Module 1: The Nature of Geography

Unit One: Course Basics

Students should be able to:

A) Nature of Geography
1) List the major geography themes and describe their application to a particular place or issue
2) To review some basic world map facts and to introduce some new facts that will be elaborated upon during the course
3) To understand the steps necessary to help one think geographically when interpreting data on a map
4) To understand that geography is the "connecting thread" between the disciplines. To identify the relevance of geography to environmental decision making, careers, and recreational activities

B) Nature of the Environment
1) Identify and define the four principle components or spheres of the environment (lithosphere, hydrosphere, atmosphere, and biosphere)
2) Illustrate the relationships between and the dynamic nature of the four environmental spheres
3) Understand and explain how people are affected by the four spheres, depend upon them, and transform them
4) Identify examples where people have ignored nature at their peril
5) Gain a general knowledge of various environmental issues at the local, provincial, national, and international levels through the keeping of a bi-weekly Environment Diary

C) Cultural Stages and Economic Activities
1) Identify and explain the nature of the major cultural stages of humanity (hunting and gathering, agrarian, industrial, and post-industrial) especially in terms of attitudes to the land
2) Describe the four classifications of economic activities (i.e. primary, secondary, tertiary, quaternary). These concepts can then be applied to discussions about places around the world

Unit Two: Mapping Skills

Students should be able to:
1) Calculate scale in three ways (i.e. linear, representative fraction, and verbal scale)
2) Move from one scale to another
3) Measure distances curved and straight
4) Calculate area using the squares method
5) Use a variety of map symbols
6) Calculate gradient in m/km, %, and ratio
7) Determine map directions especially when paired with an air photo
8) Understand the basic rules of contours lines
9) Draw and recognize topographic profiles; calculate vertical exaggeration
10) To review the basics of latitude and longitude
11) Use the military grid for determining location (using both 4 and 6 digit methods)
12) Make scale comparisons - large, medium, and small
13) Read and interpret topographic maps in regards to
a) climate b) economic activities - forestry, mining, farming, port activities
c) transportation - logging roads, trails, roads, highways, railways
d) ethnic group e) type of land form f) agents responsible for relief
14) Interpret the two types of air photos in regards to similar items in #13, plus determining a) time of day b) recognition of various man-made features
c) approximate the scale of an air photo when twinned with a topographic map
15) Summarize the main uses of topographic maps, air photos, and satellite photos and computers to geographers

Module 2: The Systems of the Earth

Unit Three: Tectonic Processes

Students should be able to:

1) Describe the structure of the earth's interior, characteristics of each part, and explain how this knowledge has come about
2) Explain the theories of continental drift and plate tectonics
3) Distinguish between and give examples of the three types of plate boundaries and the types of landforms produced (i.e. mid oceanic ridge, trench, island arc)
4) Recognize the major tectonic plates and their direction of movement and interaction
5) Describe the three types of rocks by explaining their origin, major characteristics, landforms found in and examples of each type of rock
6) Explain the following aspects of earthquakes
a) four causes b) focus and epicenter c) major effects d) dangers on the west coast of North America
7) Explain where folding and faulting occur and list and describe the three major folds and four major faults
8) Describe the two main types of volcanic lava: andesitic and basaltic
9) Describe the three types of volcanoes and give examples
10) Describe and identify four intrusive volcanic features and three extrusive features as well
as geysers and hot springs

11) Outline the positive and negative effects of tectonic processes on topography, the atmosphere, and humans

12) Explain the correlation between earthquakes and volcanoes and why most happen in the Pacific Rim of fire

13) Explain how diastrophism helped to form the following features:
   a) Rockies b) Himalayas and Alps c) Coastal Mts. of BC
d) East African Rift Valley

diastrophism: the action of the forces that cause the earth's crust to be deformed, producing continents, mountains, changes of level, etc.

Vocabulary

1) tension 2) compression 3) San Andreas Fault 4) sedimentary 5) metamorphic
6) magma and lava 7) igneous (intrusive & extrusive) 8) fossil 9) rock cycle
10) tectonic 11) normal fault 12) reverse fault 13) tear or strike-slip fault 14) fold
15) mountain 16) rift valley 17) horst 18) anticline 19) syncline 20) shield cone 21) composite cone 22) cinder cone 23) caldera 24) fissure eruption
25) overfold 26) subducting & converging (basalt flood) 27) geosyncline plates 28) focus
29) diastrophism 30) viscosity 31a) batholith b) sill c) dike d) laccolith
32) crust (lithosphere) 33) mantle (mesosphere) 34) outer and inner core (centrosphere)
35) continental drift and Pangaea 36) sea floor spreading 37) seismograph and seismic
waves 38) primary and 39) tsunami 40) sial and sima secondary waves 40) magnetic
reversal 41) andesite 42) basalt 43) pyroclastic materials 44) vein or lode 45) plateau
(i.e. crystallized metal ore found in a rock mass fissure)

Unit Four: Erosion and Weathering (Gradational Processes)

Students should be able to:

I) Weathering
1) Explain the difference between weathering and erosion
2) Describe three types of physical (i.e. mechanical) weathering and three types of chemical weathering

II) Mass Wastage
1) Define mass wastage
2) Explain five types of mass wastage
3) Describe preventative actions humans can take to reduce mass wastage

III) Karst Topography and Running Water
1) Explain how Karst Topography forms
2) Describe the four major landforms associated with karst topography
3) Define the terms spring, artesian well, permeable rock, impervious rock, aquifer
4) List four ways that groundwater is important to humans
Vocabulary

1) gradational forces 2) physical weathering 3) chemical weathering 4) frost shattering or freeze-thaw action 5) exfoliation 6) weathering 7) erosion 8) carbonation 9) mass wastage 10) joints 11) screes 12) earth pillar 13) soil creep 14) terracettes 15) landslides 16) gullying 17) mud flows 18) avalanche 19) leaching 20) rock fall 21) granular disintegration: grain-by-grain breakup of the outer surface of coarse-grained rock yielding sand and gravel and leaving behind rounded boulders. 22) pervious 23) impervious 24) spring 25) aquifer 26) artesian well 27) karst topography 28) sink hole (swallow hole) 29) stalactite 30) stalagmite 31) cave

Unit Five: Glaciers

Students should be able to:

1) Describe three causes of ice ages
2) Describe the two types of glaciers and identify the two land areas that have most of the glacial ice of the earth
3) Describe the two main methods by which glaciers erode debris
4) Describe how glaciers affected North America during the ice ages, affect it today, and in the future
5) Describe how glacial landforms provide both problems and opportunities for humans
6) Examine glacial landforms and state whether they are produced by an alpine glacier, continental glacier, or both
7) Recognize glacial landforms on topographic maps and air photos

Vocabulary

1) alpine or valley glacier 2) continental glacier 3) interglacial 4) neve or firn 5) quarrying or plucking 6) abrasion 7) ground moraine 8) striation 9) roche moutonnee 10) cirque 11) U shaped valley 12) lateral moraine 13) medial moraine 14) arete 15) hanging valley 16) truncated spur 17) finger or ribbon lake 18) terminal moraine 19) crevasse 20) tarn 21) pyramidal peak (horn) 22) drumlin 23) esker 24) outwash plain 25) erratic 26) fiord

Unit Six: Rivers

Students should be able to:

1) Describe the four types of erosion and the three methods by which rivers transport debris
2) Compare and contrast youthful, mature and old rivers in regards to:
   a) landforms b) gradient c) discharge d) velocity e) sediment load
   f) types of erosion g) uses to humans
3) Describe how the four types of deltas form and give examples of them in the world
4) Explain how rivers can rejuvenate and thereby gain their youthfulness
5) Recognize trellis, dendritic, and radial drainage systems
6) Explain how and why inner and outer river banks vary from each other
7) Explain how rivers are complex natural systems that greatly affect human activity and also can be completely changed by man such as through building dams and clearcutting trees near rivers
8) Explain the advantages and disadvantages of dams
9) Recognize river landforms on topographic maps and air photos
10) Recognize river valley profiles
11) Draw and label the hydrologic (water) cycle
12) Explain how a river basin can be better managed

**Vocabulary**

1) rejuvenated river 2) youthful river 3) mature river 4) old river 5) trellis drainage 6) dendritic drainage 7) radial drainage 8) arcuate delta 9) bird'sfoot delta 10) estuarine delta 11) drainage basin 12) suspension 13) solution 14) saltation 15) potholes 16) rapids 17) braiding 18) meander 19) floodplain 20) alluvium 21) river terrace 22) levee 23) hydrologic (water) cycle 24) vertical erosion 25) headward erosion 26) lateral erosion 27) oxbow lake 28) river complexity

**Unit Seven: Deserts**

**Students should be able to:**

1) Name the most powerful source of erosion in deserts
2) Describe methods by which wind transports materials in the desert
3) Describe landforms formed by wind erosion and wind deposition
4) Describe landforms formed by water action in deserts

**Vocabulary**

1) dune 2) barkhans or barchans 3) erg 4) loess 5) bolson 6) plateau 7) mesa 8) butte 9) badlands 10) canyon 11) talus 12) Hamada 13) wadi 14) alluvial fan 15) bajada 16) playa lake 17) deflation 18) exfoliation 19) oasis 20) saltation 21) suspension 22) surface creep

**Unit Eight: Coastal Landforms**

**Students should be able to:**

1) Describe the processes that shape coastal landforms
2) Describe the process of cliff retreat
3) Explain the process in the creation of a stack
4) Diagram and explain how longshore drift operates and how it helps to form spits, baymouth bars, and tombolos
5) Describe the major differences between emerging coastlines and submerging coastlines
6) Describe the significance of emerging and submerging coastlines to humans
7) Describe how coral reefs, atolls, and offshore bars form
8) Recognize coastal features on topographic maps and air photos

**Vocabulary**

1) hydraulic action 2) corrasion 3) attrition 4) undercutting 5) headland 6) bay
7) blow hole 8) stack 9) arch 10) wave cut platform 11) swash 12) backwash
13) longshore drift 14) sandspit 15) off shore bar 16) bar 17) lagoon 18) groyne
19) submerging coastline 20) ria coastline 21) fiord coastline 22) longitudinal coastline
23) estuary 24) emerging coastline 25) tombolo 26) coral reef 27) atoll

**Unit Nine: Weather**

**Students should be able to:**

1) Identify forms of instrumentation and methods used to compile weather information
2) Demonstrate how weather information is collected (locally and internationally) and used to predict future weather conditions
3) Describe the characteristics and significance of the vertical, layered structure of the atmosphere
4) Define the following terms and state their significance in the mass energy exchange in the atmosphere: solar insolation, absorption, reflection, shortwave radiation, longwave radiation, convection, condensation, albedo
5) Describe how the atmosphere is largely heated from below
6) Describe the necessary conditions for precipitation
7) Describe using diagrams the three major methods by which moist air can be forced to rise and create precipitation
8) Describe the air masses of North America, giving their source regions, paths of movement, and generally associated weather conditions
9) Identify the major cloud types at the three levels including the two types of fog
10) Describe the major characteristics of high and low pressure zones and their accompanying sky cover
11) State what causes: a) wind b) sea breezes c) land breezes
12) Draw a diagram of the prevailing surface winds of the world giving their direction and name of each wind
13) Understand the role of the jet stream and upper air westerlies in influencing weather
14) Explain the history of a frontal low
15) Read and interpret a weather map including all major symbols
16) Explain the causes of hurricanes and tornadoes and how they affect human activity
17) To understand the nature of and impact of El Niño and La Niña.
18) To gain an understanding of the interrelatedness of the atmosphere and the oceans.
19) Explain how weather affects human activity (locally, nationally, and internationally)
20) Describe the major temperature controls (i.e. O LAMPNAS)
Vocabulary

1) atmosphere 2) weather 3) climate 4) troposphere 5) stratosphere 6) ozone layer 7) insolation 8) radiation 9) conduction 10) convection 11) condensation 12) evaporation 13) jet stream 14) isobar 15) prevailing wind 16) aspect 17) low or depression or cyclone 18) high or anticyclone or ridge 19) Coriolis force 20) trade winds 21) thermal equator 22) sea breeze 23) land breeze 24) humidity 25) dew point 26) advection fog 27) radiation or ground fog 28) cumulus cloud 29) stratus 30) altocumulus & altostratus 31) cumulonimbus cloud 32) cirrus cloud 33) nimbostratus 34) temperature control 35) orographic precipitation 36) convectional precipitation 37) frontal precipitation 38) rainshadow 39) chinook 40) front (warm, cold, occluded, stationary) 41) hurricane 42) tornado 43) frontal low 44) air mass 45) temperature inversion 46) continental polar air mass 47) maritime polar air mass 48) Arctic air mass 49) continental tropical air mass 50) maritime tropical air mass 51) meteorology 52) weather station model 53) ocean currents (warm and cold) 54) El Nino 55) La Nina 56) saturated 57) millibar 58) kilopascal

Unit Ten: Climates / Soils / Vegetation / Biomes / Agriculture

Students should be able to:

1) State the difference between climate and weather
2) Name the major climatic elements and describe the influence of the following temperature controls (O LAMPNAS): ocean currents, latitude, altitude, mountain barriers, prevailing winds, nearness to water, amount of cloudiness, and slope
3) Describe the following climates, their causes, their location, and identify the climate graph associated with each:
   Tropical Climates:
   - Equatorial, Tropical Wet / Dry, Monsoon
   Arid Climates:
   - Desert, Cold Desert
   Coastal Climates:
   - Cool Climate-Moderate Winter, Mediterranean, Warm Climate-Wet
   Continental Climates:
   - Cool Climate-Severe Winter, Warm Climate-Wet

Vocabulary

1) temperature controls 2) thermal equator 3) solstice 4) equinox 5) temperate climate 6) tropical 7) arid 8) equatorial 9) tropical wet/dry 10) monsoon 11) desert 12) cold desert 13) cool climate-moderate winter 14) mediterranean 15) warm climate-wet 16) cool climate-severe winter 17) warm climate-wet 18) coastal climate 19) continental climate 20) diurnal range 21) micro climate 22) macro climate
Students should be able to:

I) Soils
1) Describe the factors that influence soil formation
2) Understand the concept of horizons within a soil profile
3) Understand what leaching and capillary action is and how it affects soils
4) Describe the following soil types and recognize their soil profiles:
   a) latosol  b) podzol  c) grey-brown podzol  d) chernozem  e) sierozem (desert soil)  f) tundra
5) Relate soil type to climate, vegetation, biomes, and agriculture

II) Vegetation
1) Describe the two major factors that control the kind of vegetation that will grow in an area
2) Describe the distribution of vegetation on the earth
3) Relate vegetation to climate, soils, and biomes

III) Biomes
1) Understand the definition of a biome and ecosystem
2) Understand the nature of the major biomes by relating them to climate, soils, and vegetation

IV) Agriculture
1) Describe the agricultural activities in various parts of the world and how they relate to climate, soils, vegetation, and biomes

Vocabulary
1) parent material 2) leaching 3) capillary action 4) soil profile 5) horizon 6) zonal
7) intrazonal 8) azonal 9) latosol 10) podzol 11) grey-brown podzol 12) chernozem
13) sierozem 14) tundra soil 15) humus 16) soil creep 17) megatherms 18) mesotherms
19) microtherms 20) hydrophytes 21) xerophytes 22) tropical rain forest 23) savanna
24) Mediterranean woodland and scrub or semi-arid vegetation 25) steppe and prairie grasslands 26) temperate deciduous forest 27) coniferous forest 28) mixed conifer-broadleaf forest 29) taiga or boreal coniferous forest 30) tundra 31) biome 32) fauna (i.e. animals) 33) biotic (i.e. refers to the living things in an ecosystem) 34) abiotic (i.e. refers to the non-living components of an ecosystem) 35) primitive subsistence 36) slash and burn agriculture 37) terracing 38) pastoral nomadism 39) commercial plantation 40) livestock 41) ecosystem 42) photosynthesis 43) herbivore 44) carnivore 45) omnivore 46) food chain

Module 3: Environments and People / Resource Management

Unit Eleven: Global Atmospheric Issues
Students should be able to:

1) Describe what ozone depletion is, its causes, its potential effects, and possible cures.
2) Describe what global warming is, its possible causes (i.e. enhanced greenhouse effect and natural variation in climate), its potential effects (with emphasis on Canada), and possible cures.
3) To gain an understanding of the views of different countries regarding the Kyoto Accord and the issue of climate change.
4) Describe what acid rain is, its causes, its effects, and possible cures.
5) Describe what air pollution is, its causes, its effects, and possible solutions.

Unit Twelve: Water As A Resource

Students should be able to:

a) Fresh Water
1) Differentiate between the major competing uses for fresh water [i.e. agriculture (73%), industry (21%), domestic and public water supply (6%].
2) Describe the types, sources, and effects of fresh water pollution (eg biomagnification / bioaccumulation) and outline methods for controlling such pollution eg eutrophication, toxic chemicals, thermal pollution, pesticides, excess chemical fertilizers, etc.
3) Discuss the ways that people meet their needs for water (eg river diversions, types of irrigation, etc.) and ways to conserve water.
4) Understand that the availability of fresh water resources varies considerably around the world.
5) Understand the importance of a clean freshwater supply to humans as 80% of diseases (eg malaria and diarrhea) are water-related in developing countries.
6) Explain how a river basin can be better managed (see Unit Six: Rivers).
7) Summarize the importance of groundwater to humans (see Unit Four: Erosion and Weathering in Module Two)

b) The Oceans
1) Understand the importance of ocean water as a resource (eg harvesting the sea).
2) Describe examples of how fisheries have been mismanaged, the socio-economic and environmental impacts of such mismanagement, and solutions for better management
3) Explain the threat posed by driftnet fishing
4) Describe the importance of coastal ecosystems such as saltmarshes, mangroves, estuaries, and coral reefs as well as the threats to their survival

c) Urban Water Cycle
1) Compare and contrast the urban water cycle with the natural hydrological cycle
2) List potential threats to water quality in the urban water cycle and how these threats may be reduced.

d) Wetlands
1) Give examples of wetlands.
2) Explain the value of wetlands.
3) Identify threats to wetlands.

Unit Thirteen: Energy Resources: Renewable and Non-renewable

Students should be able to:

1) Understand the difference between renewable and non-renewable resources.
2) Compare fossil fuels and analyze their impact upon the environment.
3) Analyze the advantages and disadvantages of hydroelectric power.
4) Analyze the advantages and disadvantages of nuclear power.
5) Describe some of the energy alternatives as well as their advantages and disadvantages.

Unit Fourteen: Waste Disposal

Students should be able to:

1) Describe what sewage is and how it is treated (i.e. primary, secondary, and tertiary treatment).
2) Analyze the benefits and dangers posed by sewage.
3) Describe how solid waste is disposed of through either landfills or incinerators and the environmental impact of using these methods.
4) Describe what hazardous wastes are, give examples, and how they are disposed of.
5) Describe the three Rs and the benefits and costs of recycling.

Unit Fifteen: Assessment and Management of Resources continued

Students should be able to:

1) Describe the four major ethical views on land resource use [i.e. economic (i.e. "use it"), preservationist (i.e. "preserve it"), balanced multiple-use or scientific conservation, and ecological or sustainable earth] and how these views result in resource use conflict.
2) Define what sustainable development is (i.e. using up resources no faster than they can be regenerated by nature).
3) Identify resource use conflicts on topographic maps and air photos and offer solutions that advocate sustainable development.
4) Understand that culture and technology in society influence our perception of needs and wants in both time and place.
5) Describe the major components of an environmental impact assessment.
6) Describe the factors that must be considered in assessing how, when, where, and whether a resource should be developed (i.e. social, political, economic, and environmental considerations)

7) Describe how individuals can affect change by acting individually or collectively.
direct vs. indirect action
8) Describe the two major types of mining: open pit and underground
9) Describe environmental concerns with the mining process and management strategies
10) Understand that resource use has changed through time with changes in technology. eg in agriculture the green revolution and gene revolution
11) Describe the growing problem of desertification, the factors that contribute to it, and potential solutions
12) Understand the problem of salinization in soils
13) Describe the major uses of forests, the problem of deforestation, why it is happening, and why it matters. In particular, understand why tropical rain forests are so valuable
14) Contrast clearcutting and selective logging
15) Explain the impact of clearcutting on the four spheres (i.e. biosphere, lithosphere, atmosphere, and hydrosphere)
16) Describe the environmental impact of hydroelectric dams (see Unit Six: Rivers)
17) Describe why we should be concerned about preserving wild species, what causes extinction, and how we can protect and manage our wildlife resources.

Module 4: Course Review and Government Exam Preparation

Unit Sixteen: Review and Government Exam Helper Guides

Students should be able to:

1) Review the Content Learning Outcomes and Vocabulary from the course
2) Incorporate strategies to prepare for the Government Exam