

# ENERGY



## **Cape Verde, 2008**

Wind turbines generate electricity in the mountains of Praia, the capital of Santiago Island.

## **INTRODUCTION**

Energy is vital to sustain our lives. We use energy in every aspect of our lives; growing, transporting food and cooking it, heating or cooling our homes, for light, in manufacturing and for powering our cars.

Currently most of the world's energy is from fossil fuels: coal, gas and oil. Burning of fossil fuels not only creates carbon dioxide, but affects our air quality and exacerbates climate change.

This effect particularly impacts children, and those most vulnerable are in developing countries. Youth in Canada are also affected; issues of asthma and breathing disorders are on the rise and quality of life is compromised.

Children have the right to clean air, and the good news is we can use renewable energy sources to help reduce our dependence on fossil fuels. We can start by understanding the issues and then doing our part to make a difference.

## ACTIVITIES

The curricula links below are addressed in this theme. For an extensive list of relevant provincial expectations/outcomes, refer to Appendices G and H: Curriculum Links on pages 142 and 146, and Appendix I for links in Alberta, Saskatchewan, Manitoba and Quebec.

Province	Course	Expectation/Learning Outcome
Ontario	SVN3M Environmental Science, Grade 11, University/College Preparation  <i>Conservation of Energy</i>	F1. assess the impact on society and the environment of the use of various renewable and non-renewable energy sources, and propose a plan to reduce energy consumption;  F3. demonstrate an understanding of energy production, consumption, and conservation with respect to a variety of renewable and non-renewable sources.
Ontario	SNC1P Science 9 Applied  <i>Physics</i>	E1. assess the major social, economic, and environmental costs and benefits of using electrical energy, distinguishing between renewable and non-renewable sources and propose a plan of action to reduce energy costs.
British Columbia	Science 9  <i>Physical Science: Characteristics of Electricity</i>	Relate electrical energy to power consumption.
British Columbia	Sustainable Resources 11	Describe the processes associated with the generation and use of energy resources.

## Setting the Stage

**Objective:** Students discuss viable renewable energy sources.

**Time:** 15 minutes

### Materials

- Renewable Energy Cards (optional)
- Renewable Energy Defined answer key
- Appendix E: Reflect and Act (page 139)

## ACTIVITY

1. Distribute Appendix E: Reflect and Act (page 139) to each student and ask them to journal lessons learned during discussion and activities around the theme.
2. Arrange the class into six groups. Give each group a set of the Renewable Energy Cards. If the students have basic knowledge of the different renewable energy sources, play this game without the cards, or list of the answers.
3. Read to the class the first definition (only) from the Renewable Energy Defined answer key. Each group is to decide what renewable energy source matches the definition, and choose a renewable energy card from their deck. Once that card is played (or the answer is recorded if you did not use the cards), that card or answer cannot be used again.
4. Discuss the answers. You might want to discuss the advantages and disadvantages of each.

Nim Dolma is 18 and a grade 4 dropout because her parents could no longer afford her education. Today she is back at school thanks to the Non-Formal Education Programme (NFE), established by the government of Bhutan in 1992 with the support of UNICEF.

Classes are held in the evenings to accommodate students who have to work during the day, like Nim who is very busy collecting bamboo, weaving blankets, etc. during the day. In the evenings it is dark outside; since there is no electricity in the school, solar lanterns light the classrooms at Sakten Primary School. For more information see <http://www.unicef.org>.

## Renewable Energy Defined

### ANSWER KEY

Renewable Energy Source	Definition
Wind	This energy source works well in places like Kingston, Ontario. This source emits no carbon dioxide. We have an unlimited supply, and it works if set up on a flat expanse with no barriers in its way.
Geothermal	This energy source uses the heat from the interior of the earth.
Solar	This energy source uses a certain radiation. This source is extremely powerful and a perpetual resource.
Heat recovery	This energy source collects the warmth from sewer waste, drainwater, landfills and ventilation air.
Biomass	This energy source is an organic material that can be burned or converted to other energy forms like methane gas or transportation fuels.
Water from rivers and dams	The energy from this source is captured falling from a vertical distance. The higher the fall, the greater potential for energy.
Off shore tidal	The energy from this source harnesses the power of the ocean. This is a large underwater 'farm' remote from the shoreline.
Hydrogen	A colorless, highly flammable gaseous element, the lightest of all gases and the most abundant element in the universe, used in the production of synthetic ammonia and methanol, and in petroleum refining.

**RENEWABLE ENERGY CARDS**

Wind	Biomass
Geothermal	Rivers and dams
Solar	Off shore tidal
Heat recovery	Hydrogen

## Solar Café

**Objective:** To learn about and construct a simple solar oven and discover how using solar technology helps in the fight against climate change.

**Time:** 60 minutes (or longer)

### Materials

- A reflective accordion-folding car sunshade (6)
- A cake rack (or wire frame or grill) (6)
- 12 cm (4 ½ in.) of Velcro
- Black pot (6)
- Bucket or plastic wastebasket (6)
- A plastic baking bag (6)
- Scissors (6)
- Needle and thread (6)

According to the World Health Organization, in 23 countries, more than 10% of deaths are due to two environmental risk factors: unsafe water and indoor air pollution due to solid fuel use for cooking. Around the world, children under five are the main victims and make up 74% of these deaths. For more information see [http://www.who.int/indoorair/publications/indoor\\_air\\_national\\_burden\\_estimate\\_revised.pdf](http://www.who.int/indoorair/publications/indoor_air_national_burden_estimate_revised.pdf).

## ACTIVITY

1. Arrange the class into six groups.
2. Brainstorm with the class ways in which people who cook creating indoor pollution can develop a healthier way to cook.
3. Explain that one solution is a solar oven, which cooks food using only the power of the sun. Tell students that they will work together to build solar ovens. GreenLearning has a good backgrounder on solar heat at <http://www.re-energy.ca/docs/solar-heat-bg.pdf>.
4. Here are the instructions written by Kathy Dahl-Bredine from Oaxaca, Mexico or, you can visit [http://solarcooking.wikia.com/wiki/Kathy\\_dahl-Bredine](http://solarcooking.wikia.com/wiki/Kathy_dahl-Bredine) or Solar Cookers International at <http://solarcookers.org/> for more details:

- Lay the sunshade out with the notched side toward you.
- Cut the Velcro into three pieces, each about 4 cm long.
- Hand sew one half of each piece, evenly spaced, onto the edge to the left of the notch; sew the matching half of each piece onto the underneath side to the right of the notch, so that they fit together when the two sides are brought together to form a funnel.
- Press the Velcro pieces together, and set the funnel on top of a bucket or a round or rectangular plastic wastebasket.
- Place a black pot on top of a square cake rack placed inside a plastic baking bag. A standard size rack in the U.S. is 25 cm (10 in.). This is placed inside the funnel, so that the rack rests on the top edges of the bucket or wastebasket. Since the sunshade material is soft and flexible, the rack is necessary to support the pot. It also allows the sun's rays to shine down under the pot and reflect on all sides. If such a rack is not available, a wire

If you want to add a challenge to the solar oven construction, you might want to give the students the supplies only, with no directions. The group must work together and construct an oven that works. This is best done on a sunny day so groups can test the oven.

The other option is to give students a project to research solar ovens, draft plans and construct the oven. You could make it into a solar challenge with the winning group being the first to bring water to a certain temperature.

frame could be made to work as well. Note: the flexible material will squash down around the sides of the rack.

- The funnel can be tilted in the direction of the sun.

5. If there is time, share other examples of solar ovens:

- GreenLearning has background information and instructions on how to build your own solar oven - <http://www.re-energy.ca/docs/solaroven-cp.pdf>
- PBS — Nova Teachers has detailed plans, with follow-up resources, on how to build a sophisticated solar oven at [http://www.pbs.org/wgbh/nova/teachers/activities/3406\\_solar.html#materials](http://www.pbs.org/wgbh/nova/teachers/activities/3406_solar.html#materials).
- Try to construct an oven from a pizza box and aluminum foil.

### Keep the discussion going

Besides reducing indoor air pollution, why else would people want a solar oven?

*Using solar power eliminates the need for fossil fuels. Also, in some countries it is a matter of personal safety. In Darfur, for example, women who have solar ovens don't need to leave the camp to collect firewood, helping keep them safe from attack.*

How can we further use solar power in every part of the world to lessen the effects of climate change on children?

*Solar water pumps help with water collection from wells. Learn about Somali villages investing in solar-powered pumps at [http://www.unicef.org/wash/somalia\\_44827.html](http://www.unicef.org/wash/somalia_44827.html).*



## YOUTH TAKE ACTION

### Challenge for Change!

Distribute Student Handout #27: Youth Take Action (page 112) and discuss the inspirational profiles. Instruct students (groups, pairs or individuals) to select ONE student project listed under the Challenge for Change Action, or invite them to create their own challenge. Set appropriate timelines and criteria. Evaluate each project using Appendix C: Culminating Task Rubric on page 137.

## BACKGROUND ENERGY

### What are the issues?

The world's primary source of energy is fossil fuels. Not only are they a finite fuel source (non-renewable), but using fossil fuels also creates carbon dioxide, a major contributor to climate change. As we cut down trees faster than they can replenish in many parts of the world, we are also losing the valuable carbon sinks to store the excess CO<sub>2</sub> created when we burn fossil fuels.

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### Energy facts in developing countries:

- The burning of fossil fuels is accelerating climate change.
- 80% of the population that has no access to electricity lives in developing countries, mainly in South Asia and sub-Saharan Africa.<sup>1</sup>
- Many people in developing countries do not have electricity.
- It is estimated that currently 1.6 billion people do not have access to electricity, and 2.4 billion people are lacking the modern fuels necessary for cooking and heating their homes safely.
- More than 3 billion people must use wood, crop waste and/or dung to cook with and heat their homes. One of the immediate issues related to these energy sources is that they produce large quantities of smoke inside buildings, which contributes to the deaths of 800,000 children annually, due to their immature respiratory systems. In addition to the health effects of these energy choices, communities are affected on a long-term basis by the fact that their local resources and natural environment are being degraded.<sup>2</sup>

### Renewable solutions

We need to find ways to provide people in developing countries (and developed countries) with renewable energy sources such as wind, solar, biomass, geothermal, etc. instead of burning solid fuels. Not only would the immediate concerns of air pollution and associated health issues be eliminated, but the planet would also benefit from the reduction in carbon being released into the atmosphere. We need to end our world dependency on fossil fuels and this is starting to happen in parts of the world. For instance, China has programs to support affordable solar energy to pump water, produce electricity and heat water. The government is also promoting household biogas plants to treat human excreta.<sup>3</sup>

*"Yes, I do agree that trees shouldn't be cut down unnecessarily, but we should think about those people who have to cut down trees so that they may survive. The major cause of excess tree abuse is the cutting of trees for fuel. People around the world lack basic necessities such as fuel and need to chop down trees if they want heat and warmth. Every government needs to make an effort in providing alternative resources for our mission to succeed." Amre, age 18, Somalia<sup>4</sup>*

To learn more about climate change connected to energy, view the UNICEF UK Climate Change Report 2008: *Our climate, our children, our responsibility* at <http://www.unicef.org.uk/Documents/Publications/climate-change.pdf>

### NOTES

1. UNICEF UK, *Our climate, our children, our responsibility*, 2008, p. 17.
2. Ibid.
3. Ibid.
4. Ibid.

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## Student Handout #27

### YOUTH TAKE ACTION

#### Challenge for Change action items

Be part of the solution! Complete ONE project from the list below or create your own! You will be evaluated on criteria including knowledge of the issue, expression of ideas and connections made between personal, local and global views of the issue.

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*People-powered transit is the most environmentally friendly way to travel! If we can walk, run, or bike to our places of destination, we drastically reduce the use of fossil fuels in our lives.*

**PROJECT:** Organize a commuter challenge for both students and teachers with a Bike to School Day in May (or any other time of year)! Make it a fun event with refreshments for all the cyclists. Look into having a lunch demonstration of music and/or bike tricks.

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*Youth need to spread the message on how to get our planet out of our energy crisis.*

**PROJECT:** Partner with an elementary school in your area. Develop a 'Save Energy' board game or storybook and share this with the elementary students.

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*Research solar ovens that can be purchased and distributed to places in the world that primarily cook indoors using fossil fuels. Check out <http://www.solarovens.org/> to learn more.*

**PROJECT:** Get your school involved in a fundraiser to sponsor a family for a solar oven, or organize a Solar Oven Cook-Off at the school. Teams enter their solar oven design and have to cook a simple recipe. The judges decide on the best solar meal!

#### King David secondary school, Vancouver, BC

Students at King David Secondary School have raised money to support The Solar Cooker Project, which supplies solar ovens to women in Darfur, a region of Sudan. The ovens allow women to stay close to their families to prepare meals instead of leaving the camp to collect firewood for cooking. Leaving the camp can result in danger to women and children in this area of the world. For more information see <http://www.jewishworldwatch.org>.

#### Mount Kilimanjaro, Tanzania

Ten amazing youth from impoverished urban centres in Kenya, Tanzania and Ghana will soon be challenged even further! They will join a team that will attempt to climb Mount Kilimanjaro. The purpose of this adventure is to draw attention to the global effects of climate change due to our dependency on fossil fuels and how it can devastate urban centres as it deals with increased population, unemployment, and unacceptable health care systems. For more information see <http://www.un.org>.

# REFLECT. ADAPT. MITIGATE.

## UN Climate Change Conference

**Objective:** To explain the varying political responses by governments in approaching global environmental issues

**Time:** 2 days

**Materials:**

- One copy of Student Handout #28: Expert Team Preparation per expert group.
- One copy of Student Handout #28: UN Climate Change Conference Assignment per country group. Fill in the assigned countries. Consider assigning countries like: China, USA, Canada, Brazil, Russia, India, Bangladesh, Denmark and Iceland.
- One copy of Handout #30: Peer Assessment Rubric per student.

## ACTIVITY

### Expert Panels:

1. Organize the class into “expert groups” of (preferably three to four) students per topic:
  - a. Team 1: Climate Change Basics
  - b. Team 2: Effects of Climate Change
  - c. Team 3: Taking Action on Climate Change (Industry/National/International level)
  - d. Team 4: Taking Action on Climate Change (Personal/Community/Organization level)
  - e. For large classes, have more than one team exploring the same topic.
2. Explain that each group has been asked to join their country’s delegation to the next Climate Change Summit or related event. Discuss the UN Conference of the Parties. Research the *UN Conference of the Parties No. 15* to inform your discussion. (**Optional extension:** Have students research the history and discussions of all the UN Conferences of the Parties to broaden their understanding on the subject.)
3. Before they leave for the summit, each expert group will need to brush up on their area of expertise. Have each expert group explore an aspect of climate change. Hand out one *Expert Team Preparation* to each team and one *Peer Assessment Rubric* to each student.
4. Have teams read their assignments and peer assessment forms and ask any relevant questions.
5. Teams conduct research and discuss findings together, and ensure that everyone has an equal understanding of the topic. Teams will be responsible for recording all they have learned and should devise a way to record their findings and share with all team members.
6. When the research is complete, have students each fill in one *Peer Assessment*. Teams are then reorganized so that new groups are formed with one expert on each topic in each group. (Be careful in instances where you had more than one team studying the same topic.)

### Country Position Presentations:

1. With the new groups formed, explain that each group represents a different country. Hand out one *Climate Change Conference Assignment* to each country group. Review the steps of the assignment. Answer any questions about the assignment.
2. Students conduct their research and work together to prepare their Country Presentation. These presentations should be five to seven minutes in length. Encourage students to use creativity when preparing their presentation and imagine themselves as that country's delegation. Highlight the importance of perspective and point-of-view.
3. On Conference day, invite students to dress professionally and act the part. Enhance the experience by focusing on details like: using the school gym or auditorium to host the Conference, having linen-covered tables of beverages and snacks, providing team placards and individual name cards that identify their area of expertise, and flags to represent each country. Make the experience formal to add to the excitement! Students could also invite local media to attend the event, to get their message out.
4. As chair of the Conference, welcome the leaders and delegates. Alternatively you could increase student participation by, or holding a student vote to elect the chair of the conference. . Conduct the five to seven minute presentations from each country. Ask groups to keep note of any questions or points of rebuttal that arise for them. When all presentations are complete, open the floor for a question and discussion period. Act as a moderator to encourage all groups to participate. Have students volunteer to record major points of interest up at the front for all to see.
5. Adjourn for the day at this point so that you can draft a statement that does its best to represent the discussions of the day and puts forth recommendations for moving forward on climate change. This statement will act as a basis for discussion when you reconvene.
6. When you reconvene, have countries debate and discuss your proposed statement. Prompt debate with the following questions:
  - a. Which parts of the statement accurately reflect your country positions on climate change?
  - b. Which parts do you wish to amend or change? Why?
  - c. Can your country accept this statement and sign an agreement based on it? Why or why not?
7. At the conclusion of the Conference, when a statement has been adjusted and agreed upon, have a mock signing where countries that are comfortable with the statement agree to formalize it by signing on. Have some students take photos of this as it happens. Make it fun and dramatic!
8. Evaluate student understanding of climate change, its effects and possible actions and solutions in addition to presentation and organizational skills using the rubric in Appendix C as a guide.

See tips on public speaking, country profiles, and drafting position papers from model UN conference websites:

<http://www.unac.org/modelun/>

<http://www.cahsmun.org/index.html>

<http://www.unausa.org/global-classrooms-model-un/how-to-participate/model-un-preparation>

## Keep the Discussion Going

Have students write news articles about the results of the Conference of the Parties. Use the photos taken that day to supplement the articles. Submit the articles to local newspapers or to the school board newsletter.

Have students write letters to government leaders, including the recommendations and suggestions that came out of this event.

## What Can We Do?

**Objectives:** By the end of this activity participants will be able to:

1. Present strategies to encourage and increase mitigation
2. Name some of the main stakeholders responsible for the implementation of actions and policies aimed at increasing mitigation
3. Explain how they and young people in general can become active and support mitigation

**Time:** 1 hour

**Materials:**

- Flipchart and markers
- Post-its
- Paper and pens
- Movie clip: *Lessons Save Lives: the Story of Tilly Smith*  
<http://www.youtube.com/watch?v=E0yrONL1Q3g>

## ACTIVITY

1. Ask students by a show of hands, whether they feel they can help in addressing climate change. Ask students to explain their responses. View the movie clip *Lessons Save Lives*, as an example of how they can make a difference. Prior to viewing the clip, ask students to think about a quality that Tilly exemplified which enabled her to make a difference.
2. After viewing the clip, debrief with the students, and ask them again, whether the clip inspired them to believe they can make a change.
3. Remind students that the effects of climate change are stronger in some parts of the world, mainly in developing countries that already face other problems (poverty, hunger, HIV/AIDS, etc.). This is not “fair”, but it is the reality. However, people in industrialized countries can do something about this, and the key work is “mitigation” (taking action to reduce greenhouse gas emissions. It is about transforming the way that individuals, governments and industry produce and use energy, changing activities to reduce or eliminate emissions and developing clean and efficient infrastructure where it does not currently exist. )
4. Brainstorm all possible strategies that could be implemented to increase mitigation in your country. List them on the flipchart until you have about 10 suggestions from participants.
5. Draw a six-level “responsibilities socio-ecological model” on another flipchart (see appendix for an

example of the model) and name each level: you / family / school / local community / national government / international. Explain that this represents the different levels of responsibility to implement the different actions.

6. Explain to participants that for each of the suggested actions, they shall now identify one/several actors who can be responsible for its implementation at different (one or more) levels of the model. Tell them that they might find that some of the actions could be implemented by different actors at different levels/settings. For instance, if the suggested action is “save water”, something can be done at each level of the model: by yourself by lowering your consumption (YOU level), by other members of your family at home (FAMILY level), by the school by deciding to change broken taps or issue new water-use rules (SCHOOL level), at the LOCAL COMMUNITY level and at the NATIONAL GOVERNMENT level, which might, for instance, issue a new law. Do one or two examples all together.
7. Form small groups of two or three. Randomly distribute the actions suggested at the beginning of the activity to the different groups. Give them a few minutes to discuss and figure out which actors(s) they think should be responsible for the implementation of each action, at which level/setting and what they could do. Then, ask each group to note their ideas on Post-its (next to the action) and stick them on the right spot in the responsibility scheme, providing an explanation.
8. Now that they have an overview of the different levels of responsibilities, ask the groups if they have any new ideas for actions. Add these to the scheme.
9. Ask the groups if and how they, as young people, could contribute to making these actions implemented by the different actors identified. Of course, some actions clearly concern them directly (those in the “you” level), but what can young people do to get action implemented at the community or even national levels? The key word here is “advocacy”, that is, exerting pressure to bring those actors to implement these actions. How? Brainstorm advocacy strategies (ex. campaigns, public debates, awareness-raising actions, etc.). Note those down on the flipchart.

### **Keep the Discussion Going:**

Ask participants what they learned in this activity. Did they know that young people could do so much? Would they feel ready to undertake actions, or to change some of their habits? Do they think that it would be easy/difficult? Why?

## RESPONSIBILITIES SCHEME (SOCIO-ECOLOGICAL MODEL):



## Climate Superheroes

**Objectives:** By the end of the activity participants will be able to:

- Explain that action towards more mitigation can be supported by different stakeholders with complementary roles
- Present the role and possible action of (at least) three of those stakeholders.

**Time:** 1 hour

**Material:**

- Flipchart and markers
- Character cards (see Appendix)

### ACTIVITY

1. Introduce the activity by asking the group who are the people or institutions that are important for combating climate change, and why (e.g. politicians/authorities; the media; the school; associations; etc).
2. Tell the group that in this activity they are going to interview potential candidates to join the “Climate Change Superhero Dream Trio”. The entire group will be the interview panel. Present the candidates, making sure that everyone is familiar with their usual activities.
3. Form eight small groups. Give each group a character card (one copy per participant). Explain that they will be that character and will have to convince the interview panel (the rest of the group) why they should get to join the Climate Change Superhero Dream Trio.
4. Give them a few minutes to read through their character cards individually and then invite groups to have a discussion about why their character is essential for combating climate change. Tell them that they should prepare a two-minute speech or presentation to convince the interview panel. (Give them 10 minutes to prepare this.)
5. When everyone is ready, get the group together and give each character group two minutes to convince the interview panel why they should be on the trio. (Only three places are available!)
6. When everyone has had a go, get the groups to vote on the three characters who they think should be in the trio. (They can’t vote for their own character.)
7. When the trio is sorted out, split the group in three (one per superhero), and ask each group to come up with a list of actions that their superhero could initiate to combat climate change. Give 5 to 10 minutes for this and then let each group report back and conclude the activity with the debriefing discussion.

### Keep the Discussion Going

Ask the group how they found this activity. Was it easy/difficult to play the role of someone else? Did they learn anything from this activity?

Do they think that the three superheroes could combat climate change alone? What/who else is needed to succeed at this big challenge? What about the other characters?

Explain that in order to combat climate change, everyone must act, and that there are many things that can be done depending on who you are and what your position/job is, but that if we want to achieve something, action is needed by every single person!

## Debating the Route to Sustainability

**Objectives:** By the end of this activity participants will be able to:

1. Formulate and present strong arguments in support of a particular viewpoint
2. Assess the impact of human activities on the sustainability of ecosystems, and evaluate the effectiveness of courses of action intended to remedy or mitigate negative impact
3. Assess environmental challenges facing Canadians
4. Debate the concept of sustainability

**Time:** 2 days

**Materials:**

- Flipchart and markers
- Paper and pens
- Student Handout 32 – Initial Argument Handout, page 127
- Student Handout 33 – Argument Package Handout, page 128
- Research tools: computer, laptop, tablet, smart phone, and/or library
- Video clip about the causes of global warming: <http://video.about.com/environment/What-Are-Causes-of-Global-Warming.htm> (1 min 58sec)

## ACTIVITY

1. Ask participants to explain the various ways that people can work to combat climate change and other issues related to environmental sustainability. In order to guide discussion toward the debate topic, have participants view the video clip about the causes of global warming.
2. After viewing the clip, debrief with participants, ask them if they thought of any new ideas related to the topics discussed in the video.
3. Remind participants of the two overarching themes of environmental sustainability discussed in previous lessons; namely, individual activism and the development of renewable energy technologies. Be sure to explain that for the purpose of this activity, the participants will be made to choose one course of action to advocate for. However, it is important to remember that the two actions should work together rather than apart to combat climate change.
4. Record the debate question on the flipchart: *What do you think should be the main focus of environmental sustainability, developing and implementing large-scale green energy technologies or individual activism?* Explain that participants will choose one course of action to advocate for and that they will be placed into small groups (groups of 3) according to their chosen viewpoint.
5. Separate participants into groups and provide each group with an initial argument handout.

6. Instruct participants to use the initial argument handout to construct three affirmative arguments (arguments supporting their position rather than negating the opposition). For each argument the participants must include a justification explaining *why* the argument is true and *why* the argument is important.
7. Once participants have finished formulating their 3 initial arguments, adjourn for the day. Explain that the next step will be to present their arguments to the other small groups advocating a similar viewpoint.
8. Begin by separating the class into 2 large groups according to which viewpoint they have chosen to advocate. Explain that everyone should present their arguments from the previous lesson to their group. Once all of the arguments have been presented, the group should choose three arguments that they will use in tomorrow's debate.
9. Provide both groups with a copy of the argument package handout. Explain that they are to expand and refine their chosen affirmative arguments. In addition, explain that they are meant to complete their argument package by anticipating their opposition's logic and formulate at least 3 defensive arguments. Remind the participants that they should strengthen their arguments with facts and calculations.
10. Explain that you will be acting as the moderator of the debate and that you will instruct each side when it is their turn to speak. Remind participants that they must uphold debate decorum and therefore should keep all ideas and comments to themselves until the moderator has called on them. Once the format has been explained, begin the debate.

### **Keep the Discussion Going:**

Ask participants what they learned from this activity. Was their opinion solidified or altered by the debate? Could they identify which arguments were the strongest? What characteristics made specific arguments stand out as being strong? Do they truly believe one course of action is more reasonable or important than the others? How do they think the two courses of action can work in tandem to combat climate change?

## Student Handout #28

### EXPERT TEAM PREPARATION

#### Develop your expertise on the effects of climate change

Some questions to help focus your research:

- How does global warming affect species and their natural habitats?
- How does global warming affect weather patterns?
- How will human food security be affected by global warming?
- Why are the world's poor (particularly children) most vulnerable to the effects of climate change?
- What has been the history of climate change science up until now?

A few places to start looking for answers:

- UNICEF Report: Our children, our climate, our responsibility  
<http://www.unicef.org.uk/Documents/Publications/climate-change.pdf>
- CBC – Climate Change [www.cbc.ca/news/background/climatechange/](http://www.cbc.ca/news/background/climatechange/)
- WWF Climate, Carbon and Energy [http://panda.org/what\\_we\\_do/footprint/climate\\_carbon\\_energy/](http://panda.org/what_we_do/footprint/climate_carbon_energy/)

#### Develop your expertise on the basics of climate change

Some questions to help focus your research:

- What is climate change? What is global warming?
- What are greenhouse gases (GHGs)? What are fossil fuels?
- What is the greenhouse effect? What are carbon sinks?
- What evidence supports the idea that humans are causing global climate change?
- What has been the history of climate change science up until now?

A few places to start looking for answers:

- Carbon Sinks, FERN <http://www.fern.org/pages/climate/carbon.html>
- UN Framework Convention on Climate Change <http://unfccc.int/2860.php>
- BBC – Climate Change <http://www.bbc.co.uk/sn/hottopics/climatechange/>

#### Develop your expertise on taking action on climate change (industry/national/international levels)

Focus your research on answering these questions:

- What are some examples of companies taking steps to reduce their greenhouse gas emissions?
- What is the Kyoto Protocol? What have countries committed to under it?
- What is the Conference of the Parties No. 15? What is the history leading up to this meeting?
- What are some examples of programs that national governments are finding successful for reducing greenhouse gas emissions? Which countries are undertaking them?

A few places to start looking for answers:

- UN Framework Convention on Climate Change <http://unfccc.int/2860.php>

- The NEW Climate Deal: A pocket guide  
[www.ourplanet.com/imqversn/WWF\\_climate\\_guide/WWF\\_Climate\\_Deal.pdf](http://www.ourplanet.com/imqversn/WWF_climate_guide/WWF_Climate_Deal.pdf)

**Develop your expertise on taking action on climate change (personal/community/organizational levels)**

Focus your research on answering these questions:

- What can people do at a personal level to reduce greenhouse gas emissions? Does it really help?
- What innovative steps are communities and cities taking to reduce greenhouse gas emissions?
- How are climate change organizations motivating others to tackle climate change?
- What are some examples of youth-led initiatives to tackle climate change?

A few places to start looking for answers:

- [UNICEF](http://voicesofyouth.org/) Voices of Youth: <http://voicesofyouth.org/>
- Climate Change: Take Action Now! A guide to supporting the local actions of children and young people, with special emphasis on girls and young women:  
[http://www.ifrc.org/Global/Publications/youth/AYCEOs\\_climate-change\\_take-action-now\\_EN.pdf](http://www.ifrc.org/Global/Publications/youth/AYCEOs_climate-change_take-action-now_EN.pdf)
- Climate Change, and Child Rights Education Kit: <http://www.unicef.ca/en/teachers/article/climate-change-and-children%E2%80%99s-rights>
- Climate Change Youth Guide to Action, Taking It Global:  
<http://www.takingitglobal.org/action/guide/>

## Student Handout #29

### UNITED NATIONS CLIMATE CHANGE CONFERENCE ASSIGNMENT

Congratulations! You have all been chosen as experts in your field, to form \_\_\_\_\_'s (country) delegation to the Climate Change Conference of the Parties this year.

This climate change conference will be the most important yet, and your expertise will be crucial in representing the interests of \_\_\_\_\_ (country) at this high-level meeting.

The Conference of the Parties is being held on \_\_\_\_\_. (date) Your meals, accommodations and travel have all been arranged.

We appreciate your effort in this phase as you prepare together to address the agenda (below) as representatives of \_\_\_\_\_. (country)

All the best in your preparation,

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Chair of the UN Climate Change Conference of the Parties

#### Conference of the Parties Agenda

1. Country presentations (each five to seven minutes in length)
2. Question period, rebuttal, discussion among countries
3. Agreement/statement drafted and discussed
4. Signing of agreement

#### Your task:

Prepare a five to seven minute presentation that communicates:

- Your country's position on recent climate change protocols and flexible mechanisms
- Your country's recommendations for addressing climate change
- Commitments your country is willing to make

## Student Handout #30

### PEER ASSESSMENT RUBRIC

Peer Assessment Criteria	Student Names
<p>Put each group member's name in a column (include yourself).</p> <p>For each criteria below—give a mark out of 4.</p> <p>4—<u>Always</u> demonstrates the quality</p> <p>3—<u>Frequently</u> demonstrates the quality</p> <p>2—<u>Sometimes</u> demonstrates the quality</p> <p>1—<u>Rarely</u> demonstrates the quality</p>	
Contributes to group planning, discussion, and decision-making.	
Conducts thorough research and uses reliable sources.	
Produces high quality work.	
Contributes creative ideas with a positive attitude.	
Works with others and is willing to compromise.	
Was a valuable member of the team overall.	
<b>TOTAL ( / 25 )</b>	

# Student Handout #31

## CHARACTER CARDS

<p><b>JOURNALISTS</b></p> <p>You can help uncover the real situation and tell others! You can keep the pressure on governments and scientists by reporting on progress. You can also tell the world about communities already affected by climate change and highlight where support and assistance is needed.</p> <p><b>BUT</b> – People could ignore what you say, or the newspaper you work for might not be interested in printing stories about climate change. There might not be enough people who will read what you write.</p>	<p><b>YOUNG PEOPLE AND COMMUNITIES</b></p> <p>You can reduce your carbon impact by making changes in the way you live. You can keep pressure on businesses and governments to make sure they are doing everything in their power to reduce their carbon footprint in your country. You can also campaign or raise money to ensure that communities around the world are given the support they need to deal with the effects of climate change.</p> <p><b>BUT</b> – You need time, commitment and perseverance. And everyone might not be interested.</p>
<p><b>POLITICIANS</b></p> <p>You have the power to make important decisions and laws that can limit the amount of carbon that businesses are allowed to produce. You can make sure any cars in your country are fuel-efficient. You can invest money to support scientists to innovate and come up with new green technology.</p> <p><b>BUT</b> – Your elections are coming up and you don't want to make any changes that will make you unpopular (like charging people more to fly by aeroplane). You want to stay in power. And, even without your elections looming, there may be a lack of public support for bold decisions!</p>	<p><b>SCIENTISTS</b></p> <p>You can make new discoveries and invent new ways of making energy that produce no carbon. Your inventions could revolutionise the world. You could also come up with things that will help communities already affected by climate change deal with their situation.</p> <p><b>BUT</b> – You rely on funding from governments and businesses, and you can only explore the things they ask you to. Plus your inventions will take years to develop and will need to be tested before they can be produced.</p>
<p><b>BUSINESS LEADERS</b></p> <p>You have great power to make changes. If you are a car manufacturer you could make sure all your cars are fuel-efficient. Or if you are an electricity company you could build wind farms instead of coal-powered generators. This would have a massive impact on climate change!</p> <p><b>BUT</b> – You have to make as much money as possible for your shareholders, or else you will lose your job.</p>	<p><b>CAMPAIGNERS AND ACTIVISTS</b></p> <p>You can research what governments and businesses are doing to address climate change, and you can campaign and lobby for them to do more. You can encourage communities to get involved – and give them the tools to contact their MPs to keep the pressure on governments to make important decisions on climate change.</p> <p><b>BUT</b> – You have very little money to support your efforts. People might not listen to you. You might be going up against very wealthy and powerful people.</p>

<p><b>NGO WORKERS IN COUNTRIES AFFECTED BY CLIMATE CHANGE</b></p> <p>You can help the communities already facing the devastating effects of climate change. You can provide mosquito nets and training for people who aren't used to dealing with malaria. You can support communities in finding solutions to water and food shortages. You can also use your influence to lobby governments and businesses to cut carbon emissions.</p> <p><b>BUT</b> – There are so many problems you are already dealing with, such as supporting efforts against poverty and HIV. And you only have a limited amount of money and just a few staff members. You get funding from individual donations, businesses and governments, none of which is guaranteed to continue at the same levels.</p>	<p><b>TEACHERS</b></p> <p>You can inform your students about climate change and its impact on children around the world. You can discuss with them about strategies to reduce their carbon footprint as well as their families' footprints. You can also inform your colleagues and the school staff about how to reduce your school's carbon footprint.</p> <p><b>BUT</b> – You only have a little time to work on these topics, as you have to follow a teaching program with very little room and time for extra topics.</p>
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## Student Handout #32

### ARGUMENT PACKAGE HANDOUT

Formulate 3 affirmative arguments and record them below. Be sure to identify why each argument is *true* and *important*.

AFFIRMATIVE ARGUMENTS	
Proposed course of action:	
Argument One	
Argument Two	
Argument Three	

ARGUMENT ONE	
Why is it true?	
Why is it important?	
ARGUMENT TWO	
Why is it true?	
Why is it important?	
ARGUMENT THREE	
Why is it true?	
Why is it important?	

## Student Handout #33

### ARGUMENT PACKAGE HANDOUT

Formulate 3 affirmative arguments and 3 negative arguments and record them below. Be sure to include facts and calculations as evidence.

AFFIRMATIVE ARGUMENTS (OFFENSIVE)	
Argument One	
Argument Two	
Argument Three	

NEGATIVE ARGUMENTS (DEFENSIVE)	
Argument One	
Argument Two	
Argument Three	

## FURTHER RESOURCES

**Advocacy Guide** presented by the World Health Organization highlights the decade between 2005 and 2015 as critical years to focus global attention on water. This guide shares ways we can demonstrate our personal commitment to organizing events around World Water Day (WWD), so that we can ensure that everyone is aware of the urgency of the goals to be achieved between 2005 and 2015.

[http://www.who.int/water\\_sanitation\\_health/en/2005advocacyguide.pdf](http://www.who.int/water_sanitation_health/en/2005advocacyguide.pdf)

**Association for Canadian educational resources (ACER)** offers a program that enables students, clubs, groups, or individuals to accurately collect data to monitor tree growth.

<http://acer-acre.ca/resources/resources-for-teachers>

**Campus Climate Challenge** is the largest youth mobilization to stop global warming. This international effort is taking place on more than 600 campuses in the US and Canada. Through the Challenge, youth are leading the world toward clean energy solutions. Students are working to transform their campuses into models of sustainability by passing climate neutrality, efficiency, transportation, green building and clean energy policies.

<http://ssc.sierraclub.org/get-involved/campaigns/index.html>

**CarboSchools** is a European Union-based program that connects climate change researchers with secondary school teachers.

<http://www.carboeurope.org/education/>

**ClimateChange.org** unites 42 organizations and over 629 local groups in 56 states and provinces. Together, they have passed hundreds of local and regional climate policies.

<http://www.climatechallenge.org/>

**Climate Change Adaptation and Disaster Risk Reduction in the Education Sector** provides guidance on policy and planning for sustainable development throughout the education sector in both non-formal and formal learning places at all levels of action, from national to local.

[http://www.unicef.org/education/files/UNICEF-ClimateChange-ResourceManual-lores-c\(1\).pdf](http://www.unicef.org/education/files/UNICEF-ClimateChange-ResourceManual-lores-c(1).pdf)

**Climate Change and Environmental Education (UNICEF Canada)** explores the impact of climate change basic education and gender equality.

[http://www.unicef.org/education/bege\\_61668.html](http://www.unicef.org/education/bege_61668.html)

### Climate Change: Connections and solutions

Download this 2-week unit for grades 9-12 from the organization *Facing the Future*.

[www.facingthefuture.org/Curriculum/downloadFreeCurriculum/tabid/114/default.aspx](http://www.facingthefuture.org/Curriculum/downloadFreeCurriculum/tabid/114/default.aspx)

### Climate Change: Take Action Now!

A guide to supporting the local actions of children and young people, with special emphasis on girls and young women.

[http://www.ifrc.org/Global/Publications/youth/AYCEOs\\_climate-change\\_take-action-now\\_EN.pdf](http://www.ifrc.org/Global/Publications/youth/AYCEOs_climate-change_take-action-now_EN.pdf)

**Food and Agriculture Organization (FAO)** of the United Nations is developing resources, activities and the mechanisms to enhance awareness, access to information and participation of children and young people in a range of environmental, social and sustainable development issues, including climate change.

<http://www.fao.org/climatechange/youth/en/>

### Green learning Canada

Help your students participate in their own learning while gaining a more holistic and hopeful understanding of today's complex energy and environmental issues.

<http://www.greenlearning.ca/>

**International Climate Champions (ICC)** program, established by the British Council, unites global youth

on the subject of climate change. Each of the G8+5 countries selected three students (aged 16-18) in 2008 to represent the ICC at the G8 Environment Ministers' Meeting in Kobe, Japan.

<http://www.britishcouncil.org/new/climatechange/>

***Kick the Habit: A UN Guide to Climate Neutrality***

This online book talks about our dependence on carbon-based energy and how this “addiction” has caused a significant build-up of greenhouse gases in the atmosphere. This is a guide for everyone who wants to embark on the path to climate neutrality.

<http://www.grida.no/publications/vg/kick/ebook.aspx>

**MuchMusic’s media education website** examines the working conditions of “sweatshop” employees in Mexico and Bangladesh and provides an updated perspective on this controversial issue. Students watch a video entitled *Inside Your Threads* and discuss.

[http://www.muchmusic.com/mediaed/guidepage\\_much.asp?studyid=142](http://www.muchmusic.com/mediaed/guidepage_much.asp?studyid=142)

**Natural Resources Canada – Climate Change Posters**

A series of posters depicting risks, regional climate changes, and the effects on sectoral industries. Posters and teaching guides can be ordered from 1-800 O Canada.

[http://adaptation.nrcan.gc.ca/posters/index\\_e.php](http://adaptation.nrcan.gc.ca/posters/index_e.php)

**Ontario EcoSchools** has resources that relate to climate change developed for Grades 1-12. These resources are linked to different courses offered in grades 9-12.

[http://ontarioecoschools.org/curriculum\\_resources/](http://ontarioecoschools.org/curriculum_resources/)

**Ontario Ministry of Education.** The Ontario government’s progressive environmental education policy.

<http://www.edu.gov.on.ca/curriculumcouncil/shapetomorrow.pdf>

**Pembina Institute**

Research up-to-date information on climate change.

<http://climate.pembina.org/>

Read **United Nations Environment Programme (UNEP)’s press release** on how the atlas of Africa is changing due to climate change. See satellite images and graphs detailing landscape changes such as the evaporation of Lake Chad.

<http://www.unep.org/documents.multilingual/default.asp?documentid=538&articleid=5834&l=en>

**Teaching about Climate Change: Cool schools tackle climate change**

This book uses practical ideas to tackle the intangibles of climate change with experiments, waste audits and hands-on explorations. To order, visit: [www.greenteacher.com/tacc.html](http://www.greenteacher.com/tacc.html)

**UNESCO Course for Secondary Teachers on Climate Change Education for Sustainable Development (CCESD).** <http://unesdoc.unesco.org/images/0021/002197/219752e.pdf>

**UNICEF-themed units** for grades 3-5, 6-8 and 9-12 are based on UNICEF’s annual assessment of the world’s most vulnerable children: The *State of the World’s Children* report (SOWC).

<http://youth.unicefusa.org/teachunicef/units-and-lesson-plans/>

**UNICEF UK’s Climate Change report 2008:** *Our climate, our children, our responsibility* details the effects of climate change on our global children.

<http://www.unicef.org.uk/Documents/Publications/climate-change.pdf>

**United Nations Economic Commission for Europe (UNECE)** offers concrete examples of successful implementation of “Good Practices in Education for Sustainable Development” in different areas, including the school setting. This is a collection of experiences from governments, international organizations,

research institutions, NGOs and other stakeholders.

<http://www.unece.org/env/esd/goodPractices/index.html>

**Sandwatch** develops awareness of the fragile nature of the marine and coastal environment and the need to use it wisely. It is an educational process through which school students and community members from various countries learn and work together to critically evaluate the problems and conflicts facing their beach environments and to develop sustainable approaches to address these issues.

[http://www.sandwatch.ca/climate\\_change.htm](http://www.sandwatch.ca/climate_change.htm)

**The Stern Review: The Economics of Climate Change** explains that climate change has resulted in very serious global risks, and it demands an immediate response from all citizens globally. Read the Executive Summary. [http://www.hm-treasury.gov.uk/d/Executive\\_Summary.pdf](http://www.hm-treasury.gov.uk/d/Executive_Summary.pdf)

**UNICEF Canada's Climate Change resources**

[http://globalclassroom.unicef.ca/climate\\_change\\_resource\\_guide](http://globalclassroom.unicef.ca/climate_change_resource_guide)

## FRENCH RESOURCES:

**Association Québécoise pour l'Éducation Relative à l'Environnement:**

<http://www.aqpere.qc.ca/index.htm>

**Centre d'écologie urbaine de Montréal:**

<http://www.ecologieurbaine.net/>

**Centre de recherche en éducation et formation relatives à l'environnement et l'écocitoyenneté (Université du Québec à Montréal, UQAM):**

<http://www.unites.uqam.ca/ERE-UQAM/>

**Environnement Jeunesse:**

<http://www.deficlimat.qc.ca/>

**Environnement Canada:**

<http://www.ec.gc.ca/cc/default.asp?lang=Fr>

**L'éducation au service de la Terre (LST):**

<http://www.lsf-lst.ca/fr>

**Le Réseau In Terre Actif:**

<http://www.in-terre-actif.com/>

**Notre-Planète.info:**

[http://www.notre-planete.info/actualites/actu\\_2089\\_changements\\_climatiques\\_sahara\\_vert.php](http://www.notre-planete.info/actualites/actu_2089_changements_climatiques_sahara_vert.php)

**Wikipedia:**

[http://fr.wikipedia.org/wiki/Changement\\_climatique](http://fr.wikipedia.org/wiki/Changement_climatique)