

The Climate Challenge

Teachers Guide

by *Guy Dauncey*

Author of *The Climate Challenge: 101 Solutions to Global Warming*

Introduction

Class Discussions based on *The Climate Challenge*

Class Activities:

1: Green Jobs & Careers

2: Green School Websites

3: Green Living

4: How Green is Our School?

5: Create A Climate Solutions Questionnaire

6: Write a Letter

7: Two Stories

8: Climate Change Jeopardy

INTRODUCTION

These notes are designed to complement use of *The Climate Challenge* in the classroom, and Solution #12 for Schools. All page references are to the book. If you buy *The Climate Challenge* through the book's website at www.theclimatechallenge.ca, you can get these bulk rate discounts. (1 book \$24.95).

2-4 books:	\$20 each	5-10 books:	\$18 each
11-20 books:	\$16 each	21-40 books:	\$14 each
41-100 books:	\$12 each	101 + books:	\$11 each

Emphasize the Solutions

Don't spend too much time focused on the science and the impacts. Many young people have already absorbed the message that the general environmental situation is pretty bad, and switch off easily. When given practical examples of people who are changing the world, and new solar and similar technologies, however, they become excited and want to learn more. It is important to familiarize yourself with the solutions so that you can talk about them with confidence. For a positive framing of the problem, see page 34, and Solution #65 (p. 206).

Green Jobs and Careers

Emphasize the fact that sustainable energy and climate solutions have enormous potential for jobs, and many young people will be able to build a rewarding career here. See pages 40-55, 62-65, 242, and *Classroom Activity 2: Green Jobs & Careers*.

Free Climate Solutions Slide Show

I have a one-hour Powerpoint packed full of images that I often present to schools, assembling Grades 6-12 altogether in the gym. You can download it [here](#), and use it without needing to ask my permission. If you have useful feedback, please send it to guydauncey-at-earthfuture.com.

Climate Quiz Shows

I have created two different Climate Quiz Shows for use in schools:

(a) *The Climate Challenge Game* - a television-style quiz show for two teams of three people, in five rounds. Everyone has a role to play, and can become engaged. See: www.tinyurl.com/2h42nj

(b) *Climate Change Jeopardy* - see *Class Activity 8*. Students in South Carolina have also created Eco-Jeopardy: www.scdhec.gov/environment/earthday/eco-jeopardy.htm

Class Discussions based on *The Climate Challenge*

As author of this book, I grant teachers permission to make photocopies of the pages referenced below for the purpose of classroom discussions.

The Challenge (2-3)

- When facing this enormous challenge, do you think the adventurous side or the lazy side of our nature will win out?
- If we do not succeed, the next generation will have to live with our failure. What do you think they will say to us?

Earth's Miraculous Atmosphere (8-9)

- Why is Earth's atmosphere so important?
- Why is Earth's carbon cycle so important?

The Third and Fourth Alarm Bells (20-21)

- When you read about the threat to the world's species, what do you feel? What does it make you think about the way we humans live on this Earth?
- When you read about the threatened rise in sea level, how do you think people will respond who live on low-lying land, close to the sea?

What Then Must We Do? (32-33)

- What do you think it will take for people to treat this as an emergency, and become engaged in all the solutions?
- If we did all the things described on these pages, quite apart from their role in tackling global warming, do you think the world would be a better place?
- When the author writes that this "is about stepping into a whole new world that will bring new hopes, new dreams and new horizons", do you agree with him, or is he being hopelessly idealistic?

Is the Oil Running Out? (36-37)

- What do you think would happen to our civilization if the world's oil supply began to run out and become too expensive for most people to buy before alternative means of travel and heating were available?
- It is inevitable that the world's oil supply will run out, sooner or later. Do you think this would be good or bad for our human civilization, and the planet?

Earth's Future Economy (68-69)

- When you look at the future economy the way the author describes it, is it a world you would want to live in? Are there any factors he has forgotten which might change his optimism?
- The author writes, "As nations reach a certain level of material sufficiency, people will prefer to spend their hard-earned income on bringing more quality to their lives, rather than stuff." If you had more income than you needed, how would *you* spend it?

Getting Serious (74-75)

- The author is suggesting that we should respond to the climate crisis the same way that we responded during World War II, when everyone pulled together. From the people you know, what do you think it will take to make them willing to respond to our crisis today in a similar manner?
- Carl Sagan says, "Don't sit this one out. Do Something. You are by accident of fate alive at an absolutely critical moment in the history of our planet." Do you agree? What does it mean to you personally when he says "Don't sit this one out. Do Something"?

Solution #2: Change the Way You Eat (See also Solutions #43 and #73)

- Are you willing to eat less meat and dairy, so as to have less impact on the planet and create a more climate-friendly world?
- What do you think is needed to persuade people to eat less meat, and adopt a more vegetarian or vegan diet?

Solution #3: Wake up to Green Electricity

- What is “green” electricity? What makes other electricity *not* green?
- When you look at the list of things that can be done to save energy at home, on this and the following page (84-85), are you and your family doing most of these things? And if not, what are the obstacles or difficulties that stand in the way?
- Would you like to see your home have solar panels on the roof? What are the main obstacles that stand in the way? (See also Solution #56)
- If you showed your mother or father these pages and explained why it matters, would they be willing to follow the ideas in the “Actions” box? Would you be able to help them?

Solution #6: Change the Way You Travel

- Tell the truth - have your parents spoiled you by running you around in the car whenever you need to get somewhere? Or do they tell you to walk, ride a bike, or get the bus? Why do you think some parents spoil their children like this, when others don't?
- In the future, if you lived in a busy city where there were great bicycle lanes, a good bus service, and a car-share group you could join so that you had access to a car when you needed it, would you be willing to live without owning your own car?

Solution #9: Change Your Consumer Habits (See also Solution #82)

- Tell the truth again - is your home filled with “stuff” you really don't need? When you were a child, did you have more toys or stuffed animals than you knew what to do with?
- What's your personal score in the quiz “Are You Winning the War against Stuff?” If you showed it to your mother or father, would they be willing to do the quiz, and work with you to reduce the waste your family generates?

Solution #12: Schools

- When you read the section “Getting Started”, how easy do you think it would be to follow the recommended steps over four weeks?
- Do a show of hands in the class - how many of you would be willing to meet today or tomorrow to start the process, and plan the first lunchtime meeting? Are you willing to meet for five minutes after this class, to arrange a time when you can sit down to start making plans?

Solution #20: Build a Global Movement

- Do you think that protests and actions like those described on these pages make a difference? Do they influence the world's politicians and leaders?
- If you were to organize a climate protest or rally in your community, would the 9-Step Organizing Plan be useful? What else would you need to do to make it a success?

Solution #34: Retail Stores

- Think about your local supermarket. As far as you know, are they doing any of the things described on these pages? And if not, why do think they are not?
- If you were to choose a delegation of five students from this class to ask for a meeting with the manager of your local supermarket, to give him a copy of this Solution and ask if he could do more, what kind of preparation would you need to do?

Solution #46: The Auto Industry (see also Solution #76)

- This solution proposes a huge revolution in the auto-industry. Do you think it is possible, if the owners and managers of the auto industry really put their minds to it?

- Do you think that most people would be willing to buy a zero-emissions electric vehicle or plug-in hybrid electric vehicle, if they were available at a price similar to today's vehicles?

Solution #50: Aviation - Flying

- Do you think that the world's aviation industry could make the changes recommended? What will it take to persuade them to change?
- If you had a future job that paid you enough to be able to fly to holidays overseas, would you be willing to not take these holidays, so as to reduce your carbon footprint?

Solution #54: Wind Energy

- When you think about wind turbines as one solution to the world's climate crisis, are you excited or upset? Why do you think some people are so strongly opposed to wind energy as a solution to the crisis?
- When you look at the table on page 185 for wind energy around the world, why do you think America is lagging so far behind?

Solution #63: Governments - Lead by Example

- When you read the list of what the leading governments are doing in their own operations, are you impressed? Are they doing enough?
- How much do you know about what the government is doing in your state or province? Would you say they were being leaders, or are they "asleep at the switch"? If they're being leaders, why do you think is this? And if they're asleep, why do you think is this?

Solution #65: Governments - Inspire People

- When you read these five reasons as an argument that is supposed to be inspiring, do they inspire you?
- When you think of the people you know, does anyone think of the climate crisis in this way? If they *did* think this way, do you think they would be more willing to get engaged and do something?

Solution #71: Governments - Phase Out All Fossil Fuels

- For the past 250 years, our whole civilization has been based on the use of fossil fuels. Do you think it is realistic to call for their complete phasing out? On the other hand, what will happen if we don't?
- Do you think it right that the coal, oil and gas industries should still be receiving subsidies totaling more than \$210 billion a year? Why do you think this is still happening?

Solution #78: Governments - Put a Price on Carbon

- Sweden has been able to make huge steps towards a zero-carbon economy, in part because they have a carbon tax that charges people every time they use a fossil fuel, paying an extra 36 cents a litre (\$1.14 a gallon) for gas in their cars. Do you think this is a good policy that would persuade people to change?
- How high do you think the price of gas needs to be per litre or per gallon to persuade people to think differently about how they travel?

Solution #81: Governments - Invest in a Climate-Friendly Future

- This solution suggests ten areas where governments need to make major investments to accelerate the best solutions. As a class activity, form teams of three people each, and ask each team to research one of the solutions, using the book's Index to find more information. Then ask each team to make a 3-minute pitch to the class as to why their solution is the most important.

Solution #93: Global - Adopt Climate Solutions Treaties

- This solution suggests 13 areas where a Global Solutions Treaty is needed. As a class activity, form teams of three people each, and ask each team to research one of the treaties, using the

book's Index to find more information. Then ask each team to make a 3-minute pitch to the class as to why their treaty is the most important.

Solution #96: Slow Global Population Growth

- When you think how fast the world's population has grown, and how it looks set to continue growing to 9.5 billion people by 2050, what does it make you think or feel?
- What would happen if everyone on Earth was to live and consume the way we do in North America? When it comes to the impact we have, and our "ecological footprint", which do you think the most important issue to address - the growing population, or all the stuff that people in the wealthier nations consume?

Solution #99: Adopt Natural Capitalism

- What is it that defines "capitalism", in contrast to socialism or fascism?
- Do you think capitalism can change, so that it will enable us to build a peaceful, climate-friendly world?
- Do you think nations will accept the need for global government, as one way to address the many simultaneous crises?

Solution #101: Don't Sit This One Out

- Do you think humanity is on a journey toward a better future, or are we just drifting around from one idea to another?
- Do you think you have a personal role to play, as we face these enormous challenges?
- If you try to imagine yourself in ten years time, what would you like to be doing to help make a difference?

- Guy Dauncey, October 2009

Class Activity 1: Green Jobs & Careers

Purpose: to help students think about a career in the emerging green economy. See also Solution #83.

- Ask each student to consider this (incomplete) list of emerging green jobs, and rank the five jobs they find the most attractive from 1-5. (1 = best job; 5 = 5th best job). Where a company is listed, many jobs are possible within the company - owning, management, marketing, production, etc
- Students take it in turn to share the job or career they ranked top, and explain why.

Farming and Food

Organic farmer or rancher
 Agricultural inspector
 Food scientist
 Green landscape architect
 Urban gardener, city farmer
 Organic chef
 Local food restaurant manager/owner
 Organic food product business
 Organic caterer

Buildings and Land-Use

Architect
 Green buildings manager
 Green builder
 Plumber (solar hot water, rainwater storage)
 Solar electrician
 Heating, air conditioning and refrigeration mechanic and installer
 Sustainable property developer
 Green realtor
 Green landlord
 Urban planner
 Green planning consultant

Transport

Bicycle repair technician
 Electric bike company owner/manager
 Car share manager
 Rideshare manager
 Cycling advocate/consultant
 Transport demand management consultant
 Electric vehicles business owner/manager
 City transit planner
 Electric vehicles conversion specialist
 Electric vehicle motor mechanic

Biology

Conservation biologist
 Ecologist
 Ecosystems recovery specialist

Marine biologist

Business

Green entrepreneur
 Green business manager
 Emissions manager
 Emissions trader
 Pollution control engineer
 Community affairs manager
 Social responsibility specialist
 Environmental economist
 Green accountant
 Environmental chemist
 Climate risk analyst
 Sustainability systems planner

Environmental Health

Pollution control technician
 Toxicologist
 Environmental health and safety technicians

Education

Teacher
 Outdoor educator
 Camp counselor
 Green career consultant
 Community educator
 College teacher

Science

Climatologist
 Environmental meteorologist
 Environmental scientist
 Hydrologist
 Green chemist
 Oceanographer

Renewable Energy

Project developer
 Project manager
 Green engineer
 Biofuels chemist or biologist
 Solar installer
 Wind energy systems specialist
 Ocean energy systems specialist

Non-Profit Sector

Fund-raising director
 Policy specialist
 Executive director
 Community outreach specialist
 Communications specialist

Zero Waste

Recycling manager
 Plastics recycling company owner
 Waste-to-energy operator
 Zero waste policy developer

Forestry

Ecoforester
 Eco-certified timber company

Design

Eco-friendly furniture builder
 Green/non-toxic interior designer
 Sustainable industrial designer
 Green fashion designer

Finance

Socially responsible investment adviser
 Socially responsible investment fund manager
 Green investor
 Green venture capitalist
 Green banking consultant
 Green accounting specialist

Other

Green travel and hospitality advisor
 Green software developer
 Environmental lawyer
 Environmental lobbyist
 Environmental policy specialist
 Environmental writer/author
 Green journalist

Class Activity 2: Green School Websites

This list is more complete than in *The Climate Challenge* Solution #12. Invite each student to choose one of the websites, explore it to see what it contains, and report back the next day.

Ask them to consider these questions:

- Does it include practical things that a class or a school can do?
- Does it contain new information you did not know before?
- It is easy to read and follow?
- How highly would you recommend it to someone else, on a scale from 0-10?

School Carbon Calculators

www.earthteam.net/GWCampaign/calculate.html

www.epa.gov/climatechange/wycd/school.html

www.schoolneutral.org

www.dott07.com/flash/dott_1024.htm

Green Schools

Build Green Schools: www.buildgreenschools.org

Center for EcoLiteracy: www.ecoliteracy.org

Children and Nature Network: www.cnaturenet.org

Cool Kids for a Cool Climate: www.coolkidsforacoolclimate.com

Destination Conservation: www.dcplanet.ca

EcoSchools: www.eco-schools.org.uk

EnergySmart Schools: www1.eere.energy.gov/buildings/energysmartschools

EPA Student Center: www.epa.gov/students

Green Flag Schools: www.greenflagschools.org

Green School Kit: www.seedsfoundation.ca/greenschools.html

Green Schools Alliance: www.greenschoolsalliance.org

Green Schools Checklist: www.epa.state.il.us/p2/green-schools/green-schools-checklist.pdf

Green Schools Program: www.ase.org/section/program/greenschl

International Walk to School: www.iwalktoschool.org

Kids for Saving Earth: www.kidsforsavingearth.org

Little Earth Charter for Kids: www.littleanimation4kids.com

No Child Left Inside: www.eenclb.org

Solar Schools: www.solarschools.com

Stop Global Warming: www.stopglobalwarming.org/sgw_classroom.asp

Students Leading the Way - Energy Saving Success: www.tinyurl.com/2bbxml

The Edible Schoolyard: www.edibleschoolyard.org

The Green Squad: www.nrdc.org/greensquad

Walk to School USA: www.walktoschool.org

Watts on Schools: www.wattsonschools.com

Way to Go! www.waytogo.icbc.bc.ca

Wind Energy for Schools: www.windpoweringamerica.gov/schools_projects.asp

Green Curriculum

Climate Challenge Teachers Guide: www.theclimatechallenge.ca

Climate Curriculum: www.worldwildlife.org/climate/curriculum/item5944.html

Climate Change Education Portal: www.climatechangeeducation.org

Climate Change Showdown: www.bcsea.org/ccshowdown

Climate Change North: www.climatechangenorth.ca

EcoKids: www.ecokids.ca

Energy Kid's Page: www.eia.doe.gov/kids

Energy Quest: www.energyquest.ca.gov

EPA Teaching Center: www.epa.gov/teachers
Focus the Nation: www.focusthenation.org
Florida Solar Energy Center: www.fsec.ucf.edu/en/education/k-12/curricula
Garden-Based Learning: www.hort.cornell.edu/gbl/toolshed/jmg.html
Green Learning: www.greenlearning.ca
Green Teacher Magazine: www.greenteacher.com
Lesson Plans from California Green Schools: www.ase.org/content/article/detail/2053
Roofus' Solar & Efficient Home: www1.eere.energy.gov/kids/roofus
Sustainable School (UK): www.suschool.org.uk
Sustainable High Schools: www.sustainablehighschools.ca
The Climate Challenge Game: www.tinyurl.com/2h42nj
The Nature Challenge: www.davidsuzuki.org/NatureChallenge
Wind with Miller: www.windpower.org/en/kids

Class Activity 3: Green Living

There is a direct connection between climate solutions and habits that students may or may not have been encouraged to adopt at home or school. See Solutions #1 - #10 for many more ideas.

- Form into groups of 3-5 people, and give each group one copy of this sheet.
- Give yourselves numbers 1 to 5, where 1 was born latest in the year, and 5 earliest.
- Consider the 10 ideas and fill in Column 1, where there is a space for each person.
- Now look at the list, and discuss in the group why you have different habits.
- Share any interesting thoughts about your personal habits with the class as a whole.

- In your groups, discuss your school, and give it a score for each question in Column 2 (0 = Useless, 5 = Fantastic), then “Yes, No or Maybe” in Column 3.
- As a class, discuss each question in turn, with each group sharing its results.

Sustainable Behaviour	1					2	3
	Do I do this at home? Individual √ or X					Is this encouraged at school? Group discussion, then score.	Should we do this more, at home and school? Group discussion, then score.
	1	2	5	3	4	Score 0 to 5	Yes, No or Maybe
(1) Walk or cycle to school							
(2) Take the bus to school							
(3) Rideshare with a friend to school							
(4) Always recycle, and aim for Zero Waste							
(5) Eat less meat							
(6) Turn off the lights when you leave a room							
(7) Change to energy-saving light-bulbs							
(8) Use solar hot water							
(9) Use solar PV electricity							
(10) Grow an organic food garden							

Taking Action (Optional extra)

Week 1: As students (without staff), organize a lunchtime meeting with your friends. Go around the circle and gather everyone’s ideas as to what your school could do. Ask each person to check one of the listed websites, and come to the next meeting with ideas.

Week 2: Brainstorm for ideas. Focus on those that are achievable within 3 months, and then choose the one that is most doable and has the most support. Give your group a name, and decide on your long-term goals. Create a page on Facebook, or your favorite social networking site.

Week 3: Meet with a sympathetic teacher, and ask for his or her support. If one of your goals is to make your school carbon neutral, you will need everyone’s support, including the Principal, teachers, support staff, parents, and School Board, Parent-Teacher Association or school governors.

Week 4: Get to work on the project you have chosen. At the same time, start discussions with staff about how the whole school could become carbon neutral, and how long it would take.

If you are a member of staff, organize a meeting with other staff members, and discuss what steps you could take to improve your school’s environmental performance. Form a Green Team, and get to work!

Class Activity 4: How Green is Our School?

- Working in groups of 3, read the questionnaire below.
- Discuss each question, and rate your school from 1 to 5 (0 = Not at all 5 = Yes, totally.) The maximum a school can score is $20 \times 5 = 200$ points.

Question	Score 0 - 5
1) Does your school have a clearly written environmental policy, displayed on its website?	
2) Has your school established a Green Team in which students, teachers and support staff work together for green solutions?	
3) Does your school encourage students to cycle to school by providing safe bike parking, verbal encouragement, and safety courses?	
4) Does your school have a campaign telling parents not to idle their cars?	
5) Does your school have a green travel campaign encouraging students to walk, bike, bus or rideshare to school, instead of being driven alone?	
6) Does your school have a commitment to reduce its waste and increase recycling?	
7) Does your school have a system set up to compost its organic wastes?	
8) Does your school encourage students to eat less meat, less junk food, and more vegetarian food?	
9) Has your school removed junk snack food and sugary soft drinks from the vending machines?	
10) Does your school have a garden where students can learn how to grow food?	
11) Does your school have a policy not to use chemical pesticides on the grounds or in the buildings?	
12) Does your school have a campaign encouraging students to turn the lights off when they leave a room?	
13) Does your school have a campaign encouraging students to turn their computers off when they're finished working, if no-one else will use the computer?	
14) Does your school have a campaign encouraging students to save water by not leaving taps running?	
15) Does your school have a commitment to calculate and reduce its carbon footprint?	
16) Does your school have a plan to install solar power, solar hot water, or a wind turbine?	
17) Does your school ensure that every student learns about global warming and climate solutions?	
18) Does your school have a program where students can learn how to do an electric car conversion, or make their home more energy efficient?	
19) Does your school make an effort to tell parents and local community leaders about its environmental efforts?	
20) Does your school give annual awards to the best class and/or best students for environmental achievements?	
Total Score	

- If you feel proud of your school's score, consider issuing a challenge to other schools in the region by setting up a contest, with a panel of judges. This will take some work, and a committed team of people, but it would be a great way to raise awareness.
- Tell the local media you are doing this, to win some publicity.

Class Activity 5: Create A Climate Solutions Questionnaire

- Using a group process, and the questionnaire in Class Activity 4, brainstorm a list of climate solutions that your school could adopt.
- Reach agreement about the five best ideas. Are they practical? Are they doable? Are they affordable? Will they produce results?
- Working in groups, turn each solution into a short effective question that could be answered easily with “Yes”, “No” or “Maybe”. Eg: “Do you think our school should work to recycle everything, and reduce its garbage to zero?”
- Working in groups, write a short sentence to introduce the Questionnaire to someone you are interviewing. Write down the words and phrases you want to use, and use them in an introduction that would be easy to read.
- Take it in turn to read your Introductions to the class as a whole, and chose the one that you like the best.
- Find two volunteers who will create a written sheet with the introductory sentence at the top, and then the five Questions, with columns for “Yes”, “No” or “Maybe”.
- Students pair up, and over the next few days, each pair asks four students outside of this class to answer the questions, plus one member of the school’s teaching or janitorial staff.
- As a class, analyze the results, and publish them on a poster or in a school newsletter.
- Ask the School Principal for a formal half-hour appointment to present the results. Choose a delegation of three people, and decide how you will best use the time.
- Report back to the class on how the meeting went, and if there are any further steps that you want to take as a class.

Class Activity 6: Write a Letter

- Form into pairs, to help each other with this activity.
- Each person chooses one aspect of the climate crisis or one climate solution that you would like to write a letter about.
- Decide who your letter will go to - the editor of the local paper? An elected politician? The Mayor and Council of your town or city?
- Decide on the most important points you want to make. If your letter is going to an elected leader, decide what you want him or her to do.
- Write the first draft of the letter. If it is going to the local paper, keep it to a maximum 200 words. If it is going to a Mayor or political leader, keep it to one and a half sides.
- Read the first draft to your partner, and listen to his or her feedback. Then work on improving it. The best writers make many drafts of their writing, and seek criticism from others to make it better. Then write the final draft of your letter.
- Take it in turn to read part or all of your letters to the class. Don't make this a competitive affair - treat it as a chance to help each other make your letters clearer and stronger.
- Send it by mail to political leaders or by email to the local paper. For web links and addresses, see Solution #18.
- Don't be disappointed if you get no response. Politicians say that for every letter they receive, they know that many other people will think the same way.

Class Activity 7: Two Stories

We all carry “stories” in our head, which we use to explain what’s happening in the world to ourselves. Here are two possible stories - there can also be many others.

Write these two stories on the blackboard or display them as slides, one on the left and one on the right:

Story A: What a Mess!

Humans are making a terrible mess of our environment. It is as if we’re a cancer on the body of the Earth. There’s not much we can do about it, because the big corporations and banks have so much power.

Story B: What a Possibility!

Humans have achieved incredible things in the past, and we can do so again in the future. If we work together to build a peaceful, green, solar future, we should be able to overcome global warming.

- Invite the students to gather in a “Samoan Circle” (named after the Island of Samoa. See <http://www.kstoolkit.org/Samoan+Circle>)
- Place two chairs in the centre facing each other, and invite two volunteers to step forward, one who favors Story A and one who favors Story B.
- They proceed to debate with each other, taking it in turn to speak in favor of their story.
- All those who think they favor Story A line up behind that person, and likewise for Story B.
- When someone wishes to speak in favor of one story or the other, they tap the person on the shoulder, and take their place.
- As teacher, choose to end the Circle whenever it feels appropriate, and discuss the activity in the group as a whole.

Class Activity 8: Climate Change Jeopardy

The game follows the normal rules, as seen on TV. There are two rounds, six categories in each, and five questions per category.

- Choose three teams of three people each, and set them up in front of the class.
- Chose two people to keep score on the blackboard (one for each team).
- The teacher acts as Alex Trebek, the host.
- After Round One, the winning team is challenged by two new teams in Round Two.
- Equipment needed - three “ring for attention” bells.
- All page references refer to *The Climate Challenge*.

ROUND ONE

1. The Climate Crisis
2. The Causes of Climate Change
3. Food and Farming
4. Cars of the Future
5. The Solar Future
6. Energy Efficiency

ROUND TWO

1. Earth’s Forests
2. Transport without Oil
3. Green Buildings
4. Earth’s Future Energy
5. A Green Economy
6. Changing the World

ROUND ONE

1. The Climate Crisis

1. Gases known by this collective name trap heat in the Earth’s atmosphere.

A: What are greenhouse gases? \$200 See pages 10-17

2. This gas is produced by everyone in this classroom, and also whenever we burn coal, oil or gas.

A: What is carbon dioxide? \$400 See page 10

3. This is melting every summer because the world is warming.

A: What is Arctic Ice? Also glaciers. \$600 See page 21

4. This gas is produced in landfills when organic waste rots.

A: What is methane? \$800 See page 12

5. As the ice on this large island melts, the sea level will rise all around the world.

A: What is Greenland? (Antarctic OK - Arctic not, as it is not an island, and the ice is already floating, displacing seawater.) \$1000 See page 21

2. The Causes of Climate Change

1. This kind of energy was created millions of years ago, when ancient trees fell into swamps or lakes.

A: What is coal? \$200 See pages 4-5

2. These two kinds of energy have their origins millions of years ago, when ancient sea-creatures died.

A: What are oil and gas? \$400 See pages 4-5

3. This product, used to make buildings and bridges all over the world, is made from the shells of ancient sea-creatures.

A: What is cement? \$600 See pages 148-9

4. Raising these animals produces more greenhouse gases than all the world’s transport.

A: What are cows? \$800 See pages 62-63, 80

5. This loss of these valuable ecosystems, especially in the Amazon, Indonesia and Africa, is also producing more greenhouse gases than all the world's transport.

A: What are tropical forests? \$1000 See p. 19

3. Food and Farming

1. This powerful greenhouse gas, produced in cows' stomachs, is released when they burp.

A: What is methane? \$200 See p. 12

2. This method of farming does not use chemical pesticides or fertilizers.

A: What is organic farming? \$400 See p. 160

3. This powerful greenhouse gas is produced on the farm when nitrogen fertilizer does not break down in the soil, and when animal manure sits in lagoons of waste.

A: What is nitrous oxide? \$600 See p. 10

4. This chemical fertilizer requires 5% of the world's natural gas supply to make it.

A: What is nitrogen fertilizer? \$800

5. This substance is the foundation for all the world's farming, and an enormous store of carbon.

A: What is soil? \$1000 See p. 41

4. Cars of the Future

1. This kind of car does not require gasoline or any other liquid fuel to operate.

A: What is an electric car? \$200 See p. 43

2. This kind of car produces only water from its exhaust.

A: What is a hydrogen car? \$400 See p. 58

3. This kind of car runs on a fuel made from crops grown on farmland.

A: What is a biofuel or ethanol car? \$600 See p. 52

4. This kind of car runs on liquid fuel plus an electric battery.

A: What is a Hybrid Car? \$800 See p. 42

5. This kind of car runs on an electric battery that can be recharged when needed, and can also use a liquid fuel when it needs to.

A: What is a Plug-In Hybrid Electric Car? \$1000 See p. 42

5. The Solar Future

1. These cells gather energy from the light of the sun.

A: What are photovoltaic (solar) cells? \$200 See p. 188

2. This mineral is used to make most of the world's photovoltaic cells.

A: What is silicon? \$400

3. This kind of energy can be gathered in desert areas and used to generate electricity from the sun's heat.

A: What is solar thermal energy? \$600 See p. 186

4. This kind of water is heated by the Sun, using a system that can be installed on the roof.

A: What is solar hot water? \$800 See p. 86

5. This is how long the Sun will continue sending its energy to the Earth without ever sending us a bill.

A: What is five billion years? (Anything over one billion is OK) \$1000

6. Energy Efficiency

1. This habit saves energy by restoring darkness when light is not needed.

A: What is switching off the lights? \$200 See p. 82

2. This habit saves energy and does not shorten the life of a computer when you don't need to use it.

A: What is turning off the computer? \$400 See p. 82

3. This method of providing light uses four times less energy than a regular bulb.

A: What is a compact fluorescent or efficient light bulb? (LED is OK too) \$600 See p. 82

4. This device allows you to control when the heating or cooling in a room comes on and off.

A: What is a thermostat? \$800 See p. 82

5. This 21st century development of the electric grid enables people and industries to save energy.

A: What is the Smart Grid? \$1000 See p. 192

ROUND TWO

1. Earth's Forests

These undisturbed forests store more carbon than managed forests.

A: What are oldgrowth or ancient forests? \$200 See p. 152

2. This dangerous form of forest disturbance will increase as the Earth's temperature rises.

A: What are forest fires? \$400

3. This widely used form of forest management causes large quantities of carbon to be lost from the forest and the forest floor.

A: What is clearcut forestry? \$600 See p. 152

4. This large forest, named after a river, is being steadily razed to the ground to create land to raise cows and grow soybeans to feed to cows.

A: What is the Amazon? \$800 See p. 19

5. This organization gives certificates to timber from forests that are managed in an environmentally responsible manner.

A: What is the Forest Stewardship Council? \$1000 See p. 152

2. Transport without Oil

1. For each of this kind of vehicle full of people travelling in it regularly, 30 to 50 cars can be taken off the road.

A: What is a bus? (public transit) \$200 See p. 127

2. This means of travel increases the fuel efficiency per person of whoever uses it by anywhere from 2 to 10-fold.

A: What is ride-sharing? \$400 See p. 89

3. This means of travel allows the person using it to achieve the equivalent of 1000 miles per gallon / 0.25 litres per 100 kilometres.

A: What is a bicycle? \$600 See p. 126

4. This means of travel, when it is built, will allow you to travel overland from Los Angeles to New York in 15 hours, or Calgary to Montreal in 12 hours.

A: What is a high-speed train? \$800 See p. 172

5. If aviation fuel was made from this product, we would need less than a fifth of 1% of the world's farm and pasture land to grow the fuel needed for all the world's flying.

A: What is biofuel made from algae? \$1000 See p. 176

3. Green Buildings

1. When homes are built with lots of this in the basement, walls and attic, they need much less energy for heating and cooling.

A: What is insulation? \$200 See p. 84

2. When people use this green building method to capture rainwater, their inhabitants use much less city water.

A: What are rainwater storage tanks? \$400

When a home called this is built facing the sun, it needs half as much energy for heating.

A: What is a passive solar house? \$600 See p. 41

4. When buildings use this method, they obtain most of the heating and cooling they need from the ground beneath them.

A: What is ground-source heat? (Geothermal, earth-energy) \$800 See p. 86

5. This kind of building generates all the energy its occupants need without releasing any carbon emissions.

A: What is a zero-carbon building? \$1000 See p. 40

4. Earth's Future Energy

1. On a typical south-facing rooftop, a 5-kilowatt system using this technology could generate half the electricity that an average home needs.

A: What is solar power? (Photovoltaic) \$200 See p. 83

2. A thousand kilowatts of energy are known as this.

A: What is a megawatt? \$400 See p. 44

3. If a single tall 2 megawatt machine using this technology was built on open farmland, it could generate enough electricity to meet the needs of 500 homes.

A: What is a wind turbine? \$600 See p. 184

4. This kind of energy can be generated by drilling a hole several kilometres down into the earth, and circulating water through it to create steam.

A: What is geothermal power? \$800 See p. 187

5. This kind of energy is caused by the gravitational pull of the moon and sun.

A: What is tidal power? \$1000 See p. 48

5. A Green Economy

1. This kind of tax makes people pay for the carbon dioxide they produce whenever they burn fossil fuels.

A: What is a carbon tax? \$200 See p. 232

2. This software application enables you to calculate how much carbon dioxide you produce in a year.

A: What is a carbon calculator? \$400 See p. 78

3. This government policy creates a system of permits for the amount of greenhouse gases each company is allowed to produce, and lets companies trade permits with each other to find the cheapest way to reduce their emissions.

A: What is cap and trade? \$600. See p. 234

4. This new way of measuring progress in the economy measures people's overall happiness and wellbeing, as opposed to the simple total of goods and services sold, known as Gross Domestic Product, or GDP.

A: What is Gross National Happiness? (Genuine Progress Indicator) \$800 See p. 69, 245

5. This new approach to the wastes we produce aims to see everything recycled and re-used, so that nothing is incinerated or sent to a landfill.

A: What is zero waste? \$1000 See p. 132

6. Changing the World

1. The second global treaty to reduce our greenhouse gas emissions, signed in December 2009, was named after this Danish city.

A: What is Copenhagen? \$200 See p. 260

2. The world's climate scientists insist that in order to prevent the worst of the global climate crisis, the world's nations must reduce their greenhouse gas emissions by at least this much by 2050.

A: What is 80%? \$400 See p. 30

3. Before the Industrial Age, Earth's atmosphere contained 280 parts of carbon dioxide of per million. By 2009 it had increased to 387 parts per million, growing by 2 parts per million a year. Many climate scientists think that to create a safe situation, we need to reduce it to this level.

A: What is 350 parts per million? \$600 See p. 30

4. During this major global historical event, the US auto-industry retooled its factories to make tanks and guns within six months - the kind of rapid change we need today.

A: What is World War II? \$800 See p. 74, 200

5. During this historical period of vast social and economic change, Earth's engineers and inventors developed an entire new system of energy for the planet, giving us a precedent for the change we need today.

A: What is The Industrial Revolution? \$1000 See p. 6