



# Air Quality Curriculum Connections

— GRADES 10, 11, 12

Air Aware eCards meets grade 10 to 12 curriculum expectations for a number of subject areas including Science, Social Studies, Physical Education, Geography, Planning, Active Healthy Lifestyles, Wellness, Exercise Science, 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:

- British Columbia
- Saskatchewan
- Manitoba
- Ontario
- New Brunswick
- Nova Scotia
- Newfoundland and Labrador
- Prince Edward Island.

## For more activities on air quality

Air Aware offers a number of other curriculum-aligned activities and games for students in grades 10 to 12. For more information, [click here](http://airaware.net).

<http://airaware.net>



# British Columbia

## BC 10

### Science

*Earth and Space Science: Energy Transfer in Natural Systems*

- D3 – evaluate possible causes of climate change and its impact on natural systems

### Physical Education

*Active Living – Knowledge*

- A1 – describe a variety of ways to be active throughout one's life
- A2 – demonstrate understanding of health-related components of fitness; skill-related components; fitness movement concepts
- A3 – implement a comprehensive physical activity plan incorporating goal setting processes; components of fitness; considerations of personal abilities and interests; nutritional considerations; principles of training

## BC 11

### Chemistry

- G3 – generate names and structures for simple organic compounds
- G4 – differentiate the various types of bonding between carbon atoms

### Science and Technology

*Transportation*

- J1 – describe the roles of transportation in society and the effects transportation has on society

### Social Studies

*Human Geography*

- Assess environmental challenges facing Canadians, including global warming, ozone layer depletion

## BC 12

### Geography

*Weather and Climate*

- D6 – explain how climate affects human activity
- D7 – analyze interactions between human activity and the atmosphere, with reference to global climate change

### Planning

*Health – Healthy Living*

- C1 – analyze factors that influence health (e.g. physical activity, nutrition, stress management)



# Saskatchewan

## SK 10

### Science

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

- Identify current issues related to global climate change
- Identify the most important natural and human factors that influence global climate
- Explain how scientific knowledge of global climate has evolved and continues to evolve, as new evidence becomes known
- Discuss potential consequences of climate change and the need to investigate climate change

### Wellness

#### *Physical Dimension: Physical Activity and Fitness*

- Appropriate amounts of, and ease of access to, a variety of physical activity
- A balanced menu of physical activity that provides opportunities for development and maintenance of each component of physical fitness—cardiovascular endurance, muscular endurance, muscular strength, flexibility, and body composition (healthy body weight)

#### *Nutrition*

- Opportunities for a balanced diet and wise food choices

#### *Wellness Factors in our Natural Environment: Pollution*

- The quality of the food we eat, of the water we drink and of the air we breathe is affected by a variety of pollutants (i.e., carbon monoxide in the air due to car exhausts; residues of harmful pesticides in the air, ground, and water supplies).
- In addition, the earth's protective ozone layer is being eaten away by human-made chemicals resulting in increasing cases of skin cancer and cataracts, and decreases in human immunities.

## SK 11

### Chemistry

#### *Chemical Reactions*

- Identify changes which indicate that a chemical reaction has taken place
- Identify chemical reactions that help maintain living organisms
- Identify chemical reactions that harm living organisms
- Identify chemical reactions that affect the environment

### Social Studies – History and World Issues

#### *Environment*

- The state of the environment at the end of the Twentieth Century



## SK 11 continued

### Physical Education

- Students will demonstrate an understanding of how one's level of personal fitness is related to stress management, healthy eating and choice of leisure activities.
- Students will demonstrate the ability to assess and apply acceptable training principles in designing personal programs to improve health-related components of cardiovascular/respiratory efficiency, muscular strength, muscular endurance, flexibility, body composition and posture.

## SK 12

### Physical Education

- Students will demonstrate an understanding of how one's level of personal fitness is related to stress management, healthy eating and choice of leisure activities.
- Students will demonstrate the ability to assess and apply acceptable training principles in designing personal programs to improve health-related components of cardiovascular/respiratory efficiency, muscular strength, muscular endurance, flexibility, body composition and posture.

# Manitoba

## MB 10

### Science

- Describe the formation and environmental impact of various types of air pollution
- Investigate and evaluate evidence that climate change occurs naturally and can be influenced by human activities
- Discuss potential consequences of climate change

### Physical Education/Health Education

- Demonstrate a knowledge of healthy lifestyles practices that contribute to disease/illness prevention, including mental illness/disorders
- Explain the concept of active living, and the factors (i.e. benefits of physical activity, experiences, interests, abilities; financial, cultural, demographic, safety issues; personal circumstances) that may affect making personal choices
- Design an action plan for active living on a daily basis for self and/or others (e.g. friend, sibling, senior citizen)
- Evaluate the contribution (associated fitness component, muscle/muscle groups) of selected physical activities or exercise for physical fitness (push ups can develop muscular strength of arm muscles which contributes to health-related fitness)
- Investigate the contribution (e.g. strength, endurance, energy expenditure, elasticity, longevity, healthy weight) to exercise/physical activity to optimal health and the prevention of disease (e.g. cardiovascular disease, breast cancer, type II diabetes, osteoporosis)
- Examine factors (e.g. enjoyment, previous experiences, values and attitude, social benefits, financial commitment, medical, incentives, stages of change) that have an impact on adherence to a personal fitness plan



## **MB 11**

### **Chemistry**

- Identify the abundances of the naturally occurring gases in the atmosphere and examine how these abundances have changed over geologic time
- Research Canadian and global initiatives to improve air quality

### **Social Studies**

- Analyze urban social issues
- Describe the impact of urbanization on Canadian ways of life
- Describe urban environmental and economic issues
- Identify issues related to urban growth and decline

### **Active Healthy Lifestyles**

- Evaluate the benefits of selected types of physical activities in the development of fitness and in the prevention of disease at various stages of life
- Examine and evaluate factors that affect fitness and activity choices
- Design, implement, evaluate and revise an exercise routine that contributes to the health-related fitness components

## **MB 12**

### **Biology**

- Evaluate personal food intake and related food decisions
- Identify personal lifestyle choices that contribute to cardiovascular and respiratory wellness

### **Active Healthy Lifestyles**

- Demonstrate appropriate critical thinking, planning, and decision-making skills in the development and implementation of a personal physical activity plan that is safe and ethical and contributes to personal health and fitness goals
- Identify, implement, and revise personal goals for healthy lifestyle practices, including physical activity participation
- Demonstrate understanding of the relationship between the energy spent in physical activity and healthy weight
- Demonstrate the ability to estimate daily energy expenditure by analyzing personal physical activity participation
- Explain factors that contribute to energy balance and healthy weight



# Ontario

## ON 10

### Science Academic

*Earth and Space Science: Climate Change*

- All expectations

### Science Applied

*Earth and Space Science: Earth's Dynamic Climate*

- All expectations

### Healthy Active Living

- Identify the factors (e.g. social interaction, enjoyment, relaxation, self-esteem) that will affect choice of activities with potential for lifelong participation and enjoyment
- Explain how healthy eating is beneficial to various physical activities (e.g. sports, school)
- Make appropriate revisions to personal plans of action (e.g. using self-designed or computerized programs) that promote healthy eating and physical activity

### Food and Nutrition

- Compile a body of core information on the nutritional status of Canadians and determine personal nutrient intake using a variety of print and electronic sources and telecommunications tools (e.g. *Canada's Food Guide to Healthy Eating*)
- Demonstrate an understanding of how the findings of their nutrition survey apply to themselves and their families

## ON 11

### Physical Geography

*University and College Prep*

- 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, climate change effects of volcanic eruptions, acid precipitation, etc.)

### Environmental Science

*Workplace Prep*

- Propose possible solutions, on the basis of research, to a current practical environmental problem that is caused, directly or indirectly, by human activities

### Human Health and the Environment

- All expectations

### Healthy Active Living

- Explain the benefits of lifelong participation in different physical activities (e.g. social interaction, enjoyment, relaxation, self-esteem)
- Describe strategies that will affect their choice of activities and encourage lifelong participation and enjoyment (e.g. choosing an activity that appeals to them and that promotes personal skills and abilities)



## ON 11 continued

### Health For Life

- Analyze the environmental factors (e.g. air and water quality, living conditions) that affect personal health (e.g. increase in respiratory and communicable diseases)
- Describe environmental influences on health on the local, national and global levels (e.g. pollution, industrial activity, weather)

## ON 12

### Science

#### *University and College Prep*

- Describe requirements for a balanced diet based on the biochemical and energy needs of the average body, and explain how these requirements might vary among people with different lifestyles (e.g. young children, the elderly, a person with diabetes, an athlete)
- Explain why some populations are particularly susceptible to specific health problems (e.g. the risk of diabetes among First Nations populations; the risk of thalassemia among Mediterranean populations; the risk of pneumonia and tuberculosis among people with HIV/AIDS)

### Environmental Science

#### *University and College Prep*

- Analyze on the basis of research, social and economic issues related to a particular environmental challenge (e.g. over fishing, deforestation, acid rain, melting of the polar ice cap) and to efforts to address it
- Identify some major contemporary environmental challenges (e.g. global warming, acid precipitation) and explain their causes (e.g. deforestation, carbon and sulfur emissions) and effects (e.g. desertification, the creation of environmental refugees, the destruction of aquatic and terrestrial habitats)
- Describe a variety of human activities that have led to environmental problems (e.g. burning fossil fuels for transportation or power generation; waste disposal) and/or contributed to their solution (e.g. the development of renewable resources of energy, program to reduce, reuse and recycle)

### Human Health and the Environment

- All expectations

### The Environment and Resource Management

#### *University and College Prep*

- Explain the effects on human health and the environment of the use and proliferation of selected chemicals
- Evaluate the effects of fossil fuels use (e.g. for transportation, heat, manufacturing) on urban and rural environments
- Illustrate ways in which environmental degradation is related to human health concerns (e.g. smog and respiratory problems)
- Develop and use appropriate questions to focus a geographic inquiry on an environmental or resource management issue (e.g. deforestation, depletion of the ozone layer, soil depletion, loss of biodiversity)



## ON 12 continued

### The Environment and Resource Management

#### *Workplace Prep*

- Determine how selected human activities alter the natural environment (e.g. the effect of the depletion of forests on oxygen production, the effect of chlorofluorocarbon use on the ozone layer, the effects of resource extraction and transportation on the natural environment)
- Analyze how different kinds of pollution (e.g. air, water, noise) affect humans, plants, animals and materials
- Describe examples of responsible environmental behaviour in aspects of daily life (e.g. transportation, lawn care, water and energy consumption, shopping)

### Healthy Active Living

- Analyze the benefits of lifelong participation in different physical activities (e.g. social interaction, enjoyment, relaxation, self-esteem)
- Describe strategies that promote lifelong participation in physical activity

### Exercise Science

- Describe the relationship between nutrition and activity (e.g. caloric balance, nutrient balance, hydration, needs of specific populations)

## New Brunswick

### NB 10

#### Science – Atlantic Canada

- Propose courses of action on social issues related to science and technology, taking into account an array of perspectives, including that of sustainability

#### Environmental Science

- Explain that pollution comes in various forms in different locations
- Identify major airborne pollutants and their sources
- Illustrate how air pollution affects human health, flora and fauna, agricultural crops, forestry plantations, buildings and material structures
- Explain how air pollution is produced by energy generation plants, industrial processes, vehicle emissions, mines and ore refining, petro-chemical plants
- Identify trends that suggest the greenhouse effect may be contributing to climate change



## NB 10 continued

### Physical Education and Health

- Explain the concept of healthy active living and the wellness-awareness continuum
- Design a fitness program based on the principles of training
- Demonstrate an understanding of the concepts of balanced diets, using Health Canada Standards, and an ability to apply them to a personal plan
- Demonstrate an understanding of appropriate precautions when exercising in a variety of environments
- Develop a personal plan for healthy active living
- Adapt concepts of energy consumption and expenditures for use within their own healthy eating plan

## NB 11

### Biology

- Propose a course of action on social issues related to science and technology, taking into account human and environmental needs
- Propose courses of action on social issues related to science and technology, taking into account an array of perspectives, including that of sustainability

### Chemistry

- Propose courses of action on social issues related to science and technology, taking into account an array of perspectives, including that of sustainability

## NB 12

### Chemistry

- Propose courses of action on social issues related to science and technology, taking into account an array of perspectives, including that of sustainability



## Nova Scotia

### NS 11

#### **Biology – Atlantic Canada**

- Propose courses of action on social issues related to science and technology, taking into account an array of perspectives, including that of sustainability

### NS 12

#### **Science – Atlantic Canada**

- Propose courses of action on social issues related to science and technology, taking into account an array of perspectives, including that of sustainability

## Newfoundland and Labrador

### NL 10

#### **Science**

- Compare examples of how society influences science and technology
- Defend a decision or judgment, and demonstrate that relevant arguments can arise from different perspectives

#### **Healthy Living**

- Identify and analyze the impacts of an active lifestyle on physical, social, emotional, intellectual, and spiritual well-being
- Identify the impact of active lifestyles on society and the environment
- Demonstrate an understanding of the impact of movement and physical activity on body image including self-esteem and self-confidence
- Identify and analyze the impacts of eating practices on personal well-being
- Evaluate health benefits/risks associated with eating practices
- Critically analyze the impact of eating practices on the prevention and/or development of chronic health conditions

#### **Canadian Geography**

- Examine the factors which result in the uses of different modes of transportation

## NL 11

### Science

- Explain biotic and abiotic factors that keep natural populations in equilibrium and relate this equilibrium to the resource limits of an ecosystem
- Illustrate the cycling of matter through biotic and abiotic components of an ecosystem by tracking carbon, nitrogen and oxygen—describe the significance of global warming
- Compare the risks and benefits to the biosphere of applying new scientific knowledge and technology to industrial processes
- Analyze the interactions between the atmosphere and human activities—describe the causes and impact of the greenhouse effect; identify how human activities may increase the number and intensity of extreme weather events; describe the impact of climate change on economic, social and environmental conditions

### Biology

- Explain the importance of nutrition and fitness to the maintenance of homeostasis

### Nutrition

- Demonstrate an understanding of how food choices and eating habits impact health and well-being
- Set healthy eating goals and develop plans to achieve these
- Identify the relationship between diet and disease prevention and/or management
- Propose healthy eating strategies for prevention and management of chronic diseases and for specific lifestyle choices
- Propose healthy eating strategies for the management of chronic diseases
- Propose healthy eating strategies for specific lifestyle choices

## NL 12

### Environmental Science

- Identify anthropogenic interactions that affect Earth's atmosphere
- List the factors that can affect air quality (particulate matter, critical air contaminants, smog, persistent organic pollutants, ozone)
- Describe critical air contaminants effects on air quality (sulfur oxides, nitrogen oxides, particulate matter, volatile organic compounds, carbon monoxide, ammonia, ground level ozone)
- Describe how smog affects air quality
- Describe how persistent organic pollutants affect air quality
- Identify the sources of contaminants that degrade air quality (fuel combustion, industry, natural sources)
- Describe the affects of poor air quality on human health
- Identify that climate change can have a catastrophic affect on Earth (natural and anthropogenic sources of greenhouse gases)
- Describe the impacts of climate change in Canada on human health

### World Geography

- Examine how human activity affects climatic conditions (e.g. greenhouse effect, ozone depletion, global warming, vacationing in southern destinations during winter)



## NL 12 continued

### **Nutrition**

- Demonstrate an understanding of how food choices and eating habits impact health and well-being
- Set healthy eating goals and develop plans to achieve these
- Identify the relationship between diet and disease prevention and/or management
- Propose healthy eating strategies for prevention and management of chronic diseases and for specific lifestyle choices
- Propose healthy eating strategies for the management of chronic diseases
- Propose healthy eating strategies for specific lifestyle choices

## Prince Edward Island

### PEI 10

#### **Science – Atlantic Canada**

- Compare examples of how society influences science and technology
- Defend a decision or judgment and demonstrate that relevant arguments can arise from different perspectives

#### **Canadian Studies**

- Articulate the importance of sustainability of natural resources from a local, regional, national and global perspective
- Describe how Canadians can make their communities sustainable

### PEI 11

#### **Biology**

- Discuss the responsibility of society, through biology and technology, to protect the environment and use natural resources wisely

#### **Agriscience**

- Determine major sources of atmospheric pollution and identify procedures for maintaining and improving air quality

### PEI 12

#### **Biology**

- Discuss the responsibility of society, through biology and technology, to protect the environment and use natural resources wisely

#### **Science – Atlantic Canada**

- Propose course of action on social issues related to science and technology, taking into account an array of perspective, including that of sustainability