



Global Encounters
International Student
Video Conferences

LET'S TALK SCIENCE! INDIGENOUS PERSPECTIVES ON CLIMATE CHANGE

International Video Conference

Teacher's Guide



The Centre for
Global Education



TakingITGlobal
INSPIRE INFORM INVOLVE

Dear Teacher,

We would like to extend a warm welcome to the Let's Talk Science! Indigenous Perspectives on Climate Change, Video Conference! This conference is possible through a partnership between the [Centre for Global Education](#) and [TakingITGlobal](#). We are excited to have you and your students engage in our interactive virtual classroom and participate in the live event on May 11th, 2017.

The Climate Change video conference is geared to giving opportunities to acknowledge, identify, and change the perception of climate change and the impacts it has on Indigenous people globally as well as locally. Students will have the opportunity to share their research findings, thoughts and ideas on climate change with a panel of guest speakers.

To help prepare for the event, we have created this guide to help you facilitate your students' participation in the video conference and the pre-conference activities. It contains instructions on how to join the virtual classroom, through which they can collaborate with their peers all over the world, and an overview of the lessons housed there. All resources mentioned in this curricular guide will be found linked to the corresponding Activities inside the virtual classroom.

Thank you again for being willing to reach beyond the class and connect your students to their peers, as we all seek to help promote awareness of Indigenous cultures.

If you have any questions or concerns, feel free to reach out to our team at encounters@tigned.org

- The Global Encounters Team

Let's Talk Science! Indigenous Perspectives on Climate Change

Date: June 2, 2017

Time: 09:00-10:00 MT/11:00-12:00 ET

Total Run Time: 60 minutes

AGENDA

- 9:00 – 9:05 MT / 11:00 – 11:05 ET
Welcome, Introductions (Each school will have one minute to introduce their school)
- 9:05 – 9:15 MT / 11:05 – 11:15 ET
Guest speaker(s) introduction(s) & presentation
- 9:15 – 9:45 MT / 11:15 – 11:45 ET
 - Guest speaker presentation
 - Q & A/feedback/art reflection
- 9:50 – 10:00 MT/ 11:50 – 12:00 ET
Summary and Closing Remarks

SPEAKER

Brenda Parlee

Key Dates

Date	Activity	Description
May 25th	Classroom Collaboration	Between May 25th and June 2nd students can/will engage in activities to learn more about climate change and the global impact on Indigenous People and interact with their peers to discuss their project ideas through the Virtual Classroom (online collaboration space).
June 2nd	June 2nd Let's Talk Science! Indigenous Perspectives on Climate Change	On this day, participating classrooms will join LIVE together to share their research surrounding climate change and discuss with guest speakers.

The Video Conference

In this live and interactive event, students will see, listen to and engage with a series of experts. Students will also have an opportunity to ask questions and share their own thoughts and research. The video conference will take place between 9:00-10:00 am (Mountain time) on Friday, June 2, 2017.

Testing and setup for Video Conference

We will be connecting using **Zoom**, which is a free online collaboration tool. This is a downloadable conferencing software that can be used on any laptop. All you need is a laptop, webcam and the internet. Here is a [link](#) to a video describing how to use the software. Here is a [link](#) to a written step-by-step guide.

Activity Outline

Ahead of the video conference, you will lead your class through the pre conference activities as well as the research activities available in the assignments section of the teacher's guide, which are designed to take two or three class periods. Activities also include corresponding collaboration activities to provide a more holistic learning experience. We ask that you strongly encourage and support this participation.

PRE-CONFERENCE ACTIVITIES

The following contains three learning activities for students to complete prior to the video conference. Please choose **one** of the three lessons provided below, as well responses to the critical questions to complete, prior to the conference. Both components should take 1 to 1.5 classes to complete.

Please have your students work in groups to complete the assignments they may post their work to the virtual classroom if they choose. While we estimate that each activity will take about one class period to complete, please spend as much or as little time on this as your curriculum will allow.

CRITICAL QUESTIONS & PRESENTATIONS

Break students into groups of 3 or 4, and assign one of the questions below to each group to discuss and create a presentation (one or two slides) surrounding their assigned question (must have a minimum of 4 groups). During the conference, students will be paired with another group from a different school to share their presentations.

1. What are some steps you can take to Decarbonize and Decolonize?
2. Are there measures being taken by governments or other groups that are creating a deeper impact of climate change on Indigenous populations? (ie. Modern Colonialism: the policy or practice of acquiring full or partial political control over another country, occupying it with settlers, and exploiting it economically)
3. Compare and contrast the impact of Climate Change on your Physical Region (as per the Getting Started Activity) and Indigenous groups to that of international Indigenous groups. For example, a student in BC may talk about impact of a warming climate and the decline of salmon available for fishing.
4. How can you become a climate change hero? Share a brief outline for an action plan you could take to become a climate change hero. To help create a plan, consider the following questions:
 - 1) What can I do to reduce my carbon footprint?
 - 2) What are the effects of global climate change on today's world?
 - 3) Why is it important to preserve the land for Indigenous groups?
 - 4) What are the consequences if we don't preserve the land for Indigenous groups?

Although we are asking that the student work be posted/linked in the TakingITGlobal Virtual Classroom Blog section, students are welcome to choose any medium they would like (videos, Prezi's, Photo journals, etc.) In order to receive feedback from their peers, we would ask that they put a hyperlink to their work in the Blogs.

Activities

Lesson One:

Climate Change, Pt. I: This activity explores the [Greenhouse Effect](#), how human activities, such as government, and private entities, contribute to climate change, and how we can learn from the experience in the past.

Following the video, write down definitions to the following terms. As a class, compare your definitions to ensure that you have all grasped these important climate change concepts.

- Fossil fuels
- Global warming
- Greenhouse effect
- Greenhouse gases

Discussion

To be done in groups of about 3-5 students.

1. Choose one of the Societies Past Handouts to investigate (make sure class is divided evenly among the three topics).
2. Read through the handout and look to clues that reveal the fate of the civilization.
3. Do online research to discover what happened to the civilization.
4. In your group, discuss how you can relate the stories of this society to the way in which your society operates.

Blog Post

Write a 200 word blog that answers the following questions in a short paragraph:

- How is the story of the Vikings, Anasazi, or Easter Islanders relevant today?

- What sort of impact do current human societies have on their surrounding environments? (visit TakingITGlobal's climate change page link below for tons of additional resources and information about climate change)
- Should we be concerned about our own future, considering the current impact of humans on the environment?
- What might be some indicators that different parts of earth might be reaching their "carrying capacity"?
- What lessons can we learn from studying this historical civilization?

Learning Objectives

- To develop a basic understanding of the science of climate change.
- To be able to describe how the greenhouse effect is related to climate change.
- To understand that human activities and greenhouse gases contribute to climate change.

Lesson Two:

Impact of climate change in your community and global communities: This activity explores how climate change is affecting both our local Indigenous communities as well as global Indigenous groups.

A. In this section, students will learn about different regions in Canada.

Additional resources (Not needed for the assignments):

- [RMR: A Message from Environment Canada](#)
- [Environment Canada has issued Severe Weather Warnings](#)
- [Is Alberta Flooding a Sign of Climate Change](#)

In small groups, get students to discuss/research different impacts of climate change on different regions of Canada. Using a classroom map as a base, get each small group to share their findings as to the different impacts on the different regions.

Physical Regions of Canada: ([link to more information](#))

- The Cordillera.
- The Prairies.

- The North.
- The Canadian Shield.
- The Great Lakes.
- The St. Lawrence River.
- The Atlantic.

Have students go over the following resources on climate change and Canadian Indigenous groups:

[Permafrost Thaw in Northern Canadian Arctic](#)

[First Nations Communities suffering 'more intense' impacts of climate change](#)

[Climate change, Health, and Vulnerability in Canadian Northern Aboriginal Communities](#)

[Video: Indigenous Climate Action](#)

[Video: Aboriginal Perspectives on Climate Change](#)

B. In this section, students will learn about different effects of Climate Change on a few international Indigenous communities:

- [Daku-Climate change in Fiji](#)
- [Climate Change in the Pacific-Food](#)
- [Australia-Fighting Carbon with Fire](#)
- [News Cast, Maori, New Zealand](#)

Climate Change Around the World

1. Ask students what they know about the following countries: New Zealand, Fiji, and Australia
2. Discuss each country (by latitude, temperature, and climate) using a large classroom map of the world or a globe; discuss longitude and latitude as needed.
3. Discuss these two media
 1. Temperature change over the last 1000 years: [graphic](#)
 2. [What if all the ice melted on Earth?](#)

Post a Blog - Climate Change, globally and in your Community

Now that students have a broad understanding of the impact of climate change across Canada, or their country, and New Zealand, Fiji, and Australia, in particular, we want the students to begin looking closer to home.

1. Before writing a blog entry, have students discuss:
 1. What are signs of Climate Change in our community?
 2. What is the impact of Climate Change on local Indigenous communities?
2. Get students to post a blog in response to the following question:
3. *Compare and contrast the impact of Climate Change on your Physical Region (as per the Getting Started Activity) and Indigenous groups to that of international Indigenous groups. For example, a student in British Columbia may talk about impact of a warming climate and the decline of Salmon available for fishing.*

Learning Objectives

- To develop an understanding of the how climate change is impacting the local Indigenous communities and global Indigenous communities
- To be able to understand how climate change is affecting Indigenous communities and traditional ways of life.

Lesson 3

Stepping forward: Having learned about the causes of climate change and impacts on Indigenous groups (globally and locally), you are now ready to take your environmental initiatives beyond the classroom. This lesson should take approximately 1-1.5 classes.

Climate Change Hero

Step One:

Watch [Climate 101 With Bill Nye](#) video **(4:33 minutes)**

Step Two:

Have students navigate through [Climate Kids: NASA's Eye on Earth](#), , and take notes on the following key terms (for younger students, these notes can be provided for the students as handouts, and the website can be accessed as a whole class). Once students have completed the definitions and information on terms, and they have been checked, students can play the interactive games to help gain a better understanding. **(10-15 minutes)**

- Fossil fuels: What are they, what do they do, how do we use them?
- Global warming: What is it? What does it do? What does it mean for the future?
- Greenhouse effect: What is it? What does it do?
- Greenhouse gases: What are they? What does it do?

Step Three:

Take your students on an interactive journey surrounding the effects of climate change through [NASA's Climate Change Time Machine](#), to help navigate the time machine, use the following questions to help facilitate your student's journey:

- 1) How do greenhouse effect impact the melting of sea ice and raising water levels what does this mean for coastal cities?
- 2) How do fossil fuels contribute to carbon emissions?
- 3) Based on what you know about fossil fuels, the greenhouse effect, and greenhouse gases, what do you think is happening to the earth's average temperature, is it getting hotter, or colder? Why? **(15-20 minutes total)**

Step: Four (30-35 minutes or a second class period)

Take a moment to reflect on the qualities which stand out to you in a leader. Keeping these in mind, find a story online about a young climate change hero – a young person who is taking action to address a local or global issue related to climate change - who inspires you.

For your climate change hero, identify:

- Location
- Age
- Local challenges and issues
- Global challenges and issues
- How these problems related to climate change
- How the youth addressed the problems
- What help or resources they used

After reading some of these stories, reflect on what role young people have in the future of climate change and our world.

How can you become a climate change hero? In small to medium size groups, using the [TIG 6-step action guide](#), construct a brief outline for an action plan you could take to become a climate change hero.

Post a “Blog” (two options):

1. Write a blog post about your youth hero’s story.
2. Write a blog post about your climate change action plan

Learning Objectives

- Identify local issues related to climate change that are most relevant and important to students.
- Research how other youth have responded to climate change.
- Make a climate change action plan.

Additional (optional) Lesson Plans

**Let’s Talk Science! Indigenous Perspectives on Climate Change
Debate Lesson Plan**

Objective:

To encourage objective debate among students surrounding the impacts of climate change and Indigenous populations globally.

Materials & Prep:

Provided activity sheets for students with questions

3 sheets of colored paper red=disagree, green=agree, yellow=unsure.

Separate the classroom into three areas with the colored papers before students arrive to class.

Time Needed:

One class period

Execution:

- 1) Hand out the debate assignment sheet to the students. (1-2 minutes)
- 2) Have students reflect on the question independently, writing their supported response on the spaces provided. (15 minutes)
- 3) Once students have completed their response, have the students separate into the proper areas of the classroom based on their response to the question. (1-2 minutes)
- 4) In each group have one student chosen to participate in a coin toss to indicate which group speaks first. (2-3 minutes)
- 5) Allow each group to respond to the question for 1-2 minutes (this is a hard time limit). (total of 10 minutes)
- 6) Students are allowed to move from their groups if/when they are convinced by the other side. Students who are in the “unsure” group, are also taking part, they MUST have a reason as to why they are unsure (ie. Conflicting information, not enough information, they do not fully understand the question, etc.)
- 7) Once all groups have shared their responses, discuss findings as a class (15 minutes)
- 8) Have students then respond and reflect individually, or with a partner to the final question on the activity sheet. (remainder of class, plus additional time desired)

Student Activity Sheets

Let's Talk Science! Indigenous Perspectives on Climate Change Debate Activity

Instructions: Read the question provided below, do you agree, disagree, or are unsure? Write a paragraph to support your rationale by using information you've learned about climate change during class. NOTE: Be sure you are using proper evidence for your rationale from class notes, the textbook, etc.

Questions:

- 1) Are there measures being taken by governments or other groups that are creating a deeper impact of climate change on Indigenous populations? (ie. Modern Colonialism: the policy or practice of acquiring full or partial political control over another country, occupying it with settlers, and exploiting it economically)

Response:

- 2) What are some steps you can take to Decarbonize and Decolonize? You can choose to prepare a written answer, include imaging in your art piece, or create a new visual art piece.



Curricular Links

SOCIAL STUDIES

Social Studies 4

General Outcome 4.2: The Stories, Histories and Peoples of Alberta: Students will demonstrate an understanding and appreciation of the role of stories, history and culture in strengthening communities and contributing to identity and a sense of belonging.

4.2.1 appreciate how an understanding of Alberta's history, peoples and stories contributes to their own sense of belonging and identity:

- recognize how stories of people and events provide multiple perspectives on past and present events (I, TCC)
- recognize oral traditions, narratives and stories as valid sources of knowledge about the land, culture and history (CC, TCC)
- recognize the presence and influence of diverse Aboriginal peoples as inherent to Alberta's culture and identity (CC, I, TCC)
- demonstrate respect for places and objects of historical significance (I, LPP, TCC)

4.2.2 assess, critically, how the cultural and linguistic heritage and diversity of Alberta has evolved over time by exploring and reflecting upon the following questions and issues:

What do the stories of Aboriginal peoples tell us about their beliefs regarding the relationship between people and the land? (TCC)

General Outcome 4.3 Alberta: Celebrations and Challenges:

4.3.1 appreciate the factors contributing to quality of life in Alberta:

- value and respect their own and other cultural identities (C, I)
- demonstrate respect for the rights, opinions and perspectives of others (C, I)
- appreciate the influence of the natural environment and resources on the growth and development of Alberta (ER, LPP)
- value and respect their relationships with the environment (C, ER, LPP)

4.3.3 examine, critically, Alberta's changing cultural and social dynamics by exploring and reflecting upon the following questions and issues:

- In what ways have Aboriginal peoples and communities changed over time? (CC, I, TCC)
- How has multiculturalism in Alberta evolved over time? (CC, I, GC, LPP)
- How do buildings, historic sites and institutions reflect the establishment and cultural diversity of communities in Alberta (i.e., Glenbow Museum, Royal Alberta Museum, Head-Smashed-In Buffalo Jump, Writing-on-Stone Provincial Park, Father Lacombe Chapel Provincial Historic Site, Ukrainian Cultural Heritage Village)? (CC, I, LPP, TCC)
- How do the names of geographic places reflect the origins of the people who inhabited, discovered or developed communities in these places? (CC, I, LPP, TCC)
- In what ways have music, art, narratives and literature contributed to the vitality of the culture, language and identity of diverse Alberta communities over time? (I, CC, LPP, TCC)
- How does living in a particular community, region or province help shape individual and collective identity? (CC, I, LPP)

Social Studies 5

5.2 Histories and Stories of Ways of Life in Canada General Outcome Students will demonstrate an understanding of the people and the stories of Canada and their ways of life over time, and appreciate the diversity of Canada's heritage.

5.2.1 appreciate the complexity of identity in the Canadian context:

- recognize how an understanding of Canadian history and the stories of its peoples contributes to their sense of identity (I, TCC)
 - acknowledge oral traditions, narratives and stories as valid sources of knowledge about the land and diverse Aboriginal cultures and history (CC, I, TCC)
 - acknowledge British influence and presence in Canada (CC, I, TCC)
 - acknowledge the contributions made by diverse cultural groups to the evolution of Canada (CC, I, TCC)
 - recognize how changes in society can affect identity (CC, I)

5.2.2 examine, critically, the ways of life of Aboriginal peoples in Canada by exploring and reflecting upon the following questions and issues:

- What do the stories of First Nations, Métis and Inuit peoples tell us about their beliefs regarding the relationship between people and the land? (I, CC, TCC, LPP)
- How are the Aboriginal cultures and ways of life unique in each of the western, northern, central and eastern regions of Canada? (I, CC, TCC)
 - How were the natural environment and geography of each region of Canada determining factors of the diversity among Aboriginal groups (e.g., languages, symbolism)? (LPP, TCC)

5.3 Canada: Shaping an Identity Students will demonstrate an understanding of the events and factors that have changed the ways of life in Canada over time and appreciate the impact of these changes on citizenship and identity.

5.3.1 appreciate how changes impact citizenship and identity:

Social Studies 7

7.1.2 appreciate the challenges of co-existence among peoples (C, CC, I, LPP)

7.1.3 compare and contrast diverse social and economic structures within the societies of Aboriginal, French and British peoples in pre-Confederation Canada by exploring and reflecting upon the following questions and issues:

- In what ways did European imperialism impact the social and economic structures of Aboriginal societies? (ER, GC, PADM, TCC)
- What role did the British government play in the settlement of North America? (PADM, ER, LPP, GC)

7.1.4 assess, critically, the economic competition related to the control of the North American fur trade by exploring and reflecting upon the following questions and issues:

- How did the First Nations, French, British and Métis peoples interact with each other as participants in the fur trade? (TCC, ER, LPP)

7.2 Following Confederation: Canadian Expansions

General Outcome

Students will demonstrate an understanding and appreciation of how the political, demographic, economic

and social changes that have occurred since Confederation have presented challenges and opportunities for individuals and communities.

7.2 Following Confederation: Canadian Expansions: Students will demonstrate an understanding and appreciation of how the political, demographic, economic and social changes that have occurred since Confederation have presented challenges and opportunities for individuals and communities.

7.2.1 recognize the positive and negative aspects of immigration and migration (GC, LPP, C, I)

7.2.3 appreciate the challenges that individuals and communities face when confronted with rapid change (I, CC, LPP)

Social Studies 9

9.1.3 appreciate how emerging issues impact quality of life, citizenship and identity in Canada (C, I, PADM)

9.1.6 assess, critically, the impact of the Canadian Charter of Rights and Freedoms on the legislative process in Canada by exploring and reflecting upon the following questions and issues:

- In what ways has the Canadian Charter of Rights and Freedoms fostered recognition of individual rights in Canada? (PADM, I)
- How does the Canadian Charter of Rights and Freedoms support individuals in exercising their rights? (PADM, C, I)
- How does the Indian Act recognize the status and identity of Aboriginal peoples? (PADM, I, C)
- How does legislation such as Treaty 6, Treaty 7 and Treaty 8 recognize the status and identity of Aboriginal peoples? (I, PADM, LPP)

Social Studies 10-1 & 10-2

10-1:

Key Issue: To what extent should we embrace globalization?

Related Issue 1: To what extent should globalization shape identity? Students will explore the impacts of globalization on their lives.

1.1 acknowledge and appreciate the existence of multiple perspectives in a globalizing world (GC, CC)

1.2 appreciate why peoples in Canada and other locations strive to promote their cultures, languages and identities in a globalizing world (I, CC, GC)

1.3 appreciate how identities and cultures shape, and are shaped by, globalization (I, CC, GC)

1.4 explore ways in which individuals and collectives express identities (traditions, language, religion, spirituality, the arts, attire, relationship to land, ideological beliefs, role modelling) (I, CC, LPP)

1.5 explore understandings and dimensions of globalization (political, economic, social, other contemporary examples) (PADM, ER, CC)

1.6 examine the impact of communications technology and media on diversity (universalization of pop culture, hybridization, diversification) (I, CC, GC)

1.7 analyze opportunities presented by globalization to identities and cultures (acculturation,

accommodation, cultural revitalization, affirmation of identity, integration) (I, CC, GC)

1.8 analyze challenges presented by globalization to identities and cultures (assimilation, marginalization, accommodation, integration, homogenization) (I, CC, GC)

1.9 evaluate efforts to promote languages and cultures in a globalizing world (language laws, linguistic rights, cultural content legislation, cultural revitalization, linguistic revitalization) (I, CC)

Key Issue: To what extent should we embrace globalization?

Related Issue 2: To what extent should contemporary society respond to the legacies of historical Globalization? Students will assess the impacts of historical globalization on Indigenous and non-Indigenous Peoples.

2.1 recognize and appreciate historical and contemporary consequences of European contact, historical globalization and imperialism on Aboriginal societies (TCC, CC, I, GC)

2.2 exhibit a global consciousness with respect to the human condition (GC, C)

2.3 accept social responsibilities associated with global citizenship (C, GC)

2.4 recognize and appreciate the validity of oral histories (TCC, CC)

2.5 recognize and appreciate various perspectives regarding the prevalence and impacts of Eurocentrism (TCC, CC, I)

2.12 evaluate various attempts to address consequences of imperialist policies and practices on Indigenous peoples in Canada and other locations (GC, PADM, TCC)

2.13 examine legacies of historical globalization and imperialism that continue to influence globalization (TCC, GC)

Key Issue: To what extent should we embrace globalization?

Related Issue 3: To what extent does globalization contribute to sustainable prosperity for all people? Students will assess economic, environmental and other contemporary impacts of Globalization.

3.7 explore multiple perspectives regarding the relationship among people, the land and globalization (spirituality, stewardship, sustainability, resource development) (LPP, CC, ER, GC)

Key Issue: To what extent should we embrace globalization?

Related Issue 4: To what extent should I, as a citizen, respond to globalization? Students will assess their roles and responsibilities in a globalizing world.

4.1 recognize and appreciate the impact of globalization on the quality of life of individuals and communities (GC, C, CC)

4.2 recognize and appreciate the importance of human rights in determining quality of life (GC, C)

4.3 accept political, social and environmental responsibilities associated with global citizenship (C, GC, ER)

4.4 explore various understandings of quality of life (GC)

4.5 analyze impacts of globalization on children and youth (awareness of global issues, employment issues, identity) (GC, C, PADM, ER, I)

4.6 analyze impacts of globalization on women (gender issues, labour issues, opportunities for entrepreneurship) (GC, C, PADM, ER, I)

4.7 evaluate relationships between globalization and democratization and human rights (GC, PADM)

4.8 analyze how globalization affects individuals and communities (migration, technology, agricultural issues, pandemics, resource issues, contemporary issues) (GC, LPP)

4.10 evaluate means by which individuals, governments, organizations and businesses could address

opportunities and challenges of globalization (pro-globalization activism, anti-globalization activism, legislation, agreements, consumer activism, corporate responsibility)

(GC, C, PADM, ER)

4.11 develop strategies to demonstrate active, responsible global citizenship (C, GC, PADM, ER)

10-2

Key Issue: To what extent should we embrace globalization?

Related Issue 1: Should globalization shape identity? Students will explore the impacts of globalization on their lives.

1.1 acknowledge and appreciate the existence of multiple perspectives in a globalizing world

(GC, CC)

1.2 appreciate why peoples in Canada and other locations strive to promote their cultures, languages and identities in a globalizing world (I, CC, GC)

1.3 appreciate how identities and cultures shape, and are shaped by, globalization (I, CC, GC)

1.4 identify the various ways that people in Canada express their identities (traditions, language, religion, spirituality, the arts, attire, relationship to land, role modelling) (I, CC, LPP)

1.5 explore understandings and dimensions of globalization (political, economic, social, other contemporary examples) (PADM, ER, CC)

1.6 explore the impact of communications technology and media on diversity (universalization of pop culture, hybridization, diversification) (I, CC, GC)

1.7 examine opportunities presented by globalization to identities and cultures of peoples in Canada (acculturation, accommodation, cultural revitalization, affirmation of identity, integration)

(I, CC, GC)

1.8 examine challenges presented by globalization to identities and cultures of peoples in Canada (assimilation, marginalization, accommodation, integration, homogenization) (I, CC, GC)

1.9 analyze the efforts to promote languages and cultures in Canada in response to globalization (language and cultural legislation, revitalization of language and culture) (I, CC)

Key Issue: To what extent should we embrace globalization?

Related Issue 2: Should people in Canada respond to the legacies of historical globalization? Students will understand the effects of historical globalization on Indigenous and non-Indigenous peoples.

2.1 recognize and appreciate historical and contemporary consequences of European contact, historical globalization and imperialism on Aboriginal societies (TCC, CC, I, GC)

2.2 exhibit a global consciousness with respect to the human condition (GC, C)

2.3 accept social responsibilities associated with global citizenship (C, GC)

2.4 recognize and appreciate the validity of oral histories (TCC, CC)

2.5 recognize and appreciate various perspectives regarding the prevalence and impacts of Eurocentrism (TCC, CC, I)

2.6 identify the effects of cultural contact between Europeans and Indigenous peoples in Canada and one other location (exchange of goods and technologies, depopulation, influences on government)

(TCC, CC, GC)

2.8 explore the relationship between historical globalization and imperialism (TCC, ER, LPP, PADM)

2.9 examine multiple perspectives on the political, economic and social impacts of imperialism in Canada (I, LPP, PADM)

2.10 examine the consequences of imperialism in Canada for Aboriginal Peoples (Indian Act,

consequences of residential schools, social impact on Indigenous peoples) (CC, TCC, I, GC)

2.11 analyze various attempts to address the consequences of imperialism in Canada (Royal Commission on Aboriginal Peoples, contemporary examples) (TCC, GC, PADM)

2.12 identify legacies of historical globalization and imperialism that continue to influence globalization (TCC, GC)

Key Issue: To what extent should we embrace globalization?

Related Issue 3: Does globalization contribute to sustainable prosperity for all people? Students will understand economic, environmental and other impacts of globalization.

3.1 recognize and appreciate multiple perspectives that exist with respect to the relationships among economics, politics, the environment and globalization (GC, ER, PADM)

3.2 recognize and appreciate impacts of globalization on the interdependent relationships among the economy, people and the environment (GC, ER, PADM)

3.7 explore multiple perspectives on relationships among people, the land and globalization (spirituality, stewardship, sustainability, resource development) (LPP, CC, GC, ER)

3.8 analyze the impact of actions and policies associated with globalization on the environment (land and resource use, resource development agreements, environmental legislation) (LPP, ER, GC)

3.9 examine multiple perspectives on sustainability and prosperity in a globalizing world (ER, LPP, CC)

Key Issue: To what extent should we embrace globalization?

Related Issue 4: Should I, as a citizen, respond to globalization? Students will examine their roles and responsibilities in a globalizing world.

4.1 recognize and appreciate the impact of globalization on the quality of life of individuals and communities (GC, C)

4.2 recognize and appreciate the importance of human rights in determining quality of life (GC, C)

4.3 accept political, social and environmental responsibilities associated with global citizenship (C, GC, ER)

4.4 explore various understandings of quality of life (GC)

4.5 examine impacts of globalization on children and youth (awareness of global issues, employment issues, identity) (GC, C, PADM, ER)

4.6 examine impacts of globalization on women (gender issues, labour issues, opportunities for entrepreneurship) (GC, C, PADM, ER)

4.7 analyze relationships between globalization and democratization and human rights (GC, PADM)

4.8 examine how globalization affects individuals and communities (migration, technology, agricultural issues, pandemics, resource issues, contemporary issues) (GC, LPP)

4.9 explore multiple perspectives regarding the civic responsibilities that individuals, governments, organizations and businesses in Canada may have in addressing the opportunities and challenges presented by globalization (GC, C, PADM)

4.10 analyze means by which individuals, governments, organizations and businesses in Canada could address the opportunities and challenges of globalization (pro-globalization activism, anti-globalization activism, legislation, agreements, consumer activism, corporate responsibility) (GC, C, PADM, ER)

4.11 develop strategies to demonstrate active, responsible global citizenship (C, GC, PADM, ER)

Social Studies 20-1/20-2

20-1

Key Issue: To what extent should we embrace nationalism?

Related Issue 1: To what extent should nation be the foundation of identity? Students will explore the relationships among identity, nation and nationalism.

- 1.1 appreciate that understandings of identity, nation and nationalism continue to evolve (I, C)
- 1.2 appreciate the existence of alternative views on the meaning of nation (I, C)
- 1.3 appreciate how the forces of nationalism have shaped, and continue to shape, Canada and the world (I, TCC, GC)
- 1.4 appreciate why peoples seek to promote their identity through nationalism (I, C)
- 1.5 explore a range of expressions of nationalism (I, C)
- 1.6 develop understandings of nation and nationalism (relationship to land, geographic, collective, civic, ethnic, cultural, linguistic, political, spiritual, religious, patriotic) (I, CC, LPP)
- 1.9 analyze nationalism as an identity, internalized feeling and/or collective consciousness shared by a people (French Revolution and Napoleonic era, Canadian nationalism, Québécois nationalism, American nationalism, First Nations and Métis nationalism, Inuit perspectives) (I, TCC, C, CC)
- 1.10 evaluate the importance of reconciling contending nationalist loyalties (Canadian nationalism, First Nations and Métis nationalism, ethnic nationalism in Canada, civic nationalism in Canada, Québécois nationalism, Inuit perspectives on nationalism) (I, TCC, C)
- 1.11 evaluate the importance of reconciling nationalism with contending non-nationalist loyalties (religion, region, culture, race, ideology, class, other contending loyalties) (I, C, CC, LPP)

20-2

Key Issue: To what extent should we embrace nationalism?

Related Issue 1: Should nation be the foundation of identity? Students will explore the relationships among identity, nation and nationalism.

- 1.1 appreciate that understandings of identity, nation and nationalism continue to evolve (I, C)
- 1.2 appreciate the existence of alternative views on the meaning of nation (I, C)
- 1.3 appreciate how the forces of nationalism have shaped, and continue to shape, Canada and the world (I, TCC, GC)
- 1.4 appreciate why peoples seek to promote their identity through nationalism (I, C)
- 1.9 examine nationalism as an identity, internalized feeling and/or collective consciousness shared by a people (French Revolution, Canadian nationalism, Québécois nationalism, First Nations and Métis nationalism, Inuit perspectives) (I, TCC, C, CC)
- 1.10 analyze the importance of reconciling contending nationalist loyalties (Canadian nationalism, First Nations and Métis nationalism, ethnic nationalism in Canada, Québécois nationalism, Inuit perspectives on nationalism) (I, TCC, C)
- 1.11 analyze the importance of reconciling nationalism with contending non-nationalist loyalties (religion, region, culture, race, ideology, class, other contending loyalties) (I, C, CC, LPP)

Social Studies 30-1/30-2

30-1

Key Issue: To what extent should we embrace an ideology?

Related Issue 1: To what extent should ideology be the foundation of identity? Students will explore the relationship between identity and ideology.

1.1 appreciate various perspectives regarding identity and ideology (PADM, TCC, I)

1.2 appreciate various perspectives regarding the relationship between individualism and common good (PADM, C, GC)

1.3 explore factors that may influence individual and collective beliefs and values (culture, language, media, relationship to land, environment, gender, religion, spirituality, ideology) (I, C, LPP)

1.4 examine historic and contemporary expressions of individualism and collectivism (I, C, LPP, TCC)

1.6 explore themes of ideologies (nation, class, relationship to land, environment, religion, progressivism) (TCC, PADM, LPP)

Key Issue: To what extent should we embrace an ideology?

Related Issue 3: To what extent are the principles of liberalism viable? Students will assess the extent to which the principles of liberalism are viable in a contemporary world.

3.8 evaluate the extent to which governments should promote individual and collective rights (American Bill of Rights; Canadian Charter of Rights and Freedoms; Québec Charter of Human Rights and Freedoms; First Nations, Métis and Inuit rights; language legislation; emergencies and security legislation) (PADM, C, CC)

3.9 evaluate the extent to which the principles of liberalism are viable in the context of contemporary issues (environment concerns, resource use and development, debt and poverty, racism, pandemics, terrorism, censorship, illiberalism) (PADM, ER, LPP)

30-2

Key Issue: To what extent should we embrace an ideology?

Related Issue 1: Should ideology be the foundation of identity? Students will explore the relationship between identity and ideology.

1.1 appreciate various perspectives regarding identity and ideology (PADM, ER, TCC)

1.2 appreciate various perspectives regarding the relationship between individualism and common good (PADM, C, GC)

1.3 explore factors that may influence individual and collective beliefs and values (culture, language, media, relationship to land, environment, gender, religion, spirituality, ideology) (I, C, LPP)

1.4 identify historic and contemporary expressions of individualism and collectivism (I, C, LPP, TCC)

1.6 identify themes of ideologies (nation, class, relationship to land, environment, religion)

Key Issue: To what extent should we embrace an ideology?

Related Issue 3: Are the values of liberalism viable? Students will understand the extent to which the values of liberalism are viable in a contemporary world.

3.7 explore the extent to which governments should promote individual and collective rights (Canadian Charter of Rights and Freedoms; Québec Charter of Human Rights and Freedoms; First Nations, Métis and Inuit rights; emergencies and security legislation) (PADM, C, CC)

3.8 evaluate the extent to which the values of liberalism are viable in the context of contemporary issues (environmental concerns, resource use and development, debt and poverty, racism, pandemics, terrorism, censorship) (PADM, ER, LPP)

ABORIGINAL STUDIES

Aboriginal Studies 10

THEME I: ORIGIN AND SETTLEMENT PATTERNS: Students will demonstrate an understanding of the diverse cultural characteristics, origins, and migration and settlement patterns of Aboriginal peoples.

2. demonstrate an understanding that there are distinctive narrations of legends and stories that are related to cultural characteristics of Aboriginal peoples:

- appreciate the role of legends and stories of how Aboriginal peoples are interconnected to the land and nature
- distinguish between legends and stories of many diverse linguistic and cultural groups in Alberta and North America
- appreciate that Aboriginal peoples used sign language to communicate with each other and to communicate ideas and practices of land occupation in a particular territory
- research creation stories by interviewing Aboriginal Elders and researching current literature

3. demonstrate an understanding that Aboriginal peoples developed distinct cultures in differing Canadian environments:

- identify and locate the major linguistic and cultural groups in Alberta and Canada
- interpret Canada as being culturally diverse before the arrival of the Europeans
- appreciate that Aboriginal peoples shared many of the same characteristics and values; e.g., respect for nature, harmony with the land

4. recognize and demonstrate an understanding that Aboriginal peoples moved from place to place according to well-defined patterns:

- compare and contrast the main geographical regions of Canada, and examine how development of different Aboriginal cultures was influenced by various factors
- research and trace settlement and migration patterns from a historical perspective, and describe reasons for cultural migrations; e.g., investigate and trace the reasons for: buffalo hunt, cultural migratory routes, landmarks and hunting routes, intertribal awareness, leaders, alliances/treaties
- research how the geographical regions influenced Aboriginal culture by examining the following:
 - behaviours/restrictions influenced by geographical factors
 - harmony with land, clans, families
 - spiritual forces in nature/interconnectedness
 - sharing of resources
 - plants and animals
- interpret, historically, that circular seasonal time frames were a major influence for moving from place to place

THEME II: ABORIGINAL WORLDVIEWS: Students will demonstrate an understanding of aspects of Aboriginal spirituality and worldviews.

1. demonstrate an understanding that spirituality is fundamental to traditional Aboriginal worldviews:

- examine how animate and inanimate objects are interrelated and respected in Aboriginal cultures
- examine why living in harmony and unity is essential to traditional Aboriginal cultures
- analyze the role of sharing and generosity in traditional Aboriginal cultures
- research the following aspects of spirituality by; e.g., interviewing a local Elder regarding:

interrelationship of animate and inanimate, harmony, unity, sharing and generosity, protocols and accepted traditional practices

- appreciate and respect the value of Elders in helping people discover their inner gifts and strengths
- appreciate and respect the diversity of traditional spiritual beliefs and practices of Aboriginal peoples

2. demonstrate an understanding that Aboriginal stories on creation of the world and Aboriginal peoples provide a strong spiritual foundation:

- examine traditional Aboriginal stories on creation that have inspirational messages about young people recognizing their gifts, journeying to take on challenges and accomplishing feats to help Others

3. demonstrate an understanding that cycle of life is fundamental to the Aboriginal way of life:

- research the significance of the following symbols:

– the Circle²

– MedicineWheel

- appreciate and respect that Aboriginal peoples traditionally view life and its interrelated parts as a never-ending cycle

THEME IV: ABORIGINAL SYMBOLISM AND EXPRESSION: Students will demonstrate an understanding of Aboriginal art forms, oral tradition and literature.

2. interpret and recognize significant oral symbolism and expressions:

- explore the lives, experiences and values of Aboriginal authors through their writings
- examine the contributions made by Aboriginal authors
- identify how Aboriginal writers use symbolism, allusions and inference to portray their messages to the reader

3. develop an understanding of many Aboriginal art forms, oral tradition and literature:

- identify and appreciate the diversity of cultural expression of Aboriginal peoples
- describe the relationship of environment expressed in the art form, oral tradition and literature of each Aboriginal group
- compare similarities and differences in expressions of environmental relationships
- develop an understanding that Aboriginal art reflects the belief that art is holistic in nature and is integrated in all aspects of Aboriginal life
- compare how Aboriginal oral tradition connects the expression of personal, spiritual, social and cultural aspects of that individual within the group
- appreciate Aboriginal philosophy, spirituality and love of land and nature.

Aboriginal Studies 20

THEME II: TREATIES AND CULTURAL CHANGE: Students will demonstrate an understanding of the effects of treaty relationships between First Nations people and the Government of Canada.

7. demonstrate an awareness that First Nations people throughout the world are diverse in their culture, identity and security:

- compare the similarities and differences among the spiritual, political, economic, educational and social structures, and inherent rights of indigenous people in other parts of the world

THEME III: LEGISLATION, POLICIES AND CULTURAL CHANGE: Students will demonstrate an understanding of the effects of government policies, legislation and practices on Aboriginal cultures and peoples.

3. demonstrate an understanding of the impact of change upon Aboriginal peoples:

- research and report on the concept of Indian reserves:
 - reasons for establishing reserves
 - choice of locations in Alberta
 - groups involved, dates and timelines from the signing of the treaties to the present
 - impact on changes in lifestyle
 - concept of displacement
 - history of the reserve concept as it relates to imperialism and colonization; e.g., New France, Upper Canada or British Columbia
 - use of permits to restrict freedom of movement
 - relocation and the role of the North West Mounted Police (NWMP) and Royal Canadian Mounted Police (RCMP)

Aboriginal Studies 30

THEME 1: ABORIGINAL RIGHTS AND SELF-GOVERNMENT: Students will demonstrate an understanding that Canadian Aboriginal peoples have an inherent right to self-government and self-determination.

2. demonstrate an understanding of how First Nations and Métis land rights are based on differing premises:

- discuss the oral history passed on to Aboriginal peoples of the belief that First Nations existed on Canadian land before the arrival of the Europeans

SCIENCE

Grade 1

Overview: Students learn that changes in their environment occur in a regular pattern known as the seasons. They explore weather change, and how the ups and downs of weather affect their own lives. Looking beyond themselves and beyond the immediate weather, students are guided to discover that there are larger patterns of change that affect the life habits of many living things. The interactions among different parts of the environment, and the recurrence of change as part of a cycle, are important science ideas that are introduced in this topic.

1–6 Describe seasonal changes, and interpret the effects of seasonal changes on living things.

1. Describe the regular and predictable cycle of seasonal changes:

- changes in sunlight
- changes in weather.

2. Identify and describe examples of plant and animal changes that occur on a seasonal basis:

- changes in form and appearance
- changes in location of living things
- changes in activity; e.g., students should recognize that many living things go into a dormant period during winter and survive.

Grade 3

3–10 Describe the appearances and life cycles of some common animals, and identify their adaptations to different environments.

6. Demonstrate awareness that animals require different habitats in order to meet their basic needs of food, water, shelter and space.
7. Recognize adaptations of a young animal to its environment, and identify changes in its relationship to its environment as it goes through life; e.g., tadpoles are adapted for life in an aquatic environment; adult frogs show adaptations to both terrestrial and aquatic environments.
8. Identify examples of environmental conditions that may threaten animal survival, and identify examples of extinct animals.
9. Recognize that habitat preservation can help maintain animal populations, and identify ways that student actions can assist habitat preservation.

4–5 Recognize that human activity can lead to the production of wastes, and identify alternatives for the responsible use and disposal of materials.

1. Identify plant and animal wastes, and describe how they are recycled in nature. For example, plant leaves serve as a source of food for soil insects, worms and other creatures. The wastes of these animals may then be further broken down by molds, fungi and bacteria.
2. Identify and classify wastes that result from human activity.
4. Distinguish between wastes that are readily biodegradable and those that are not.
6. Identify methods of waste disposal currently used within the local community.
7. Identify kinds of wastes that may be toxic to people and to the environment.
11. Identify actions that individuals and groups can take to minimize the production of wastes, to recycle or reuse wastes and to ensure the safe handling and disposal of wastes.
12. Develop and implement a plan to reduce waste, and monitor what happens over a period of time.

Grade 5 Science

Topic D: Weather Watch

5–8 Observe, describe and interpret weather phenomena; and relate weather to the heating and cooling of Earth's surface.

5–9 Investigate relationships between weather phenomena and human activity.

9. Describe the effects of the Sun's energy on daily and seasonal changes in temperature— 24-hour and yearly cycles of change.
10. Recognize that weather systems are generated because different surfaces on the face of Earth retain and release heat at different rates.
11. Understand that climate refers to long term weather trends in a particular region and that climate varies throughout the world.
12. Recognize that human actions can affect climate, and identify human actions that have been linked to the greenhouse effect.
13. Appreciate how important it is to be able to forecast weather and to have suitable clothing or shelter to endure various types of weather.

Grade 7 Science

Unit A: Interactions and Ecosystems (Social and Environmental Emphasis)

Focusing Question: How do human activities affect ecosystems? What methods can we use to observe and monitor changes in ecosystems, and assess the impacts of our actions?

1. Investigate and describe relationships between humans and their environments, and identify related issues and scientific questions

- illustrate how life-supporting environments meet the needs of living things for nutrients, energy sources, moisture, suitable habitat, and exchange of gases
- describe examples of interaction and interdependency within an ecosystem (e.g., identify examples of dependency between species, and describe adaptations involved; identify changing relationships between humans and their environments, over time and in different cultures—as, for example, in aboriginal cultures)
- identify examples of human impacts on ecosystems, and investigate and analyze the link between these impacts and the human wants and needs that give rise to them (e.g., identify impacts of the use of plants and animals as sources of food, fibre and other materials; identify potential impacts of waste products on environments)
- analyze personal and public decisions that involve consideration of environmental impacts, and identify needs for scientific knowledge that can inform those decisions

3. Monitor a local environment, and assess the impacts of environmental factors on the growth, health and reproduction of organisms in that environment

- investigate a variety of habitats, and describe and interpret distribution patterns of living things found in those habitats (e.g., describe and compare two areas within the school grounds—a relatively undisturbed site and a site that has been affected by heavy use; describe and compare a wetland and a dryland area in a local parkland)
- investigate and interpret evidence of interaction and change (e.g., population fluctuations, changes in weather, availability of food or introduction of new species into an ecosystem)
- identify signs of ecological succession in local ecosystems (e.g., emergence of fireweed in recently cut forest areas, replacement of poplar by spruce in maturing forests, reestablishment of native plants on unused farmland)

4. Describe the relationships among knowledge, decisions and actions in maintaining life-supporting environments

- identify intended and unintended consequences of human activities within local and global environments (e.g., changes resulting from habitat loss, pest control or from introduction of new species; changes leading to species extinction)
- describe and interpret examples of scientific investigations that serve to inform environmental decision making
- illustrate, through examples, the limits of scientific and technological knowledge in making decisions about life-supporting environments (e.g., identify limits in scientific knowledge of the impact of changing land use on individual species; describe examples in which aboriginal knowledge—based on long-term observation—provides an alternative source of understanding)
- analyze a local environmental issue or problem based on evidence from a variety of sources, and identify possible actions and consequences (e.g., analyze a local issue on the control of the beaver population in a nearby wetland, and identify possible consequences)

Unit B: Plants for Food and Fibre (Science and Technology Emphasis)

Focusing Questions: How do we produce useful plant products? What techniques do we use, what knowledge are these techniques based on, and how do we apply these techniques in a sustainable way?

1. Investigate plant uses; and identify links among needs, technologies, products and impacts
 - describe human uses of plants as sources of food and raw materials, and give examples of other uses (e.g., identify uses of plants as herbs or medicines; describe plant products, and identify plant sources on which they depend)
 - investigate trends in land use from natural environments (e.g., forests, grasslands) to managed environments (e.g., farms, gardens, greenhouses) and describe changes
 - investigate practical problems and issues in maintaining productive plants within sustainable environments, and identify questions for further study (e.g., investigate the long-term effects of irrigation practices or fertilizer use)
2. Investigate life processes and structures of plants, and interpret related characteristics and needs of plants in a local environment
 - investigate and interpret variations in needs of different plants and their tolerance for different growing conditions (e.g., tolerance for drought, soil salinization or short growing seasons)
4. Identify and interpret relationships among human needs, technologies, environments, and the culture and use of living things as sources of food and fibre
 - investigate and describe the development of plant varieties through selective breeding, and identify related needs and problems (e.g., identify needs leading to the development of new grain varieties; identify problems arising from the development of new plant varieties that require extensive fertilization)
 - investigate and identify intended and unintended consequences of environmental management practices (e.g., identify problems arising from monocultural land use in agricultural and forestry practices, such as susceptibility to insect infestation or loss of diversity)
 - identify the effects of different practices on the sustainability of agriculture and environmental resources (e.g., identify positive and negative effects of using chemical fertilizers and pesticides and of using organic farming practices)

Unit C: Heat and Temperature (Social and Environmental Emphasis)

Focusing Questions: What heat-related technologies do we use to meet human needs? Upon what scientific principles are these technologies based? What implications do these technologies have for sustainable use of resources?

3. Apply an understanding of heat and temperature in interpreting natural phenomena and technological devices
 - describe ways in which thermal energy is produced naturally (e.g., solar radiation, combustion of fuels, living things, geothermal sources and composting)
4. Analyze issues related to the selection and use of thermal technologies, and explain decisions in terms of advantages and disadvantages for sustainability
 - identify and evaluate different sources of heat and the environmental impacts of their use (e.g., identify advantages and disadvantages of fossil fuel use; compare the use of renewable and nonrenewable sources in different applications)
 - compare the energy consumption of alternative technologies for heat production and use, and identify related questions and issues (e.g., compare the energy required in alternative cooking technologies, such as electric

stoves, gas stoves, microwave ovens and solar cookers; identify issues regarding safety of fuels, hot surfaces and combustion products)

- identify positive and negative consequences of energy use, and describe examples of energy conservation in their home or community

Unit E: Planet Earth (Nature of Science Emphasis)

Focusing Questions: What do we know about Earth—about its surface and what lies below? What evidence do we have, and how do we use this evidence in developing an understanding of Earth and its changes?

1. Describe and demonstrate methods used in the scientific study of Earth and in observing and interpreting its component materials

- investigate and interpret evidence that Earth's surface undergoes both gradual and sudden change (e.g., recognize earthquakes, volcanoes and landslides as examples of sudden change; recognize glacial erosion and river erosion as examples of gradual/incremental change)
- interpret models that show a layered structure for Earth's interior; and describe, in general terms, evidence for such models
- identify and explain the purpose of different tools and techniques used in the study of Earth (e.g., describe and explain the use of seismographs and coring drills, as well as tools and techniques for the close examination of rocks; describe methods used in oil and gas exploration)

3. Investigate and interpret evidence of major changes in landforms and the rock layers that underlie them

- investigate and interpret patterns in the structure and distribution of mountain formations (e.g., describe and interpret mountain formations of the North American cordillera)
- interpret the structure and development of fold and fault mountains
- describe evidence for crustal movement, and identify and interpret patterns in these movements (e.g., identify evidence of earthquakes and volcanic action along the Pacific Rim; identify evidence of the movement of the Pacific plate relative to the North American plate)
- identify and interpret examples of gradual/incremental change, and predict the results of those changes over extended periods of time (e.g., identify evidence of erosion, and predict the effect of erosional change over a year, century and millennium; project the effect of a given rate of continental drift over a period of one million years)

Grade 8 Science

Unit E: Freshwater and Saltwater Systems (Social and Environmental Emphasis)

Focusing Questions: How do water, land and climate interact? What are the characteristics of freshwater and saltwater systems, and how do they affect living things, including humans?

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

- describe, in general terms, the distribution of water in Alberta, Canada and the world; and interpret information about water characteristics (e.g., identify glaciers, snow, polar icecaps, ground water and oceans as components of Earth's water; interpret graphical information on the availability of potable water)

2. Investigate and interpret linkages among landforms, water and climate

- describe the processes of erosion and deposition resulting from wave action and water flow, by:
 - identifying dissolved solids and sediment loads, and identifying sources and endpoints for these materials
 - describing how waves and tides are generated and how they interact with shorelines

- investigate and describe stream characteristics (e.g., describe the slope, flow rate and stream profile characteristics of a model stream on a stream table)
 - describe processes leading to the development of ocean basins and continental drainage systems (e.g., describe the formation of geological features on the ocean floor, such as continental shelves and trenches)
 - identify evidence of glacial action, and analyze factors affecting the growth and attrition of glaciers and polar icecaps (e.g., identify factors that affect the size of polar ice sheets and the Columbia Icefield)
 - describe the movement of ocean currents and its impact on regional climates (e.g., effects of the Gulf Stream, Labrador Current, El Niño, La Niña)
4. Analyze human impacts on aquatic systems; and identify the roles of science and technology in addressing related questions, problems and issues
- analyze human water uses, and identify the nature and scope of impacts resulting from different uses (e.g., identify pollutants in ground water and surface water systems resulting from domestic and industrial use; analyze the effects of agriculture and forestry practices on stream flow and water quality)
 - identify current practices and technologies that affect water quality, evaluate environmental costs and benefits, and identify and evaluate alternatives (e.g., research and analyze alternatives for ensuring safe supplies of potable water; research, analyze and debate alternatives for a specific water quality issue, such as the location and design of a landfill, the protection of a natural waterway, the use of secondary and tertiary wastewater treatment, the salinization of soils due to irrigation, the eutrophication of ponds and streams due to excess use of phosphates in fertilizers and detergents, or a proposal to export water resources)
 - illustrate the role of scientific research in monitoring environments and supporting development of appropriate environmental technologies (e.g., describe a local example of aquatic monitoring, and describe how this research contributes to watershed management)
 - provide examples of problems that cannot be solved using scientific and technological knowledge alone (e.g., the need to prevent pollutants from entering aquatic environments, the need to avoid damage from ice sheets and icebergs)

Grade 9 Science

Unit A: Biological Diversity (Social and Environmental Emphasis)

Focusing Questions: What is biological diversity, and by what processes do diverse living things pass on their characteristics to future generations? What impact does human activity have on biological diversity?

4. Identify impacts of human action on species survival and variation within species, and analyze related issues for personal and public decision making
- describe the relative abundance of species on Earth and in different environments (e.g., note the overall abundance of insect species; note that in harsh environments there are relatively fewer species found than in temperate and tropical environments)
 - describe ongoing changes in biological diversity through extinction and extirpation of native species, and investigate the role of environmental factors in causing these changes (e.g., investigate the effect of changing river characteristics on the variety of species living in the river; investigate the effect of changing land use on the survival of wolf or grizzly bear populations)
 - evaluate the success and limitations of various local and global strategies for minimizing loss of species diversity (e.g., breeding of endangered populations in zoos, development of seed banks, designating protected areas, development of international treaties regulating trade of protected species and animal parts)

- investigate and describe the use of biotechnology in environmental, agricultural or forest management; and identify potential impacts and issues (e.g., investigate issues related to the development of patented crop varieties and varieties that require extensive chemical treatments; identify issues related to selective breeding in game farming and in the rearing of fish stocks)

Science 10

Unit D: Energy Flow in Global Systems (Social and Environmental Contexts Emphasis)

Focusing Questions: Are there relationships between solar energy, global energy transfer processes, climate and biomes? What evidence suggests our climate may be changing more rapidly than living species can adapt? Is human activity causing climate change? How can we reduce our impact on the biosphere and on global climate, while still meeting human needs?

1. Describe how the relationships among input solar energy, output terrestrial energy and energy flow within the biosphere affect the lives of humans and other species
 - describe and explain the greenhouse effect, and the role of various gases—including methane, carbon dioxide and water vapour—in determining the scope of the greenhouse effect
2. Analyze the relationships among net solar energy, global energy transfer processes—primarily radiation, convection and hydrologic cycle—and climate.
 - describe, in general terms, how thermal energy is transferred through the atmosphere (i.e., global wind patterns, jet stream, Coriolis effect, weather systems) and through the hydrosphere (i.e., ocean currents, large bodies of water) from latitudes of net radiation surplus to latitudes of net radiation deficit, resulting in a variety of climatic zones (e.g., analyze static and animated satellite images)
 - explain how thermal energy transfer through the atmosphere and hydrosphere affects climate
 - investigate and interpret how variations in thermal properties of materials can lead to uneven heating and cooling
3. Relate climate to the characteristics of the world’s major biomes, and compare biomes in different regions of the world
 - describe a biome as an open system in terms of input and output of energy and matter and exchanges at its boundaries (e.g., compare and contrast cells and biomes as open systems)
 - relate the characteristics of two major biomes (i.e., grassland, desert, tundra, taiga, deciduous and rain forest) to net radiant energy, climatic factors (temperature, moisture, sunlight and wind) and topography (mountain ranges, large bodies of water)
 - analyze the climatographs of two major biomes (i.e., grasslands, desert, tundra, taiga, deciduous and rain forest) and explain why biomes with similar characteristics can exist in different geographical locations, latitudes and altitudes
 - 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)
4. Investigate and interpret the role of environmental factors on global energy transfer and climate change
 - 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))
 - identify evidence to investigate past changes in Earth’s climate (e.g., ice core samples, tree ring analysis)
 - 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)
- describe the limitations of scientific knowledge and technology in making predictions related to climate and weather (e.g., predicting the direct and indirect impacts on Canada's agriculture, forestry and oceans of climate change, or from changes in energy transfer systems, such as ocean currents and global wind patterns)
- assess, from a variety of perspectives, the risks and benefits of human activity, and its impact on the biosphere and the climate (e.g., compare the Gaia hypothesis with traditional Aboriginal perspectives on the natural world; identify and analyze various perspectives on reducing the impact of human activity on the global climate)

Science 20

Unit C: The Changing Earth

Focusing Questions: What is the scientific evidence of change to Earth? How has this evidence been used to formulate scientific theories? What are the limitations of current theories in making predictions about future changes to Earth?

General Outcome 4

Students will analyze the evidence of, and assess the explanations for, natural variations in Earth's climate over the last two million years.

20–C4.1k describe the geologic evidence for repeated glaciation over large areas of Canada and in their local area; e.g., the Cypress Hills, gold deposits in the Yukon, topography, drainage patterns, erratics, U-shaped valleys

20–C4.2k explain how ice cores from polar icecaps provide evidence of warming and cooling in the past hundred thousand years

20–C4.3k 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.

Unit D: Changes in Living Systems

Focusing Questions: What are the characteristics of an ecosystem? How does matter cycle and energy flow through the biosphere and through ecosystems, and what are the implications of this knowledge in terms of protecting the environment for future generations? How do ecosystems and organisms change over time and respond to natural and human interventions?

20–D1.2sts explain that society and technology have both intended and unintended consequences for humans and the environment (SEC3) [ICT F2–4.8, F3–4.1]

- discuss, in terms of scientific principles, how reforestation projects change the direction of secondary succession in a natural ecosystem
- assess the long-term implications of fire control and prevention on population and ecosystem stability, diversity and productivity
- assess habitat loss and the responsibility of society to protect the environment for future generations
- analyze the need for habitat reclamation, such as recreating wetlands and swamps, forests, and prairie grasslands, and describe steps to ensure species diversity.

General Outcome 2

Students will analyze and investigate the cycling of matter and the flow of energy through the biosphere and ecosystems as well as the interrelationship of society and the environment.

20–D2.1sts explain that science and technology have both intended and unintended consequences for humans and the environment (SEC3) [ICT F2–4.8, F3–4.1]

- assess whether the efforts to reduce human impact on biogeochemical cycles are viable, taking into consideration a variety of perspectives (considerations for deep-well and deep-ocean injection of wastes, for example, include properties of waste, concentration, uncertainty, environmental concerns, risks and benefits to human health and organisms, costs)
- evaluate the influence of society, and the impact of a variety of technologies, on the nitrogen cycle
- discuss the use of water by society, the impact such use has on water quality and quantity in ecosystems, and the need for water purification and conservation, considering such things as manufacturing, the oil industry, agricultural systems, the mining industry and domestic daily water consumption

Science 30

Unit D: Energy and the Environment

Focusing Questions: How can Canadians and other members of the international community conserve energy and maintain quality of life? What are the benefits and costs of available nonrenewable energy sources and of developing renewable energy sources? What is our energy future?

General Outcome 1

Students will explain the need for balancing the growth in global energy demands with maintaining a viable biosphere.

30–D1.1k compare the energy consumption of contemporary society with that of traditional cultures and precontact Aboriginal societies, and investigate and analyze the exponential growth of global energy consumption in recent history

30–D1.2k compare Canada's per-capita energy consumption with developed and developing countries and identify factors that affect consumption; e.g., economy, lifestyle, level of technology, geography, climate

30–D1.3k apply the concept of sustainable development to increasing the efficient use of energy; e.g., efficient use of energy in the home, in industry and in transportation

30–D1.4k explain the need to develop technologies that use renewable and nonrenewable energy sources to meet the increasing global demand

30–D1.5k describe the environmental impact of developing and using various energy sources; i.e., conventional oil, oil sands, solar power, wind power, biomass, hydroelectricity, coal-burning power, nuclear power, geothermal

30–D1.6k describe how the Aboriginal perspective of an interconnected environment demonstrates the need to balance resource extraction with environmental impact.

