects" can be omitted.
2. Please print the assignment double-sided to save paper!
3. Possible post-visit extensions to this activity may include:
 - a. further research on a specific species and how it is affected by global warming
 - b. class discussion and brainstorming of ways to reduce global warming, for example recycling or composting as a class, or planting native species as a class
 - c. post-Zoo activities (included) can also be completed

Climate Change and the Toronto Zoo

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Below is the student assignment with expected answers. Some answers will vary, based on student choice.

Climate Change and the Toronto Zoo

Name: _____

Date: _____

You have just received great news! Al Gore, former US vice president and the man behind *An Inconvenient Truth*, is returning to Canada. Part of his visit will be to the Toronto Zoo, and you have a chance to accompany him! Use your field trip today to uncover the truth surrounding the Zoo's animals and plants that are threatened by global warming.



Polar Bears (Americas outdoor exhibit)

Polar bears also hunt for seals from the ice, and must eat and gain fat reserves before the ice melts for the summer. With global warming, the ice melts earlier in the year and returns later, leaving the bears less of a chance to gain the weight that will sustain them throughout the summer. They or their cubs may die from this lack of food.

1. Observe the polar bear and its enclosure. What are two ways the enclosure is designed to be similar to the polar bear's natural habitat? /2

-enclosure includes water and landscape that mimics rough ice and snow terrain, with no vegetation

2. Canada's natural habitat loss, partly due to global warming, will be almost fifty percent in the next hundred years. Name and explain one difficulty polar bears might face if their habitat area is reduced by half. /2

-less area to hunt, look for prey, raise young; this will lead to a drop in their populations
-they will have less food because animals they prey on, such as seals, will also suffer

3. Name one way the polar bear is adapted for survival in its habitat, and explain why this adaptation is useful. (Hint: Find out what is special about their fur) /2

(from sign)

-in winter, its hair stands up to let sun in and warm its skin
-in summer, its hair lies flat to shield skin and reflect rays of sun

American Alligators (Americas pavilion)

Alligators, along with some other reptiles, are influenced by temperature in an interesting way. The sex of their offspring, which hatch from eggs, is dependent on the temperature the eggs are exposed to. In the case of the American alligator, lower temperatures (30°C) will produce all females, and higher temperatures (34°C) will produce all males.

4. From the sign outside the alligator display, name and explain an earlier threat facing alligators. /2

-alligators were threatened by uncontrolled hunting in the 1950s and 60s, which led to them being listed as endangered

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5. If global warming continues, what is a new threat to alligator populations? /2

-alligators will be unable to hatch both males and females, since their sex is dependent on incubation temperature. This will lead to problems with reproduction, because an all-male population will be favoured with higher temperatures.

6. Alligators are a “keystone species” (see sign outside display). If their numbers are reduced, how will this affect other animals? /2

-during times of drought alligators create water holes, which provide a home for aquatic animals, as well as drinking water for many others. If they were to disappear, these water holes would no longer be available and these other species will suffer.

Pavilion Climates (Indo-Malaya, Americas, or African pavilion)

7. Describe the climate in one of the following pavilions: Indo-Malaya, Americas or African. /1

-the pavilions are designed to match the climate of their geographic area, so they are mostly hot and humid.

8. Imagine that Canada’s climate was identical to that of this pavilion, what changes in the species composition of Canada do you think would you observe? /2

-some animals would be able to live in this climate and would spread north, while others would no longer be able to survive and would disappear from Canada. Some examples would include animals that require a period of cold (e.g. temperate snakes that hibernate) as part of their life cycle.

Insects/Spiders (Americas pavilion, Australasia pavilion, or Indo-Malaya pavilion)

9. Choose an insect or spider from one of the above locations: /1

_____ in the _____ pavilion.

-there are a variety of possibilities here, such as the lubber grasshopper, Brazilian giant cockroach, black widow, or giant centipede

10. Describe the insects or spiders habitat and environment and in what part of the world does it normally live? /1

-answers will depend on the insect or spider chosen

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11. If Canada was to become as warm as your insects native country and this insect or spider was introduced here, what might result? /2

-an insect may become a pest in terms of crops, it may prey on other important plants or insects, and it may disrupt pre-existing food webs.

-spiders may also disrupt pre-existing food webs because of the insects they prey on, which might be needed as food for other animals, or to control smaller insects they prey on.

Fish (Darwin's Dream Pond in the African Pavilion, Great Barrier Reef in the Australasia Pavilion, or Indo-Malaya Pavilion Aquarium)

Fish breathe oxygen that is dissolved in water, but as temperatures increase, the amount of oxygen that can dissolve in water decreases. Because of this, fish that require more oxygen, such as trout or salmon, must live in colder water.

12. Choose one of the locations named above, and name two fish species you can observe: /2

location(s): _____

species 1: _____

species 2: _____

13. Name one way global warming affects cold-water fish populations, and one way global warming affects warm-water fish populations. /2

-warmer water affects their ability to reproduce (all fish)

-there is less oxygen available in warmer water, so fish cannot breathe as easily (all fish, but this affects cold-water fish more)

-fish may move to cooler or deeper water to avoid water that is too warm (cold-water)

-warm-water fish may extend their ranges and move further north as waters warm up

14. How can these problems affect humans? /1

-if too many fish die or move, humans that rely on fish for food or income will be affected

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Climate Change and the Toronto Zoo

Name: _____

Date: _____

You have just received great news! Al Gore, former US vice president and the man behind *An Inconvenient Truth*, is returning to Canada. Part of his visit will be to the Toronto Zoo, and you have a chance to accompany him! Use your field trip today to uncover the truth surrounding the Zoo's animals and plants that are threatened by global warming.



Polar Bears (Americas outdoor exhibit)

Polar bears also hunt for seals from the ice, and must eat and gain fat reserves before the ice melts for the summer. With global warming, the ice melts earlier in the year and returns later, leaving the bears less of a chance to gain the weight that will sustain them throughout the summer. They or their cubs may die from this lack of food.

1. Observe the polar bear and its enclosure. What are two ways the enclosure is designed to be similar to the polar bear's natural habitat? /2

2. Canada's natural habitat loss, partly due to global warming, will be almost fifty percent in the next hundred years. Name and explain one difficulty polar bears might face if their habitat area is reduced by half. /2

3. Name one way the polar bear is adapted for survival in its habitat, and explain why this adaptation is useful. (Hint: Find out what is special about their fur) /2

American Alligators (Americas pavilion)

Alligators, along with some other reptiles, are influenced by temperature in an interesting way. The sex of their offspring, which hatch from eggs, is dependent on the temperature the eggs are exposed to. In the case of the American alligator, lower temperatures (30°C) will produce all females, and higher temperatures (34°C) will produce all males.

4. From the sign outside the alligator display, name and explain an earlier threat facing alligators. /2



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5. If global warming continues, what is a new threat to alligator populations?

/2

6. Alligators are a “keystone species”(see sign outside display). If their numbers are reduced, how will this affect other animals?

/2

Pavilion Climates (Indo-Malaya, Americas, or African pavilion)

7. Describe the climate in one of the following pavilions: Indo-Malaya, Americas or African. /1

8. Imagine that Canada’s climate was identical to that of this pavilion, what changes in the species composition of Canada do you think would you observe? /2

Insects/Spiders (Americas pavilion, Australasia pavilion, or Indo-Malaya pavilion)

9. Choose an insect or spider from one of the above locations: /1

_____ in the _____ pavilion.

10. Describe the insects or spiders habitat and environment and in what part of the world does it normally live? /1

11. If Canada was to become as warm as this country and this insect or spider was introduced, what might result? /2



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Fish (Darwin's Dream Pond in the African Pavilion, Great Barrier Reef in the Australasia Pavilion, or Indo-Malaya Pavilion Aquarium)

Fish breathe oxygen that is dissolved in water, but as temperatures increase, the amount of oxygen that can dissolve in water decreases. Because of this, fish that require more oxygen, such as trout or salmon, must live in colder water.

12. Choose one of the locations named above, and name two fish species you can observe: /2

location(s): _____

species 1: _____

species 2: _____

13. Name one way global warming affects cold-water fish populations, and one way global warming affects warm-water fish populations. /2

14. How can these problems affect humans? /1

POST-ZOO ACTIVITY: GREAT BARRIER REEF STUDENT REPORT

Time Needed: 75 minutes

Type of Activity: Individual research and a written report

Purpose: To make students aware of the immediate and current affects of climate change and how it affects a bio-diverse environment.

Curriculum Expectations:

ESV.03D: assess the global and regional consequences of climate change

ES1.07D: identify and describe global indicators of climate and climate change (e.g., glacial and polar ice, sea levels, wind patterns and global carbon budget);

ES2.06D: describe the natural and human causes of climate change on the planet and in particular to Canada (e.g., forest fires, deforestation, combustion of fossil fuels in transportation, utilization of fertilizers and industrial emissions);

ES3.01D: research and propose a course of action related to individual, regional or national initiatives (e.g., community action with industry, non-governmental organizations) to address climate change;

Materials Required:

- Access to a computer lab with internet access for research portion of assignment (although this could be assigned as a homework research assignment)
- Copies of Great Barrier Reef introduction sheet
- Copies of the assignment sheet

Prior Knowledge: Students should understand the basics of climate change and global warming, as well as the basics of photosynthesis. Students will have probably visited the Great Barrier Reef exhibit during their time at the Toronto Zoo.

Task: Students will research how climate change is affecting the Great Barrier Reef. They will use that information to write a one-to-two page report to the United Nations addressing the issue.

1. Distribute copies of introduction sheet to the students and have them read it, either independently or as a class aloud. Ask them how old they will be in 2035.
2. Introduce assignment to students. Distribute and read aloud the assignment sheet.
3. Instruct students to research the issue using the internet and searching news sites (suggestions: Google/Yahoo News, BBC News, CBC...)
4. Students will write and submit their report.

Notes:

1. Steps 3 and 4 can be made into a homework assignment, instead of class/computer lab time.
2. Students should be made aware that although the Great Barrier Reef is far from Canada, they should state in their letter why the Reef's health is important for the entire world.

Debrief: At the end of class, a discussion should take place linking what they researched to what they saw at the Toronto Zoo.

The Great Barrier Reef & Climate Change

What Is the Great Barrier Reef?

The Great Barrier Reef is a coral reef located on the northeast coast of Australia. It covers an area approximately 350,000 km. It can even be seen from outer space! The reef is made up of many millions of coral polyps. The reef is home to many thousands of species including whales, turtles, dolphins and over 200 types of birds that feed on sea grass located within the reef. Many thousands of other species of plants and animals also live, feed and reproduce in the reef. It is a gigantic bio-region and has been called by some as one of the "Wonders of the World".

Did You Know?

The Great Barrier Reef may become extinct in *your* lifetime! Most people tend to think of the consequences of climate change as something their grandchildren will suffer with, but in this case one of the greatest natural wonders of the world may disappear before you retire to play golf in funny-looking pants. The United Nations predicts that the reef will be functionally extinct by the year 2030!

What is Global Warming Doing to the Reef?

Many of the corals are living in the upper limit of their tolerance for high temperatures. When the water gets warm enough, the coral's photosynthesising zooxanthellae are damaged and turn to a bleached white colour (their skeletons). If the water cools within a month the coral can regain its strength and keep on living, but if the water does not cool the coral dies of starvation. Climate change has raised the earth's temperature and the United Nations predicts it is putting the Barrier Reef on a course for functional extinction! About 200,000 jobs are directly dependent on a healthy reef, generating about \$4.3 billion a year for the Australian economy.

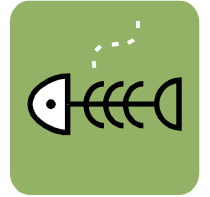
What happens to the Wildlife?

How will this affect the wildlife you saw at the Toronto Zoo? Some species of fish will move to cooler waters, leaving birds that feed on those fish to starve to death. Other types of fish won't be able to reproduce in the warmer waters. Some of the rare species of turtles found in the reef may have their sex ratios thrown off due to the fact that the temperature of the eggs determines what gender the turtle will be.

Save the Great Barrier Reef



As you are aware, the Great Barrier Reef is in trouble due to climate change! It is your job to write a one-page convincing report to the United Nations urging action on the issue.



The first thing you will need to do is research and understand the issue. This includes understanding how the Reef functions and why it is at risk because of warmer temperatures. The next thing to do is to prepare your report (politely) demanding action.

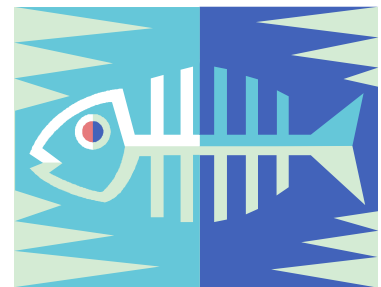


Requirements:

- Your report must be at least one page long in 12 pt. font, double-spaced.
- Remember to write it in a way that is easy to understand. Not everyone at the United Nations has a scientific background
- Make sure you include your visit to the Toronto Zoo. What animals did you see that would be threatened? Think back to the Australasian pavilion and the Barrier Reef exhibit.
- Be sure to explain why the Great Barrier Reef's health, although located far from us, is important to the entire World, not just the Oceania continent.

Marking Scheme (See Rubric):

Knowledge & Understanding:	/15
Thinking and Inquiry:	/10
Communication:	/25
Application:	/10
Total Marks:	/60



Suggested Rubric for Great Barrier Reef Report

	LEVEL 1	LEVEL 2	LEVEL 3	LEVEL 4
Knowledge & Understanding ____/15	Lack of understanding of central issues evident	Understanding present but not clear.	Demonstrates satisfactory understanding of issues and biological processes.	Demonstrates excellent comprehension of the issues and biological implications
Thinking and Inquiry ____/10	Prior knowledge and research use limited.	Prior knowledge and research apparent	Uses prior knowledge to build on research effectively	Prior knowledge and researched critically evaluated and used effectively.
Communication ____/25	Report is not convincing, lacks focus and is unclear & ineffective	Report's message is unclear, lacking focus	Report's message is clear and effective	Report is clear, concise, convincing and effective
Application ____/10	Many grammatical errors and poor structure. Not presented in a professional manner.	Some grammatical errors and other mechanical problems.	Minor grammatical errors. Well written.	No grammatical or spelling errors. Professional format. Effectively written.

Total: ____ / 60



Grade 10- Climate Change Package

Student Activity Evaluation Form

Please let us know how useful you found these activities. When you return a completed evaluation to us we will send you an attractive poster.

Please return to:

Education, Toronto Zoo
361 A Old Finch Ave.
Toronto, ON M1B 5K7
FAX: 416-392-5948

Date of visit: _____ Grade Level: _____

Subject: _____ Your Name: _____

School: _____

Activities Used: _____

Please rate the following on a scale of 1 to 5 : 1 poor; 2 fair; 3 satisfactory, 4 good, 5 excellent

1. The activities were appropriate for the curriculum. 1 2 3 4 5
2. The language level was suitable for your students. 1 2 3 4 5
3. The tasks were clearly explained and easily understood by the students. 1 2 3 4 5
4. Did you use this activity as part of your evaluation process for students? (Y / N)
5. Did you or will you be visiting the Toronto Zoo with your students? (Y / N)
6. Would you use these activities again? (Y / N)
7. How would you change the activity to be more useful?

8. Did you use any other Zoo teaching resource material? (Y / N) (What?)

9. Are there any other kinds of resources you would like the Zoo to provide to support your visit?

10. Do you have any other comments?