

## ▶ HOW APPROVED TEXTBOOKS LINK TO LEARNING ABOUT CLIMATE CHANGE

Strand/Overall Expectations	Expectations Addressed	SciencePower 10	Nelson 10
<p><b>Biology:</b> <b>The Sustainability of Ecosystems</b></p> <ul style="list-style-type: none"> <li>▶ BYV.01D demonstrate an understanding of the dynamic nature of ecosystems, including the relationship between ecological balance and the sustainability of life</li> <li>▶ BYV.02D investigate factors that affect ecological systems and the consequences of changes in these factors</li> <li>▶ BYV.03D analyse issues related to environmental sustainability and the impact of technology on ecosystems</li> </ul>	<ul style="list-style-type: none"> <li>▶ BY1.01D Describe the processes of photosynthesis and cellular respiration as they relate to the cycling of energy, carbon, and oxygen through abiotic and biotic components of an ecosystem</li> <li>▶ BY1.06D explain why different ecosystems respond differently to short-term stresses and long-term changes</li> <li>▶ BY1.08D explain how soil composition and fertility can be altered in an ecosystem and identify the possible consequences of such changes</li> <li>▶ BY2.01D through investigations and applications of basic concepts, formulate scientific questions about observed ecological relationships, ideas, problems and issues</li> <li>▶ BY3.01D assess the impact of technological change on an ecosystem</li> <li>▶ BY3.05D identify and evaluate Canadian initiatives in protecting Canada's ecosystems</li> </ul>	<ul style="list-style-type: none"> <li>▶ pp 4-17 (energy in the food chain), 33-34 (human consumption)</li> <li>▶ pp 43-51 (carbon cycling, the cycling of oxygen is not covered)</li> <li>▶ pp 48-49 (carbon cycle, climate activity)</li> <li>▶ pp 26-34 (climate, food, DDT)</li> <li>▶ pp 74-80 (soil)</li> <li>▶ pp 81-91 (succession, ecosystems)</li> <li>▶ pp 454-461 (seasons, latitude, zones)</li> <li>▶ p 53 (human impact on the nitrogen cycle and soil)</li> <li>▶ pp 61-62 (acidity and soil lab)</li> <li>▶ p 63 (biodiversity)</li> <li>▶ pp 74-78 (soil)</li> <li>▶ pp 26-34 (human activity and climate)</li> <li>▶ pp 56-65 (human impact – soil, air, water)</li> <li>▶ pp 88-91 (change – activity and text)</li> <li>▶ pp 96-97 (Environmental Impact Assessment)</li> <li>▶ pp 33-34 (consuming the planet)</li> <li>▶ pp 112-122 (ecological footprint, technology)</li> <li>▶ pp 92-95 (land use)</li> <li>▶ pp 102-122 (managing resources, sustainability)</li> </ul>	<ul style="list-style-type: none"> <li>▶ pp 50-51 (cycling of matter)</li> <li>▶ pp 60-61 (photosynthesis and cellular respiration)</li> <li>▶ pp 62-65 (carbon cycle)</li> <li>▶ pp 32-39 (energy flow)</li> <li>▶ pp 10-13 (frog example)</li> <li>▶ pp 22-31 (ecosystems)</li> <li>▶ pp 88-96 (biomes, biogeography)</li> <li>▶ pp 70-71 (fertilizer and ecosystems)</li> <li>▶ pp 97-107 (soil)</li> <li>▶ pp 126-131 (abiotic factors in lake ecosystems)</li> <li>▶ pp 14-21 (Canadian species at risk, extinction)</li> <li>▶ pp 42-44 (Zebra mussel)</li> <li>▶ pp 48-58 (change and ecosystems, pesticides)</li> <li>▶ pp 132-142 (water quality and ecosystems)</li> <li>▶ pp 146-151 (marine ecosystems and crude oil)</li> <li>▶ pp 81-82 (pesticide use)</li> <li>▶ pp 108-120 (management of ecosystems)</li> <li>▶ pp 152-153 (sustainable fishery)</li> </ul>

## How Approved Textbooks Link to Learning about Climate Change (continued)

Strand/Overall Expectations	Expectations Addressed	SciencePower 10	Nelson 10
<p><b>Chemistry: Chemical Processes</b></p> <ul style="list-style-type: none"> <li>▶ CHV.01D demonstrate an understanding of chemical reactions, the symbolic systems used to describe them and the factors affecting their rates</li> <li>▶ CHV.02D design and conduct investigations of chemical reactions, using standard scientific procedures, and communicate the results</li> <li>▶ CHV.03D determine why knowledge of an chemical reactions is important in developing consumer products and industrial processes and in addressing environmental concerns</li> </ul>	<ul style="list-style-type: none"> <li>▶ CH1.03D describe, using their observations, the reactants and products of a variety of chemical reactions, including synthesis, decomposition, and displacement reactions</li> <li>▶ CH1.04D describe qualitatively, using their observations, how factors such as heat, concentration, light, and surface area can affect rates of chemical reactions</li> <li>▶ CH1.08D name and write the formulae for common ionic and molecular compounds</li> <li>▶ CH2.09P represent simple chemical reactions using molecular models, word equations, balanced chemical equations</li> <li>▶ CH3.01D explain how environmental challenges can be addressed through an understanding of chemical substances</li> <li>▶ CH3.03D identify everyday examples where the rates of chemical reactions are modified</li> </ul>	<ul style="list-style-type: none"> <li>▶ pp 190-199 (chemical reactions)</li> <li>▶ pp 203-206 (carbon reactions)</li> <li>▶ pp 242-251 (factors that affect chemical reactions)</li> <li>▶ pp 155-166 (chemical names and formulas)</li> <li>▶ pp 170-174 (writing chemical equations)</li> <li>▶ pp 155-162 (naming compounds)</li> <li>▶ pp 200-201 (analyzing an industrial process)</li> <li>▶ pp 231-236 (neutralization reactions)</li> </ul>	<ul style="list-style-type: none"> <li>▶ pp 233-247 (types of reactions)</li> <li>▶ pp 254-264 (factors that affect chemical reaction rates)</li> <li>▶ pp 268-269 (surface area and rate of reaction)</li> <li>▶ pp 193-198 (writing formulas for compounds)</li> <li>▶ pp 201-207 (compounds, models, formulas)</li> <li>▶ pp 205-207 (hydrocarbons)</li> <li>▶ pp 218-219 (word equations)</li> <li>▶ pp 226-229 (chemical equations)</li> <li>▶ pp 223 (vehicle exhaust)</li> <li>▶ pp 230-232 (combustion)</li> <li>▶ pp 305-316 (oxides and acid rain)</li> <li>▶ pp 248-249 (consumer output)</li> <li>▶ pp 317-324 (neutralization reactions)</li> <li>▶ pp 208-212 (synthetic materials)</li> <li>▶ pp 317-324 (uses of acids and bases)</li> </ul>

## How Approved Textbooks Link to Learning about Climate Change (continued)

Strand/Overall Expectations	Expectations Addressed	SciencePower 10	Nelson 10
<p><b>Earth and Space Science: Weather Dynamics</b></p> <ul style="list-style-type: none"> <li>▶ ESV.01D demonstrate an understanding of the factors affecting the fundamental processes of weather systems</li> <li>▶ ESV.02D investigate and analyse trends in local and global weather conditions to forecast local and global weather patterns</li> <li>▶ ESV.03D evaluate how technology has contributed to our understanding of the physical factors that affect the weather</li> </ul>	<ul style="list-style-type: none"> <li>▶ ES1.01D identify and describe the principal characteristics of the hydrosphere and the four regions of the atmosphere</li> <li>▶ ES1.02D describe and explain heat transfer within the water cycle and how the hydrosphere and atmosphere act as heat sinks</li> <li>▶ ES1.03D describe and explain heat transfer within the water cycle and its effects on air and water currents</li> <li>▶ ES1.04D describe and explain the effects of heat transfer within the hydrosphere and atmosphere on the development, severity, and movement of weather systems</li> <li>▶ ES2.06D investigate factors which affect the development, severity, and movement of global and local weather systems</li> <li>▶ ES3.01D explain the role of weather dynamics in environmental phenomena and consider the consequences to humans of changes in weather</li> </ul>	<ul style="list-style-type: none"> <li>▶ pp 441-446 (atmosphere)</li> <li>▶ pp 427-434 (water and energy transfer)</li> <li>▶ pp 435-441 (energy transfer)</li> <li>▶ pp 469-478 (currents, El Niño)</li> <li>▶ pp 422-426 (energy budget outlined)</li> <li>▶ p 446 (gases in the atmosphere)</li> <li>▶ p 447 (weather after global warming activity)</li> <li>▶ pp 462-480 (wind currents, ocean currents)</li> <li>▶ pp 502-512 (severe weather)</li> <li>▶ pp 486-495 (clouds, rain)</li> <li>▶ pp 496-501 (pressure systems)</li> <li>▶ pp 532-538 (forecasting)</li> <li>▶ p 447 (weather after global warming)</li> <li>▶ pp 475-478 (El Niño)</li> </ul>	<ul style="list-style-type: none"> <li>▶ pp 526-537 (global weather model)</li> <li>▶ pp 542-563 (forecasting weather)</li> <li>▶ pp 5120-513 (atmosphere)</li> <li>▶ pp 504-507 (energy balance)</li> <li>▶ pp 516-527 (hydrosphere, winds, currents)</li> <li>▶ pp 578-615 (severe weather)</li> <li>▶ pp 567-573 (technology)</li> </ul> <p>Chapter 16: Climate Change</p>

## How Approved Textbooks Link to Learning about Climate Change (continued)

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<p><b>Physics: Motion</b></p> <ul style="list-style-type: none"> <li>▶ PHV.01D demonstrate an understanding of different kinds of motion and of the quantitative relationships among displacement, velocity, and acceleration, and solve simple problems involving displacement, velocity, and acceleration</li> <li>▶ PHV.02D design and conduct investigations on the displacement, velocity, and acceleration of an object</li> <li>▶ PHV.03D analyse everyday phenomena and technologies in terms of the motions involved</li> </ul>	<ul style="list-style-type: none"> <li>▶ PH3.01D evaluate the costs and benefits, including the environmental and safety factors, of technologies which have enabled us to travel at ever-greater speeds, and the impact of the increased capacity for speed on risk behaviour and subsequent injuries</li> <li>▶ PH3.03D analyse how technology is used for tracking the motion of objects and outline the kinds of scientific knowledge gained through the use of such technologies</li> </ul>	<ul style="list-style-type: none"> <li>▶ pp 284-294 (motion, transportation technologies)</li> <li>▶ pp 330-340 (faster technology)</li> <li>▶ p 402 (speeding, safety, and modern life)</li> <li>▶ pp 330-340 (modes of transport)</li> <li>▶ pp 374-375 (modes of braking)</li> <li>▶ pp 412, 413 (highway technology)</li> </ul>	<ul style="list-style-type: none"> <li>▶ pp 354-368 (speed)</li> <li>▶ pp 382-388 (speed comparisons)</li> <li>▶ pp 406-408 (acceleration of different vehicles)</li> <li>▶ pp 418-419 (experience motion like a graph)</li> <li>▶ pp 342-343 (speed on highways)</li> <li>▶ pp 366-368 (smart highways)</li> <li>▶ pp 430-436 (athletes)</li> <li>▶ pp 438-440 (tracking and position)</li> <li>▶ pp 458-459 (technology and skiing)</li> </ul>

## ► TEACHER RESOURCES

### SciencePower 10 Teacher's Resource Binder, Ontario Edition, Blackline Masters

#### **Biology:**

BLM 2-4 It's a Gas

BLM 2-5 Charting Carbon Changes

BLM 2-7 The Greenhouse Effect

BLM 2-8 Follow That Carbon Molecule

BLM 2-16 Dramatic Cycles (if carbon cycle used)

BLM 3-9 Land Use in Southern Ontario

BLM 3-10 Urban Use of Rural Lands

BLM 3-11 The Order of Succession

BLM 3-14 Sustainability at Work

BLM 3-17 Succession and Energy Flow

BLM 3-18 Soil Loss from Clearcutting

BLM 3-19 Remediation and Me

BLM 4-3 Environments in Distress

BLM 4-13 Calculating Ecological Footprints

BLM 4-14 Fossil Fuel Survey

#### **Chemistry:**

BLM 6-14 Naming Hydrocarbons

BLM 6-15 Building Hydrocarbon Models

BLM 6-16 Structural Figures for Hydrocarbons

BLM 6-17 Hydrocarbons in Industry

BLM 6-18 Chemistry Scavenger Hunt

BLM 6-19 Alternative Fuels

BLM 8-1 Factors That Affect Chemical  
Reactions

BLM 9-13 Controlling Harmful Emissions

#### **Earth and Space Science:**

BLM 13-1 Why is the Sky Blue?

BLM 13-2 Absorption or Reflection

BLM 13-3 Earth's Energy Budget Quiz

BLM 13-4 Change in Temperature of Water

BLM 13-9 Review of Energy and Water

BLM 13-10 Does Solar Energy Heat the Air?

BLM 13-12 Levels of the Atmosphere

BLM 13-13 Atmospheric Composition

BLM 14-3 Solar Energy and a Spherical Earth

BLM 14-5 Determining the Direction of  
Prevailing Winds

BLM 14-7 Worldwide Wind Currents Quiz

BLM 14-8 Ocean Gyres

BLM 14-9 The Gulf Stream and Climate

BLM 14-11 El Niño

BLM 14-12 El Niño

BLM 15-20 Severe Weather Quiz

#### **Physics:**

BLM 9-8 Transportation in Canada

BLM 9-11 The Bug Race

## Nelson Science 10 Concepts and Connections: Student Record of Learning

### *Unit 1: Ecosystems and Human Activity*

- 1.1 Disappearing Frogs
- 1.2 Going, Going, Gone!
- 1.3 Ecology
- 1.5 Investigation: A Schoolyard Ecosystem
- 1.7 Energy in Ecosystems
- 1.8 The Carbon Cycle
- 1.10 Explore an Issue: Should We Interfere with Natural Cycles?
- 1.11 Case Study: Pesticides
- 1.15 Soil
- 1.17 Logging Forests
- 1.20 Case Study: The Greening of Sudbury

### *Unit 2: Chemical Reactions and Their Practical Applications*

- 2.1 Case Study: Household Chemicals
- 2.4 Polyatomic Ions and Compounds
- 2.6 Describing Chemical Reactions

### *Unit 3: Motion and Its Applications*

- 3.1 Explore an Issue: Progress and Speed on Canadian Highways
- 3.4 Explore an Issue: How Could You Choose the Best Vehicle?
- 3.10 Case Study: Smart Highways

### *Unit 4: Weather Systems*

- 4.1 Forecasting the Weather
- 4.5 Regional Weather
- 4.6 Water and the Weather
- 4.7 Humidity – Water in the Air
- 4.8 Investigation: What Affects the Evaporation of Water?
- 4.16 Global Weather Model
- 4.18 Case Study: Extreme Weather Events
- 4.20 Explore an Issue: Human Impact on Global Climate

## Nelson Science 10 Teacher's Resource, Blackline Masters

### *Biology: Sustaining Ecosystems*

Blackline Master 2.5 The Carbon Cycle

Blackline Master 3.2 How Does Temperature Affect Seed Germination?

Blackline Master 3.7 What's the Alternative?

Blackline Master 3.10 The Forests of the Temagami Region

Blackline Master 4.5a Areas of Concern in the Great Lakes – St. Lawrence Basin

Blackline Master 4.5b Great Lakes 2000 Cleanup Fund Habitat Rehabilitation Project

### *Chemistry: Chemical Processes*

Blackline Master 5.12 Hydrocarbons Word Search

Blackline Master 7.2 Concentration and Rate

Blackline Master 7.8 Catalytic Converters – Reduce Automobile Pollution, But ...

### *Earth and Space Science: Weather Dynamics*

Blackline Master 13.8 The Saga of a Water Molecule

Blackline Master 14.5 Forms of Precipitation

Blackline Master 15.6c Hurricanes in Canada

Blackline Master 15.12 El Niño Visits Canada

Blackline Master 16.3 Fighting Forest Fires

### *Physics: Motion*

Blackline Master 10.2 Speed Comparisons

Blackline Master 10.10 Acceleration of Different Vehicles: Sample Report

## ► BACKGROUND RESOURCES

### Websites

Climate Change. Government of Canada Environment Canada [www.ec.gc.ca/climate/overview\\_what-e.html](http://www.ec.gc.ca/climate/overview_what-e.html)

This site gives a summary and overview of climate change and links to other Canadian climate change sites.

Climate Change. Government of Canada. [www.climatechange.gc.ca](http://www.climatechange.gc.ca) If you navigate this site's links, you will find information on provincial and territorial regional impacts, health impacts, the greenhouse effect, and a comprehensive overview of all climate change topics. It is ready to read for high school students. Included are global links and a resource list.

Regional Climate Change Poster Series – Climate Change in Canada. Natural Resources Canada. [http://adaptation.nrcan.gc.ca/posters/teachers/lesson\\_e.asp](http://adaptation.nrcan.gc.ca/posters/teachers/lesson_e.asp)

This site provides access to provincial and territorial posters about climate change including a teacher's guide and website. The topics in this poster series focus on weather/climate and ecosystems of Canada. It lists specific outcomes, links to the impacts of climate change on health, community, land, water, coastal regions, and different areas in Canada.

Weather Office. Government of Canada. [http://weatheroffice.ec.gc.ca/Canada\\_e.html](http://weatheroffice.ec.gc.ca/Canada_e.html)

This site offers interactive weather imaging and climate data. It includes seasonal change and forecasts, radarsat images, and the use of technology in weather and climate.

Confronting Climate Change in the Great Lakes Region (2003) Union of Concerned Scientists (UCS) and the Ecological Society of America. [www.ucsusa.org/greatlakes/pdf/solutions\\_ontario.pdf](http://www.ucsusa.org/greatlakes/pdf/solutions_ontario.pdf)

This is a major study written by university and government scientists in the Great Lakes region. Short summaries of the impact of climate change in Ontario and possible solutions have been co-authored by the

David Suzuki Foundation. The solutions section has a helpful discussion of Canada's Kyoto Commitment. [www.ucsusa.org/greatlakes/pdf/solutions\\_ontario.pdf](http://www.ucsusa.org/greatlakes/pdf/solutions_ontario.pdf)

Global Warming Project. North Western University. [www.letus.nwu.edu/projects/gw/navigation.html](http://www.letus.nwu.edu/projects/gw/navigation.html).

This project provides an approach to global warming through three parts: How Does Temperature Change?, What Makes Earth Warm?, and Addressing Climate Change. It has a teacher preparation section and introduction to global warming. The project can be done as a whole or separately to complement your unit.

Background Material. Global Climate Change. [www.ucar.edu/learn/1\\_4\\_1.htm](http://www.ucar.edu/learn/1_4_1.htm).

This site provides a background on climate change and its relation to carbon dioxide. It contains topics such as Climate Past, Present Climates and Human Activity, and Future Climates – the Great Uncertainty. Seven activities links follow that are useful in exploring these topics more thoroughly. They all focus on carbon dioxide.

### Book

Grant, Tim and Gail Littlejohn, eds. *Teaching About Climate Change*. Gabriola Island, B.C.: New Society Publishers, 2001. These essays, both new and updated from *Green Teacher*, focus on the needs of teachers seeking solid background information, a balanced pedagogical strategy and a series of activities to give the subject of climate change a vivid reality. The collection is divided into five sections: Foundations, Energy Alternatives, Transportation Alternatives, The School Building and Home and Community. Includes a broad range of learning activities for all grades. Of special interest for Grade 10 Science students who select the Urban Sprawl and Transportation culminating task are articles on “Investigating Public Transit” and “Counting the Real Cost of Cars” (includes student worksheet). ISBN 086571-437-1