

Geography 12

Content Learning Outcomes and Vocabulary

Module 1: The Nature of Geography

Unit One: Course Basics

Students should be able to:

A) Nature of Geography

- 1) List the five basic themes of geography [i.e. location (absolute and relative), nature of place, human-environment interaction, movement, and regions] and be able to apply them to a particular place or issue
- 2) Apply major geography themes (i.e. pollution knows no borders, global citizenship, etc.) to various environmental issues and case studies
- 3) To review some basic world map facts and to introduce some new facts that will be elaborated upon during the course
- 4) To understand the steps necessary to help one think geographically when interpreting data on a map
- 5) 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
 - e) shallow versus deep earthquakes
- 7) Explain where folding and faulting occur and list and describe the three major folds and four major faults; recognize the formation of horsts and grabens
- 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) sedimentary 4) metamorphic 5) magma and lava 6) igneous (intrusive & extrusive) 7) fossil 8) rock cycle 9) tectonic 10) normal fault
- 11) reverse fault 12) San Andreas Fault* 13) *tear or strike-slip fault or slip & slide fault or transform plate boundary 14) fold mountain 15) rift valley or graben 16) horst
- 17) anticline 18) syncline 19) theory of isostasy 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 & epicenter 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 (i.e. crystallized metal ore found in a rock mass fissure) 45) plateau 46) fissure (i.e. a narrow opening – associated with diverging plates)
- 47) focus 48) epicenter 49) magnitude 50) Richter Scale 51) intensity 52) Modified Mercalli Scale

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 the inner bank (i.e. slip off slope / point bar) 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's foot delta 10) estuarine delta 11) cuspate delta 12) drainage basin 13) suspension 14) solution
- 15) saltation (rock fragments bouncing on the river bed)
- 16) traction (rock fragments rolling on the river bed) 17) potholes 18) rapids 19) braiding
- 20) meander 21) floodplain 22) alluvium 23) river terrace 24) levee
- 25) hydrologic (water) cycle 26) vertical erosion 27) headward erosion 28) lateral erosion
- 29) oxbow lake 30) river complexity 31) slip off slope / point bar
- 32) abrasion or corrasion: the wearing away of bedrock caused by the rubbing, scouring, or scraping action of rock fragments or particles carried by streams, ice, wind, or waves
- 32) corrosion: the dissolving of soluble minerals by water in streams or waves; common in humid areas underlain by limestone rocks.

Unit Seven: Deserts

Students should be able to:

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

Vocabulary

- 1) dune 2) barchans 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
- 28) wave refraction

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 especially the troposphere and the stratosphere
- 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 (i.e. radiation fog and advection 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) convective precipitation 37) frontal precipitation
- 38) rainshadow 39) front (warm, cold, occluded, stationary) 40) hurricane
- 41) tornado 42) frontal low 43) air mass 44) temperature inversion 45) continental polar air mass 46) maritime polar air mass 47) Arctic air mass 48) continental tropical air mass
- 49) maritime tropical air mass 50) meteorology 51) weather station model 52) ocean currents (warm and cold) 53) El Nino 54) La Nina 55) saturated 56) millibar
- 57) kilopascal 58) chinook 59) anabatic wind 60) katabatic wind

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 maquis vegetation (i.e. low-lying bushes) or sclerophyll forest (eg olive, oak, pine) or chaparral vegetation (i.e. a thicket of dwarf oak, low thorny bushes) 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 / primary consumer 44) carnivore / secondary consumer 45) omnivore / tertiary consumer 46) primary producer (green plants capable of photosynthesis) 47) decomposer (bacteria and fungi) 48) food chain or food web

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 (i.e. pesticides, dioxins, radioactive materials) 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.
Define silviculture: the care and cultivation of forest trees.
- 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