

# eCards

## Curriculum Connections

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Climate Change eCards meets grade 9 to 12 curriculum expectations for a number of subject areas including Science, Social Studies, Business Studies, Canadian World Studies, Physical Education/Health Education, Geography, Political Science, Planning, Active Healthy Lifestyles, Environmental Science, Biology and Chemistry. As a communications activity, eCards has easy applications in Language Arts classrooms as well.

In this document, look for curriculum links for these provinces:

- Alberta
- Ontario

# Alberta

## AB 7

### Science

#### 7. A Interactions and Ecosystems

1. Investigate and describe relationships between humans and their environments, and identify related issues and scientific questions;
2. Trace and interpret the flow of energy and materials within an ecosystem;
3. Monitor a local environment, and assess the impacts of environmental factors on the growth, health and reproduction of organisms in that environment;
4. Describe the relationships among knowledge, decisions and actions in maintaining life-supporting environments

## AB 8

### Science

#### 8. E. Freshwater and Saltwater Systems

1. Describe the distribution and characteristics of water in local and global environments, and identify the significance of water supply and quality to the needs of humans and other living things;
4. Analyze human impacts on aquatic systems; and identify the roles of science and technology in addressing related questions, problems and issues

## AB 9

### Health and Life Skills

#### *Personal Health*

- use knowledge of a healthy, active lifestyle to promote and encourage family/peer/ community involvement

#### *Learning Strategies*

- use decision-making skills to select appropriate risk-taking activities for personal growth and empowerment (e.g., increasing freedom means increased responsibility for consequences of choices)

## AB 10

### Knowledge and Employability Science

#### *Investigating Matter and Energy in Environmental Systems*

- examine how various abiotic factors influence biodiversity in an ecosystem (e.g., climate, substrate, temperature, elevation)
- explain how various factors influence the size of populations (e.g., immigration, emigration, birth rate and death rate, food supply, predation, disease, number of offspring produced, climate change)

## Science

### *Energy Flow in Global Systems*

- explain how climate affects the lives of people and other species, and explain the need to investigate climate change
- identify the potential effects of climate change on environmentally sensitive biomes (e.g., impact of a reduction in the Arctic ice pack on local species and on Aboriginal societies that rely on traditional lifestyles)
- investigate and identify human actions affecting biomes that have a potential to change climate (e.g., emission of greenhouse gases, draining of wetlands, forest fires, deforestation) and critically examine the evidence that these factors play a role in climate change (e.g., global warming, rising sea level(s))
- describe and evaluate the role of science in furthering the understanding of climate and climate change through international programs (e.g., World Meteorological Organization, World Weather Watch, Global Atmosphere Watch, Surface Heat Budget of the Arctic Ocean (SHEBA) project, The Intergovernmental Panel on Climate Change (IPCC); the study of paleoclimates and models of future climate scenarios)
- describe the role of technology in measuring, modelling and interpreting climate and climate change (e.g., computer models, devices to take measurements of greenhouse gases, satellite imaging technology)
- identify questions to investigate that arise from practical problems and issues (e.g., develop questions related to climate change, such as “How will global warming affect Canada’s northern biomes?”; and “How will a species be affected by an increase or decrease in average temperature?”)
- identify and apply criteria for evaluating evidence and sources of information, including identifying bias (e.g., investigate the issue of global climate change)
- identify limitations of data, evidence or measurement (e.g., list the limitations of data and evidence of past climate changes, evaluate the validity of interpolations and extrapolations, use significant digits appropriately)
- explain how data support or refute a hypothesis or a prediction (e.g., provide evidence for or against the hypothesis that human activity is responsible for climate change)

## AB 11

### Political Science

#### *Political Thinking 20*

- to provide an understanding of the process of political decision making
- to establish an awareness on the part of the student of different political points of view and to create in the student an element of political sophistication
- to illustrate the relationship that exists in society between freedom, on the one hand, and responsibility on the other

## Science

### *The Changing Earth*

- explain, in general terms, how changes to Earth’s climate and how mass extinctions could be caused by changes or variation in the following: Earth’s orbit around the sun, the inclination of Earth’s axis, solar energy output, Earth’s geography due to crustal movement, volcanic activity, ocean currents, atmospheric composition or asteroid impact

- distinguish between correlation and cause and effect when describing the relationship between climate change and mass extinction
- synthesize information from multiple sources when making inferences about global warming and climate change, recording relevant data, acknowledging sources of information and citing sources correctly

## AB 12

### Science

Students will develop an understanding that:

- science and technology have both intended and unintended consequences for humans and the environment **(SEC3)**
- society provides direction for scientific and technological development **(SEC4)**
  - – Canadian society supports scientific research and technological development to facilitate a sustainable society, economy and environment **(SEC4a)**
  - – Decisions regarding the application of scientific and technological development involve a variety of perspectives, including social, cultural, environmental, ethical and economic considerations **(SEC4b)**

## Ontario

### ON 7

#### Science

7. B1.3 analyse how diverse First Nations, Métis, and Inuit practices and perspectives contribute to environmental sustainability

#### Social Studies

7.B2.1 formulate questions to guide investigations into issues related to the impact of the extraction/ harvesting and/or use of natural resources around the world from a geographic perspective

### ON 8

#### Science

8.E1.3 assess the impact of scientific discoveries and technological innovations on local and global water systems

#### Social Studies

7.B2.1 formulate questions to guide investigations into issues related to the impact of the extraction/ harvesting and/or use of natural resources around the world from a geographic perspective

## ON 9

### **Geography of Canada (Academic)**

#### *Geographic Foundations: Space and Systems*

- explain the terms and concepts associated with regions (e.g., bioregion, ecozone, "ecological footprint", boundaries, transition zone, ecumene)

#### *Human-Environment Interactions*

- explain how human activities (e.g., agricultural and urban development, waste management, parks development, forest harvesting, land reclamation) affect, or are affected by, the environment
  - identify the role of government in managing resources and protecting the environment
  - present findings from research on ways of improving the balance between human and natural systems (e.g., recycling, river clean-ups, ecological restoration of local woodlots or schoolyards, industrial initiatives to reduce pollution)
- evaluate solutions to environmental problems proposed by various groups (e.g., by government, industry, environmentalists, community members) and make recommendations for sustainable resource use

#### *Global Connections*

- explain the role of selected international organizations and agreements and why Canada participates in them (e.g., Kyoto Protocol)
- evaluate Canada's participation in organizations that deal with global issues (e.g., global warming, biodiversity, human rights)
- compare, in terms of resource use and consumption, the "ecological footprint" of an average Canadian with that of an average citizen in a developing country
- produce a set of guidelines for developing a solution to a global geographic or environmental issue

#### *Understanding and Managing Change*

- explain how selected factors cause change in human and natural systems (e.g., global warming)
- predict the consequences of human activities (e.g., agriculture, recreation) on natural systems (e.g., climate change)
- analyse the positive and negative effects on people and the environment of the manufacture, transportation to market, and consumption of selected products (e.g., cars, clothing, tropical food products)

### **Geography of Canada (Applied)**

#### *Human-Environment Interactions*

- describe the role of key stakeholders in protecting the environment (e.g., through emissions testing, environmental assessments)
  - create a visual (e.g., poster, cartoon, multi-media presentation) to address an environmental sustainability issue or promote environmental awareness

#### *Global Connections*

- describe Canada's participation in major international organizations (e.g., United Nations) and agreements (e.g., Kyoto Protocol)

- evaluate Canada's effectiveness and commitment in responding to global challenges (e.g., climate change,) and promoting international well-being (e.g., humanitarian aid, human rights advocacy, peacekeeping)
- analyze the potential impact on the global community of their personal choices (e.g., in music, clothes, food, work, recreation)
- compare the "ecological footprint" of a typical Canadian with those of people from other countries

## **Introduction to Business**

### *Business Fundamentals*

- explain the concepts of ethics and social responsibility as they apply to business (e.g., workplace safety, antidiscrimination issues, accessibility issues for people with disabilities, environmental responsibility, respect for labour laws, fair trade)
- explain controversial business issues from a local, national, and international perspective (e.g., accounting scandals, environmental impact of some business practices, insider trading, fraud)

## **ON 10**

## **Introduction to Business**

### *Business Fundamentals*

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## **Science (Academic)**

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

- explain the role of weather dynamics in environmental phenomena and consider the consequences to humans of changes in weather (e.g., the role of weather in air pollution, acid rain, global warming, and smog; the fact that smog aggravates asthma)

## **Science (Applied)**

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

- identify the impact of climate change on economic, social, and environmental conditions

## **ON 11**

## **Chemistry (University Prep)**

### *Gases and Atmospheric Pressure*

- analyze the cumulative effects of human activities and technologies on air quality, and describe some Canadian initiatives to reduce air pollution, including ways to reduce their own carbon footprint
- analyze the effects on air quality of some technologies and human activities (e.g., smelting; driving gas-powered vehicles), including their own activities, and propose actions to reduce their personal carbon footprint

## **Environmental Science (University and College Prep)**

### *Scientific Solutions to Contemporary Environmental Challenges*

- analyze, on the basis of research, social and economic issues related to a particular environmental challenge (e.g., melting of the polar ice cap) and to efforts to address it
- analyze ways in which societal needs or demands have influenced scientific endeavours related to the environment (e.g., research into alternative energy sources in response to demands to address the impact on climate change of burning fossil fuels)
- use a research process to locate a media report on a contemporary environmental issue (e.g., climate change, melting of the polar ice cap, deforestation), summarize its arguments, and assess their validity from a scientific perspective
- explain how new evidence affects scientific knowledge about the environment and leads to modifications of theory and/or shifts in paradigms (e.g., the impact of evidence of the effects of carbon dioxide emissions on theories of global warming)

### *Human Health and the Environment*

- analyze longitudinal data to determine the impact of various environmental factors that affect human health (e.g., air temperature, atmospheric greenhouse gases, contaminants in drinking water)

## **Environmental Science (Workplace Prep)**

### *Human Impact on the Environment*

- propose possible solutions, on the basis of research, to a current practical environmental problem that is caused, directly or indirectly, by human activities
- analyze the risks and benefits to the environment of human recreational activities and the leisure industry
- explain the concept of a “carbon footprint” and how it is used to measure the impact on the environment of a range of human activities

## **Physical Geography: Patterns, Process, and Interactions (University and College Prep)**

### *Human-Environment Interactions*

- evaluate the impact on a selected region of human-caused changes in atmospheric conditions (e.g., acid precipitation, smog, ozone depletion)
  - evaluate the impact of human activities (e.g., deforestation, the burning of fossil fuels, fertilizer use) on natural cycles (e.g., the carbon, nitrogen, or phosphorus cycles)

### *Global Connections*

- analyze the effects that human activities and/or natural events in a region or country can have on another part of the world (e.g., downstream impacts of dams, climatic effects of volcanic eruptions, acid precipitation or ozone layer depletion from the burning of fossil fuels) *Understanding and Managing Change*
  - explain the relationship between natural variations in global climate and glacial movements
  - distinguish natural short-term variability from long-term trends in historical climate data
  - explain the potential effects of long-term climate change (e.g., global warming) on different parts of the world, including their local community

- explain the correlation between changes in population density, changes in human activities, and changes in the “ecological footprint” of our species
- describe the difficulties involved in predicting climate change

## ON 12

### **Chemistry (College Prep)**

#### *Chemistry in the Environment*

- identify gases and particulates that are commonly found in the atmosphere, and explain how they affect air quality (e.g., greenhouse gases, tropospheric and stratospheric ozone, carbon monoxide, chlorofluorocarbons, soot)

### **The Environment and Resource Management (University and College Prep)**

#### *Human-Environment Interactions*

- explain the effects on human health and the environment of the use and proliferation of elected chemicals
- evaluate the effects of fossil fuel use (e.g., for transportation, heat, manufacturing) on urban and rural environments
- estimate personal and class “ecological footprints” (e.g., based on consumption of resources, production of wastes)

#### *Understanding and Managing Change*

- evaluate the impact on both human and natural systems of a selected environmental or resource management problem (e.g., tropical deforestation, climate change, water scarcity)