

► CLIMATE CHANGE CONNECTIONS

These Climate Changes Connections have been written using a systems approach. This methodological tool defines the parts of the human and natural world and how they interact as systems. A systems approach involves identifying component parts of systems as *inputs* and *outputs* and the boundaries that define a system. Describing the world in this way allows us to more fully understand the impact of human systems on natural systems and natural systems on human systems. This method has helped geographers and other scientists understand the human-created sources of accelerated climate change and where to focus efforts in designing solutions.

Natural Systems Big Idea

Canada's natural systems are divided into 15 ecozones. The ecozone systems are composed of vegetation, soil, landforms, wildlife, human activity and climate, among other parts. Each ecozone is defined to some extent by its particular climate that interacts with other parts of that system. Recently, climate has been contributing to serious changes in parts of the natural and human systems (e.g., flooding, drought, severe weather). Such dynamic and constant changes can be described as patterns or trends.

Expectations addressed in this Big Idea

Geographic Foundations: Space and Systems

- [OE] demonstrate an understanding of the regional diversity of Canada's natural and human systems
- [OE] analyse local and regional factors that affect Canada's natural and human systems
- [SE] explain the terms and concepts associated with regions (e.g., *bioregion, ecozone, "ecological footprint," boundaries, transition zone, ecumene*); describe the characteristics (e.g., complex, interconnected, life supporting, driven by solar energy) of natural systems (e.g., climate, biomes, the lithosphere, the hydrosphere)

Human-Environment Interactions

- [SE] analyse the ways in which natural systems interact with human systems and make predictions about the outcomes of these interactions

Understanding and Managing Change

- [OE] explain how natural and human systems change over time and from place to place; predict how current or anticipated changes in the geography of Canada will affect the country's future economic, social, and environmental well-being

<ul style="list-style-type: none"> • [SE] explain how selected factors cause change in human and natural systems (e.g., technological developments, corporate and government policies, zoning by-laws, natural hazards, global warming) 	
<p>Links to culminating task</p>	
<p><i>Geographic Foundations: Space and Systems</i></p> <ul style="list-style-type: none"> • [OE] analyse local and regional factors that affect Canada’s natural and human systems 	
<p>Focus Questions and Answers For tips on using Focus Questions, please see page 2.</p>	
<p>1. What are the parts of natural systems?</p>	<ul style="list-style-type: none"> ▸ <i>Landforms, soils, vegetation, climate, and animals</i>
<p>2. How does climate affect the other parts of the natural system?</p>	<ul style="list-style-type: none"> ▸ <i>Landforms – erosion</i> ▸ <i>Vegetation – growth through precipitation and temperature, depicts vegetation type and plant adaptations</i> ▸ <i>Soils – erosion of certain types of rock and deposits of this sediment, changes in water content</i>
<p>3. How have natural systems and landforms changed over time?</p>	<ul style="list-style-type: none"> ▸ <i>Plate tectonics over the Earth’s geologic history have shaped the continents and landforms. Climates have also been changing over time, contributing to the shape of these landforms. Climate has also affected the amount of erosion that has occurred on the Earth’s surface, changing soil deposits in different regions (for example, through glaciation), which in turn affects types and amount of vegetation.</i>
<p>4. What are some of the consequences of changes to natural systems?</p>	<ul style="list-style-type: none"> ▸ <i>The appearance of mountain ranges changes over time with erosion.</i> ▸ <i>The nutrient content of soils varies with the amount of organic matter and precipitation.</i> ▸ <i>The types of species able to survive can change if habitats change or the amount of carbon dioxide and oxygen in the atmosphere is altered.</i> ▸ <i>Amounts of oxygen and carbon dioxide in the atmosphere vary with the amount of vegetation present.</i>

<p>5. How have human systems had an impact on natural systems?</p>	<ul style="list-style-type: none">▶ <i>Deforestation and logging have caused a loss of habitat for species, a loss of soil and soil nutrients, and a decrease in the capacity of forests to act as carbon sinks.</i>▶ <i>Transportation that depends on fossil fuel (e.g., cars) has increased the amount of carbon dioxide in the atmosphere, changing our climate and causing erratic weather patterns globally.</i>▶ <i>As societies exploit natural systems for their use, they limit an ecosystem's ability to function in nature (e.g., deforestation can cause erosion, loss of habitat).</i>
<p>6. How will climate change affect natural and human systems?</p>	<ul style="list-style-type: none">▶ <i>Natural systems will be affected by a warming of the Earth's surface, erratic weather patterns, extinction of species, desertification, flooding, etc.</i>▶ <i>Human systems will be affected in many ways: availability of resources, changes in climate based economies, loss of homes and businesses, change in the types of transportation, alternative energy sources, and so on.</i>