

Geography 12

June 2004 Provincial Examination

ANSWER KEY / SCORING GUIDE

- Topics:** 1. The Nature of Geography
2. Systems of the Earth
3. Resources of the Earth

Part A: Multiple Choice

Q	K	C	S	T	PLO	Q	K	C	S	T	PLO		
1.	B	K	1	3	3A1	21.	B	U	1	2	2C1b		
2.	B	K	1	3	3A2	22.	A	U	1	2	2C1d		
3.	B	K	1	3	3B1	23.	C	U	1	2	2C1b		
4.	C	K	1	1	1B4	24.	B	U	1	2	2C1c		
5.	B	U	1	1	1A1	25.	D	U	1	2	2C1e		
6.	C	K	1	2	2A1	26.	C	K	1	2	2D1		
7.	D	K	1	1	1B2, 2B5	27.	B	U	1	2	2D4		
8.	A	U	1	2	2A2	28.	D	U	1	2	2D2		
9.	A	U	1	2	2B1, 2A3	29.	D	U	1	2	2D3b		
10.	C	K	1	2	2A4	30.	D	U	1	2	2D3b		
11.	A	U	1	2	1C2, 2A3	31.	C	U	1	2	2D3c		
12.	C	U	1	2	1C2, 2A3	32.	C	U	1	2	2D3c		
13.	D	E	L	E	T	E	D	33.	B	U	1	2	2D3e
14.	B	U	1	1	1B1, 2A2	34.	A	U	1	2	2D3e		
15.	A	U	1	2	2B3, 1C2	35.	B	U	1	1	1C1		
16.	C	U	1	2	2B2, 1C2	36.	B	U	1	1	1C1		
17.	B	U	1	2	2B2, 1C2	37.	C	U	1	1	1C1		
18.	B	U	1	2	2B3, 1C2	38.	B	U	1	1	1C1		
19.	C	K	1	1	1B1	39.	A	U	1	1	1C2		
20.	A	U	1	2	2C1a	40.	A	U	1	2	2D3d		

Multiple Choice = 40 marks

Part B: Written Response

Q	B	C	S	T	PLO
1.	1	H	6	3	3B2
2.	2	U	4	2	2B3, 1B4
3.	3	H	4	3	3A2, 2D4
4.	4	U	4	2	2B1, 2A2, 2A5
5.	5	U	5	1	1B1, 3A3, 3A4, 3B2
6.	6	H	5	3	1B4, 3B2, 3A2, 3C3
7.	7	U	4	2	2C3, 2C1c
8.	8	U	4	3	3A1
9.	9	H	4	3	3A1, 3C1
10.	10	H	10	3	3C4, 1B2, 1B3, 1B4, 3C1

Written Response = 50 marks

Multiple Choice = 40 (40 questions)

Written Response = 50 (10 questions)

EXAMINATION TOTAL = 90 marks

LEGEND:

Q = Question Number

C = Cognitive Level

T = Topic

K = Keyed Response

S = Score

PLO = Prescribed Learning Outcome

B = Score Box Number

PART B: WRITTEN RESPONSE

Value: 50 marks

Suggested Time: 80 minutes

INSTRUCTIONS: Answer each question in the space provided. You may not need all of the space provided. Answers should be written in **ink**. **Comprehensive answers are required for full marks.**

**REFER TO
DATA BOOKLET**

Use Photograph 6 and the Topographic Map to answer question 1.

Use the following information to answer question 1.

Currently there is little economic activity in the area on the topographic map except for coal mining, logging, and services along the highway. However, European interests are looking at developing an alpine destination resort as shown by **X** on the photograph. Plans for the proposed year-round resort include a ski complex, a golf course, lodges, condominiums, restaurants, and a hotel.

1. **Outline** the economic and environmental consequences of this potential development on the region. Answer in **paragraph** form. **(6 marks)**

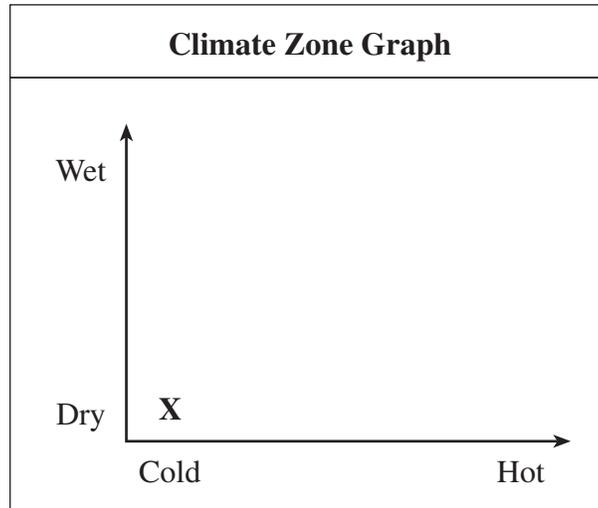
Response:

**Economic Consequences
of Resort Development**

- Direct and indirect employment opportunities.
- It will mean an economic boost for the local economy.
- Construction jobs would be available in the short-term (workers would likely come from nearby towns for the boom cycle).
- More services would be needed for tourists, causing the communities of Savanna and Sentinel to grow.
- Increased size of landfills for garbage.
- Workers would be needed at the resort after it is completed, and would require their own services such as accommodations.
- Infrastructure such as roads would have to be built. The facility would require water and sewer services.
- Increased tax revenues for provinces.
- Increased property values (land speculators).
- Loss of land available for development.
- Water shortages as many of the streams of the Savanna and Sentinel areas are intermittent.
- Air quality reduced during preconstruction and postconstruction (fossil fuels used in heavy equipment and cars).
- Water contamination from urban and road run-off, fertilizers on the golf course, domestic sewage.
- Profits made from the sale of timber.
- The cost of development may not be recovered.
- Development contributes to boom/bust cycle if unsuccessful.
- Native land use issues.

Environmental Consequences of Resort Development	<ul style="list-style-type: none">• The mountain slopes have to be cut and stabilized for the development of ski runs.• The construction of roads, towers, lifts, and the ski complex itself may impact the environment.• Solid and liquid waste disposal systems have to be constructed and will impact the environment.• The local hydrology will be altered (should be designed to minimize erosion and protect the environment from run-off).• Wildlife in the immediate vicinity will likely leave the area or could be considered a nuisance to be dealt with.• Loss of habitat.• Increased fire hazard.• Deforestation leads to stream siltation, increased CO₂ in the atmosphere and the loss of the carbon sink.• Reduced air quality.• Water contamination.• Noise pollution.
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Use the following graph to answer question 2.



2. a) **Identify** the natural vegetation associated with location **X** on the graph.

(1 mark)

Response:

Location X	<ul style="list-style-type: none">• arctic grass (sedge grass)• arctic/polar desert• grasslands• tundra• alpine• xerophytes• microtherms• moss• lichen• arctic flowers• small low-lying shrubs, dwarf shrubs, bushes
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- b) **Explain** two different ways the natural vegetation of this biome has adapted to the climatic conditions. **(2 marks)**

Response:

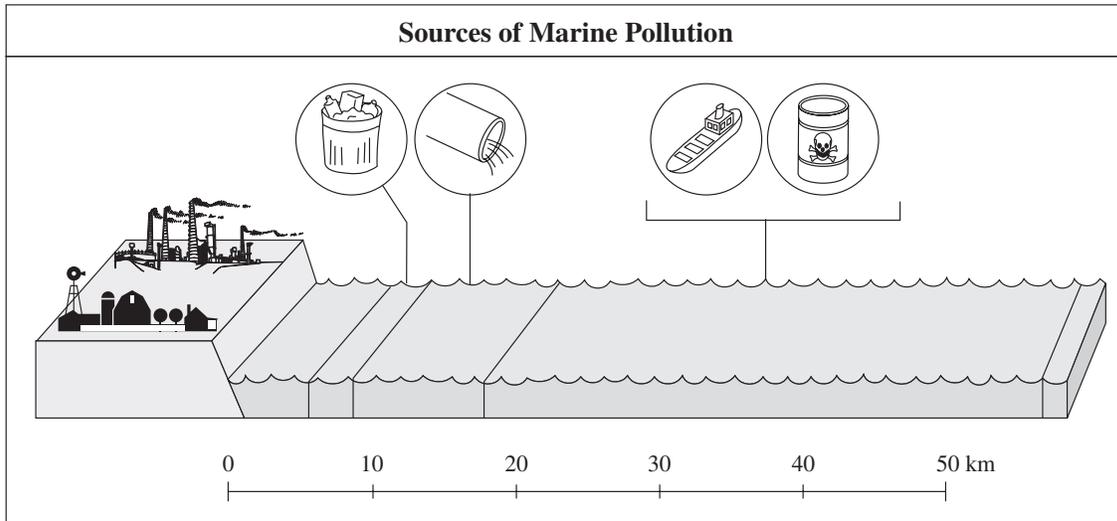
Adaptations	<ul style="list-style-type: none">• low growing to protect from cold wind• short germination period reduces growth• shallow roots due to permafrost/thin soils• plants grow in hollows and behind rocks to protect from the cold• grass and plants lay dormant for 10 months when temperatures are below 6°C• thick bark reduces transpiration• small leaves reduce transpiration• hygrophytic plants are able to withstand wet, swampy, cold conditions• dark green leaves absorb the sun's rays, raising the temperature of the plants and promoting rapid photosynthesis during the short, intensive growing season• spacing to reduce competition• bright colours to attract insects for pollination• symbiotic relationships (tree islands)• xerophytic plants• low nutrient requirements• seeds lay dormant over the winter• grow low to ground to capture radiating heat• grow in clumps for survival• seeds are spread by wind and birds (droppings)
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c) **Describe** how human activity has threatened the flora or fauna of this biome. (1 mark)

Response:

Human Threats to Flora and Fauna	<ul style="list-style-type: none">• transportation routes thwart migration patterns and destroy fragile flora• settlements and industrial developments have reduced habitat and flora• oil and gas exploration interferes with migration routes• pipelines melt permafrost• climate change is affecting food web in the arctic• recreational activities (ski runs, trails)• garbage and waste disposal attracts animals• warm microclimate change (buildings)• acid rain• CFCs and ozone depletion in the Arctic area• hunting and tourism• lack of education• harvesting for the medical possibilities of plants• global warming leads to lack of permafrost and melting of ice sheets
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Use the following diagram to answer question 3.



3. a) **Explain** two different threats to marine environments as illustrated in the diagram. **(2 marks)**

Response:

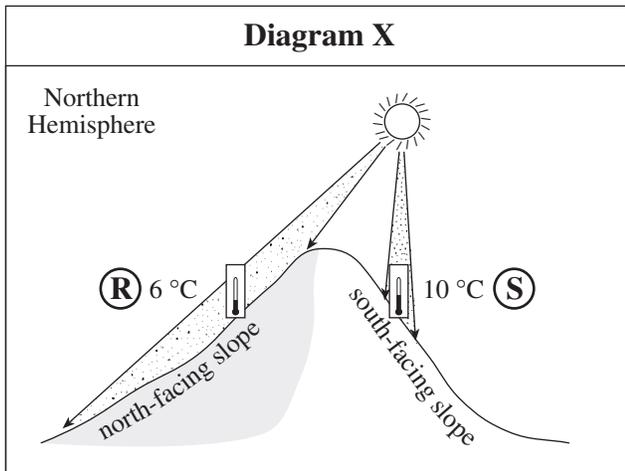
<p>Threats to Canada's Marine Environment</p>	<ul style="list-style-type: none"> • logging (siltation of estuaries impacts the richest areas of marine environment) • sewage disposal (contamination of marine organisms and potential for bioaccumulation) • dump sites at sea (contamination of marine organisms and potential for bioaccumulation) • dredging of river channels (disturbs ground fish) • urban run-off and expansion (contamination of marine organisms and potential for bioaccumulation) • leachates from landfills and mines (contamination of marine organisms and potential for bioaccumulation) • global warming and rising sea levels (alteration of tidal pools) • pulp mills (dioxins, organochlorines) • industrial development along shoreline (species migration and food chain adaptation) • agriculture run-off (pesticides, fertilizers) • emptying/cleaning of oil tankers — bilge water (oil spills) • dangers inherent in the transportation of petroleum (oil spills) • atmospheric pollution washed into the sea from factory emissions • fishing and wakes from boats • fish farms • hydro-electric dams • noise pollution • invasive species
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b) **Suggest** two measures that could be taken to protect marine environments. **(2 marks)**

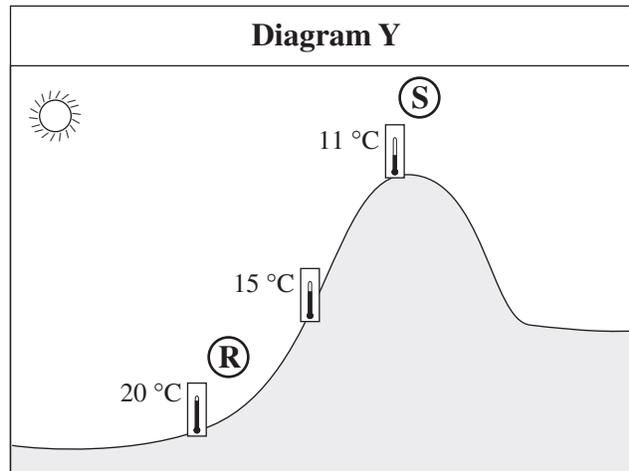
Response:

Marine environment can be protected by	<ul style="list-style-type: none">• recycling industrial water.• using double-hulled tankers.• limiting shoreline development.• creating settling ponds for industries.• monitoring vessels and tracing oil spills.• enacting “Zero Discharge” laws for industry.• constructing industrial sewage treatment plants.• establishing a system of marine protected areas.• transporting oil by pipelines instead of tankers.• imposing large fines for dumping or tanker accidents.• placing moratoriums on offshore oil and gas development.• prohibiting dredging and dumping in the marine environment.• requiring companies transporting oil to post an environmental bond.• political involvement — writing or lobbying lawmakers for strict rules.• increasing public awareness through newspaper and television advertisements.• climate change.• outlawing cyanide and TNT fishing.• prohibiting aquaculture.• limiting agriculture pesticides.• banning dragnets.• educating the public/users.• changing routes to offshore paths.• encouraging international cooperation.• using warnings and lighting to avoid crashes.• community sponsored clean-up.• designating marine parks.
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Select one of the following diagrams to answer question 4.
Indicate your selection with a ✓.



I have selected
Diagram X



I have selected
Diagram Y

4. a) **Identify** the temperature control illustrated in the diagram you have selected. **(1 mark)**

Response:

Diagram X	<ul style="list-style-type: none"> • influence of aspect on temperature • slope • relief • height • mountain barriers
Diagram Y	<ul style="list-style-type: none"> • influence of elevation/altitude on temperature • slope • relief • height • mountain barriers

- b) **Explain** the reasons for the differences in temperatures at locations **R** and **S** for the diagram you have selected. (2 marks)

Response:

Diagram X	<p>Location R</p> <ul style="list-style-type: none"> • The sun's rays are less direct in the northern hemisphere. This results in less absorption and cooler temperatures. (sunlight, insolation, light, suns rays, solar energy) <p>Location S</p> <ul style="list-style-type: none"> • The sun's rays are more direct (greatest angle of incidence) and therefore there is greater absorption of energy and warmer temperatures.
Diagram Y	<p>Location R</p> <ul style="list-style-type: none"> • The lower the elevation, the warmer the temperature because denser air contains more water vapour and dust which absorb solar radiation. <p>Location S</p> <ul style="list-style-type: none"> • The higher the elevation, the cooler the temperature. The dry adiabatic lapse rate is the rate at which air cools as it rises in altitude (a drop of 1 °C for every 100 m in altitude). (more condensed, less condensed air particles) <p>Student may refer to environmental lapse rate.</p>

c) **Describe** how human activities are influenced by the temperature control you have selected. **(1 mark)**

Response:

<p>Diagram X</p>	<ul style="list-style-type: none"> • ski facilities • micro-climates • forestry activities • tinting of windows • use and location of solar radiation cells • vegetation type changes with progression up slope • real estate values (south-facing) • habitat (house design and location) • location of agricultural activities (grapes) • alternative energy sources • leisure activities (swimming, sports, sun tanning) • prevention of skin cancer • development of towns/urban settings in lower elevations
<p>Diagram Y</p>	<ul style="list-style-type: none"> • growing season/farming activities • recreational activities (lowland versus alpine) • road maintenance (frost shattering and frost heaves) • roof design (A-frame construction so snow slides off) • vegetation patterns govern the type of economic activity • wearing appropriate clothing for high-altitude activities such as hiking, skiing and snowboarding

**Select one of the following species to answer question 5.
Indicate your selection with a ✓.**

Plant (flora) species Animal (fauna) species

5. a) **State** one reason why humans should be concerned about the extinction of the species you have selected. **(1 mark)**

Response:

Reasons to Be Concerned about Plant Extinction	<ul style="list-style-type: none"> • food source <ul style="list-style-type: none"> – approximately 20 plants provide the majority of the world’s food – herbs, spices, palm oil • cheap source of heat/energy (fuelwood) • alternative energy source (ethanol from corn) • material for clothing (cotton) • fragrance (perfume) • materials <ul style="list-style-type: none"> – lumber, rubber, hemp (rope), varnish, resin, rayon • prescription drugs (most drugs come from natural components) • medical cures <ul style="list-style-type: none"> – possible cure for cancer (rosy periwinkle) – over 25 000 tropical plants have been used in traditional medicine practices • food chain <ul style="list-style-type: none"> – all animals depend on plants for their survival (food and habitat) • air quality <ul style="list-style-type: none"> – plants take in carbon dioxide and release oxygen during photosynthesis – plants are carbon sinks and need to be kept for that reason • maintenance of nutrient cycle (when vegetation dies it decomposes and adds nutrients to the soil) • biological diversity <ul style="list-style-type: none"> – if one species is diseased then there are others to fall back on – aesthetic quality of plant diversity • soil erosion, river siltation • loss of habitat • climate change • religious/cultural reasons • could hurt the economy
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Reasons to Be Concerned about Animal Extinction

- food source for humans
- materials
 - silk, wool, fur, leather
- transportation (labour)
 - horse, elephant, camel, ox
- tourism
 - whale watching, safari
- scientific studies
 - medical research (rats)
- companionship/security
 - pets (guard dogs)
- seed dispersal
 - seeds get transported in animal fur/waste
- food chain
 - removal of one species could have a domino effect
- ethics
 - Do humans have the right to destroy another species?
- aesthetic quality of animal diversity
- loss for generations of the future (will no longer have the species)
- medical benefit of pets (psychologically)

- b) **Outline** two different threats that may lead to the extinction of the species you have selected. **(2 marks)**

Response:

Causes of Plant Extinction	<ul style="list-style-type: none">• removal<ul style="list-style-type: none">– agriculture (grazing, ranching, crops)– forestry (deforestation)– energy (fuelwood, biomass)– mining– residential– infrastructure (roads, power lines, dams)• depletion/exploitation/overharvesting<ul style="list-style-type: none">– collectors– hoarding of unique species for potential medical cures• destruction<ul style="list-style-type: none">– chemical pollution– invader species– climate change• ignorance• forest fires• diseases from aquaculture (fish farms)• interrupting pollination of plants by destroying their pollinators• draining of wetlands• offshore ownership of areas to be developed
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Causes of Animal Extinction

Habitat elimination, disturbance, fragmentation

- agriculture
 - ranching, grazing
 - crops, plantations
 - draining of wetlands
- mining
 - open pits
 - tailing piles
 - settling ponds
- deforestation
 - clear-cut, selective logging
 - fuelwood collection
- development
 - industrial
 - tourism/recreation
 - residential
 - commercial
 - infrastructure
- water diversion
 - dams, channels
- pollution
 - agrocidés (pesticides, herbicides, fertilizers)
 - urban run-off
 - industrial (dioxin)
 - landfills, dumps, junkyards
- climate change
- diseases
- exploitation
 - food source
 - for sport (hunting)
 - poaching (illegal trade)
 - collection (zoos, pets)
 - cultural use, traditional medicines
 - fashion (snakeskin boots)
- competition
 - introduction of predators, new species (Atlantic salmon destroying Pacific salmon stocks)
- accidental mortality
 - war/land mines
 - traps
 - deliberate fires

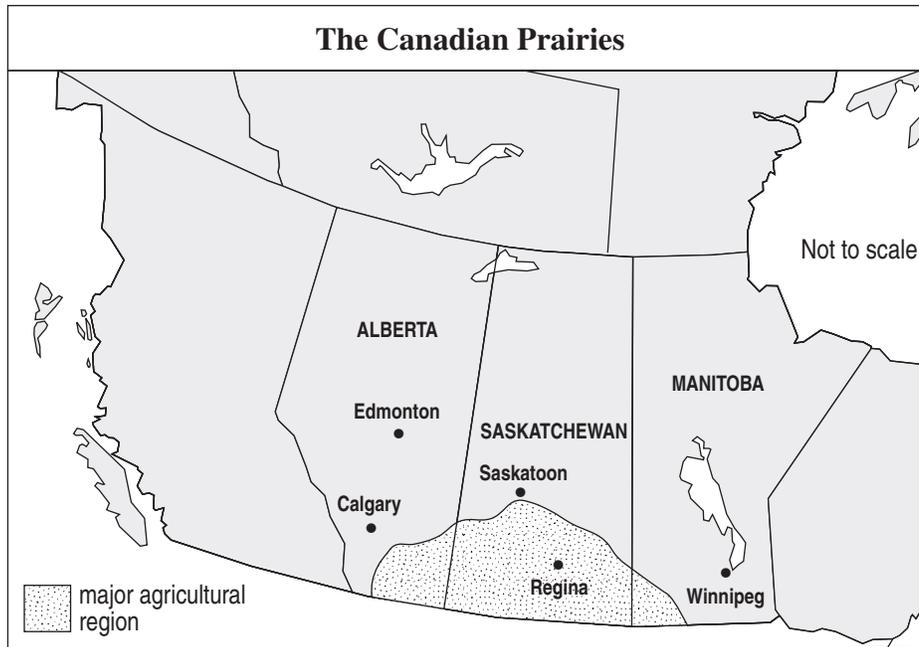
c) **Suggest** two strategies that could be utilized to protect the species you have selected.

(2 marks)

Response:

<p>Protection of Plants</p>	<ul style="list-style-type: none"> • parks • green belts • botanical gardens • ecological preserves • restrict chemical use • establish gene banks • sustainable resource extraction • strict laws and enforcement • penalties on exploitation • educational programs regarding the value of plants • encourage more organic farming • better urban planning • build up, not out • strict government enforcement against importation of alien species • better forest fire prevention techniques • Adopt-a-Highway idea • Arbour Day (plant a tree worldwide) • donations (tax breaks) • fish hatcheries/fish farms (aquaculture) • debt forgiveness in exchange for habitat preservation (developing countries) • fishing regulations (times, quotas) • “Big Brother” (developed countries helping developing countries with technical/financial assistance) • charge higher price for products from endangered species • boycott products from threatened areas (plants and animals)
<p>Protection of Animals</p>	<ul style="list-style-type: none"> • protect natural habitats <ul style="list-style-type: none"> – parks, reserves, refuges • promote ecotourism • strict laws and enforcement • educational programs regarding the value of animals • penalties on exploitation <ul style="list-style-type: none"> – hunting, poaching • breeding programs for release into the wild • sustainable methods for resource extraction • radio collars to follow and study animals

Use the following map to answer question 6.



6. a) **Describe** two physical or natural characteristics that make the Canadian Prairies a major agricultural region. **(2 marks)**

Response:

Topography	<ul style="list-style-type: none"> • relatively flat land due to continental glaciation • retreating ice sheets provided freshwater (lakes, rivers, wetlands) for irrigation • region once covered by Lake Agassiz (post-glaciation) • aquifers
Climate	<ul style="list-style-type: none"> • located on the leeward side of the Rocky Mountains resulting in semi-arid conditions (250 to 500 mm of annual precipitation) • inland location produces extreme seasonal climate <ul style="list-style-type: none"> – warm summers (temperature is high enough for wheat production) – cold winters (snowfall melts in the spring to recharge freshwater supplies) • sufficient moisture
Vegetation	<ul style="list-style-type: none"> • the natural vegetation of temperate grassland/steppe indicates the region is suitable for grain and cereal crops • removal of short grass to make room for agriculture is not as difficult as in a forested region
Soil	<ul style="list-style-type: none"> • chernozem soil is a black soil with a thick humus that is considered to be one of the most fertile in the world • the parent material of sedimentary rock provided rich nutrients to the soil

b) **Outline** one natural threat and one human threat to the sustainability of this agricultural region.

(2 marks)

Response:

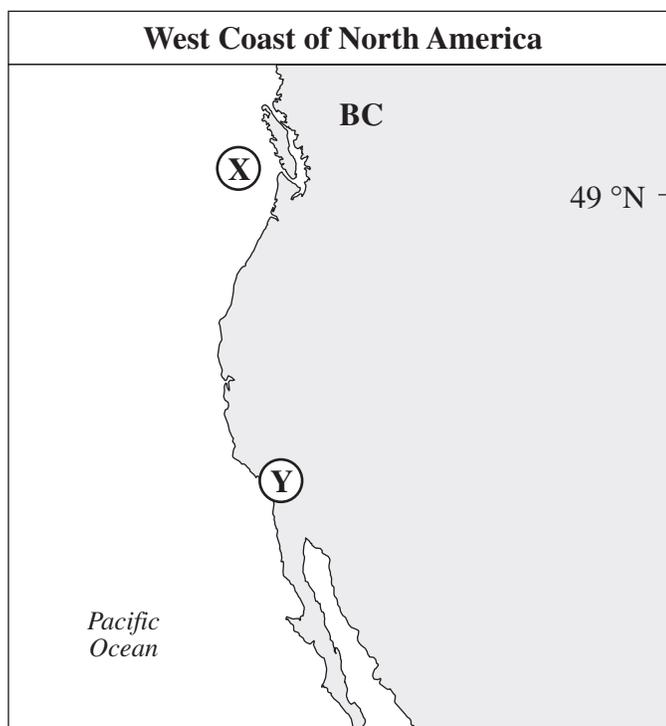
<p>Natural Threats</p>	<ul style="list-style-type: none"> • drought <ul style="list-style-type: none"> – climate change – heat wave (high pressure keeps jet stream at a polar location) • infestation <ul style="list-style-type: none"> – grasshoppers – fungus (wheat rust) • soil erosion • warmer winters <ul style="list-style-type: none"> – lack of snow to recharge freshwater supplies • wind erosion <ul style="list-style-type: none"> – heavy convectional rainfall – flooding during spring melt • water erosion <ul style="list-style-type: none"> – heavy convectional rainfall – flooding during spring melt • weather conditions <ul style="list-style-type: none"> – hail destroys crops – lightning strikes start fires – tornadoes
<p>Human Threats</p>	<ul style="list-style-type: none"> • poor farming practices <ul style="list-style-type: none"> – overcropping – monoculture – overirrigation leads to salinization – overuse of chemical fertilizers – downslope ploughing – soil compaction from heavy machines – removal of natural vegetation (wind breaks) – government subsidies encourage farmers to grow grains/cereal crops to meet the demand for such crops (population growth) • loss of farmland <ul style="list-style-type: none"> – urban development (residential, industrial, recreation, transportation) – climate change (industrial pollution) • overuse of water • oil industry • introduction of new species • acid precipitation from other sources

- c) **Suggest** one reason why management strategies to ensure the sustainability of this agricultural region may be difficult to achieve. **(1 mark)**

Response:

Reasons Sustainability Is Difficult to Achieve	<ul style="list-style-type: none">• need lots of money/capital to support many strategies• chemical fertilizers are relatively inexpensive and convenient• unable to control weather (drought/floods)• demand encourages farmers to grow cereal crops/grain• current farming methods provide farmers with an adequate living• lack of government will (lobby groups)• local governments rezone farmland for other uses which are viewed as having a higher economic/tax value• lack of economic incentives• traditional attitudes• genetically modified foods• consumer demands• danger of unexpected outbreaks of disease• global warming• urbanization• priority for oil production• native land claims• awareness/education• predators and disease
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Use the following map to answer question 7.



7. a) **Compare** the causes of earthquakes associated with locations **X** and **Y** on the map above. (2 marks)

Response:

Explanation	<ul style="list-style-type: none"> Subduction of an oceanic plate under a continental plate at X, whereas the lateral movement of two lithospheric plates at Y as they slide past one another (tear faults, slip-strike faults, transform faults).
<p>Note to Markers: Students may respond with an explanation of locking thrust faults along the San Andreas Fault.</p> <p>Students receive half marks for saying compression or convergence for X and/or Y. Therefore, if mentioned for X and Y student received 1 mark.</p> <p>Terms not required as long as process is described.</p>	

b) **Explain** two different **economic** consequences related to earthquakes.

(2 marks)

Response:

<p>Economic Consequences Related with Earthquakes</p>	<ul style="list-style-type: none">• There are significant financial costs associated with the implementation of emergency response plans (police, fire, ERT's, engineering, civil defense, triage, etc.).• Cost of clean up — removal of debris.• Repair to damaged properties, as well as to damaged transportation networks and other infrastructures.• In cases where structures are beyond repair or are deemed to be unsafe, there are the substantial costs associated with completely rebuilding.• Replacement of personal belongings.• The loss of business revenues due to the disruption and/or collapse of markets may never be recovered.• In the event that an individual or company has no/or insufficient insurance coverage, bankruptcies and foreclosures may be unavoidable.• Structural damage caused by earthquakes is generally not covered by most basic home insurance policies. However, in areas located at or near active plate margins there will be a heavy subscription to <i>optional</i> earthquake insurance coverage.• Economic benefits: job creation for seismic upgrading before the quake and rebuilding structures after the quake.• Decrease or increase in tourism.• Looting and rationing.• Must look outside local economy for assistance — globalization/international intervention.
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8. a) **Explain** two reasons for the increase in the use of alternative energy sources. (2 marks)

Response:

Reasons Alternative Energy Use Has Increased	<ul style="list-style-type: none">• energy sources are renewable (hydro, wind, solar, tidal)• energy conservation minded consumers have demanded alternatives• reduced dependency on fossil fuels — the costs for which have increased substantially over the past few decades• rapid reduction in available oil reserves• no atmospheric pollution during energy production• international agreements (Kyoto Protocol) have limited greenhouse emissions• decreased production of greenhouse gases• development of new technologies has enabled us to move from the theoretical potential to the possible (hydrogen fuel cell)• increased public awareness (more educational programs)• increased government awareness and programs• increased pressure from lobby groups• improved technology• decreased dependence on foreign oil• increased jobs• increased demand for energy• increased gas prices• media coverage (oil/Iraq)• increased variety of sources of energy available• can promote economic growth (car sales)• alternate energy more affordable now
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b) **Outline** two different disadvantages that are associated with the use of alternative energy sources.

(2 marks)

Response:

Disadvantages of Alternative Energy Production Sources	<ul style="list-style-type: none">• expensive to build• aesthetically displeasing noise and smell• batteries must be carefully maintained (solar)• long period of time to recover costs• in cooler climates, freezing damages pipes• collecting devices take up large areas of land (solar, wind)• lack of trained technicians to install and repair• appliances and lamps which run on low voltage are not as readily available• some use materials that are toxic and from non-renewable sources• alters habitat (migration)• interferes with TV signals• towers are subject to wind and lightning damage• power fluctuates and makes it difficult to attach to utility system• site specific• developing and implementing new technology is time consuming and costly, not available for all countries, not affordable to developing countries• automobile industry and oil industry will suffer• traditional ways are difficult to change• lack of desire to change (public apathy)• not always very efficient• new sources could endanger the environment• difficult to obtain• decreased revenue from fuel taxes• reliability issues• lack of knowledge
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Use the following cartoon to answer question 9.



9. a) **Discuss** two major factors that contribute to the problem identified in the cartoon.

(2 marks)

Response:

Major Factors that Contribute to the Rapid Depletion of Our Global Resources

- The enormous growth in the global population is the single most significant factor in the rapid rate of the use of our global resources. The demand for resources of all kinds (both renewable and non-renewable) has resulted in the alarming rate of their depletion. Supply cannot keep up with the demand. Non-renewable resources are, by definition, finite. Once they are used up they will be gone. Renewable resources are being (and have been) pushed to the brink of unsustainability. They are being consumed faster than they can be naturally replenished.
- Technological advancements have allowed us to harvest and extract resources at a rate never seen before in human history.
- A country's stage of development will often dictate its rate of consumption and its general use of resources.
- In the push to industrialize, an economic/use-it resource ethic has placed economic needs and "progress" in a much higher position than those of the ecology.
- The high standard of living enjoyed by those in the developed world often dictates how/if/when global resources are used. Although the developed world represents only 20% of the world's population — it controls 80% of the world's resources.
- Abuse of the world's resources based on greed not need.
- Undeveloped countries cannot afford technology of non-renewable resources.
- Not being global citizens (not practicing the 3 Rs)
- Lack of political will.
- Shifting between ethics "use it" vs. "preserve it"
- Attitude: apathy, hard to change old habits, NIMBY.
- Human expansion (urbanization) depleting resources.
- Human created problems (global warming) deplete resources.
- Humankind turns a blind eye (eye is closed) to the issue.
- International regulatory bodies are in essence ineffective in controlling and monitoring the rate and use of resources. They often lack the political power and the will to alter existing practices.
- The power of multinational corporations is staggering. A number of multinational corporations are larger and more powerful (economically speaking) than many nation states.
- Political lobbying by multinational corporations can influence government policy in the area of land and resource use.
- Most individuals/communities/countries are not compelled into action until a crisis point has been reached. Until then, their personal consumption habits tend to go on unfettered.
- Poor management of our global resources.

b) **Suggest** two strategies that may enable us to use our global resources in a sustainable manner.

(2 marks)

Response:

<p>Strategies for a More Sustainable Future</p>	<ul style="list-style-type: none">• Acting locally — but thinking globally. Taking responsibility for our actions — attempting to become more educated and active global citizens (blue-box recycling programs). The power of our collective voice can only be achieved when a host of individual voices come together and speak in the power of a more single and more unified voice.• Living the credo of <i>reducing, re-using, and recycling</i>.<ul style="list-style-type: none">– Reducing our consumption levels of renewable and non-renewable resources would allow us to conserve global supplies.– Re-use existing resources (when possible). We have become throwaway societies.– Recycling existing resources (whenever possible). Large-scale recycling programs would enable us to reduce our need to harvest and extract new sources of both renewable and non-renewable resources.• Implement tighter controls (locally, provincially/state-wide, nationally, internationally) that would ensure a more responsible use and management of existing resources.• Enhance management techniques to manage renewable resources in order to make them more sustainable (planned reforestation, fish hatcheries, etc.).• Encourage the development and widespread use of alternative and “greener” forms of energy to reduce our dependency on non-renewable energy sources through education and government incentives.• Grow crops that are suitable to the local climate, thereby reducing consumption of water.• Individual citizen strategies: “turn out the lights, water meters, carpool”• Government subsidies to conserve: tax breaks.• Raise money on non-renewable resources to encourage change.
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10. Using your understanding of geography and the data provided:

- **Describe** the factors that have made the Rhine River the “Industrial Heartland” of Europe.
- **Analyze** the impact that human activity has had upon the Rhine River basin.
- **Suggest** solutions to the environmental problems of the Rhine River basin and explain why these solutions may be difficult to implement.

Answer in **multi-paragraph** form.

(10 marks)

Response:

Factors that Made the Rhine River the Industrial Heartland of Europe	<ul style="list-style-type: none">• lowlands of the Upper Rhine are used for intensive farming and stockbreeding• 200 years of industrialization in the “heartland” of Europe• flatland, agriculturally rich soils• abundant supplies of freshwater• transportation routes (Rhine River)• abundance of natural resources (coal and iron ore) fueled an industrial economy• moderate climate• large population base• proximity to markets (local and international) as a result of transportation routes• global position location for regional and international trade• softwood• temperate climate
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Impacts of Human Activity upon the Rhine River Basin

- some of the world's densest road and railway networks are next to the river
- pollution and overfishing have reduced the number of fish (salmon)
- habitat destruction due to population increase and development
 - 5 million to over 50 million in less than a century
 - increased demand for fresh drinking water, food, living space, sewage systems, routes (more cars), energy (fossil fuels)
- noise pollution
- lowlands of the Upper Rhine are used for intensive farming and stockbreeding
 - chemical fertilizers, insecticides and agrochemicals run-off (eutrophication)
 - wetlands removed for farmland
 - native vegetation is removed for development (siltation)
 - hydrocarbons from machinery and industry
 - locks, canals, and dams regulate water levels
 - dredging required (Rotterdam Harbour)
- urban development has led to increased pollution
 - phosphorus from sewage takes up oxygen in river
 - car oil and gas, antifreeze and paint leak into river
 - rubbish dumps create leachates
 - effluent from septic tanks
 - run-off from roads, railways and lawns (non-source point pollution)
 - there are 35 000 vessels on the river at any time
- abandoned mines (France) produce numerous chemicals (lead, iron, tin, aluminum, mercury and cadmium)
- thermal pollution from papermaking, chemical and refinery plants (toxic settling ponds)
- wineries and breweries dump waste into the river
- river vessels have oil and fuel leaks
- power generation plants create thermal and noise pollution as well as radioactive waste
- hydro-electric power requires dams (sediment problems, nitrogen levels, habitat destruction)
- recreation and tourism has led to problems
 - pleasure craft pollution (oil and fuel)
 - increasing demand for hotels along the riverbanks (arable land loss and habitat destruction)
 - increasing number of highway (repair and creation programs)
 - increasing number of golf courses (irrigation and run-off)
- emission of airborne pollutants from human activities
- disposal of liquid and solid wastes (industrial toxins, garbage, sewage)

Reasons Solutions Are Difficult to Implement

- international cooperation is essential
- purification and measuring stations need to be built
- reduction of pollution from all sources by creating detailed legislation and procedures
 - create national laws stating appropriate levels of waste material that can be discharged
 - industrial plants must have permits for their emissions (emission trading)
 - pollution taxes (industry, agriculture, tourism)
 - heavy fines for non-compliance
 - incentives for reduced emission and clean-up projects (tax breaks)
- adherence to Kyoto Protocol recommendations and encourage alternative energy sources and renewable energy projects in the future
- design multi-purpose riverbanks and revival of specific environment types (riverbank buffer zones void of any development and reforestation projects along the banks)
- more efficient use of fresh water (3 Rs)
- construction of storm surge barriers
- public pressure, volunteers, educational program and protests
- create a series of smaller dams as opposed to a mega-dam project
- reintroduce fish stocks into the river (salmon hatcheries)
- review urban development theories (vertical growth as opposed to horizontal growth)
- limit number of tourists to specific regions (fees and quotas)
- decrease dependence on fertilizers, insecticides, agrocides
- financial
 - costly to rectify the problems of this magnitude
 - question of where the funds will come from
 - who do you fine or tax? (how much and for what?)
 - may lead to plant closures, job losses and decreases in tax revenue
- diversification of the economy may provide solutions, but traditional ways are difficult to change
- conflicting ethical viewpoints: economic “use it” vs. balanced “multiple use”

Reasons Solutions Are Difficult to Implement (continued)

- regulations
 - numerous national, state/provincial and municipal governments need to be in agreement
 - question of who will be in charge
 - low on government agendas
 - problem is too large to classify and subdivide
 - power of special interest/lobby groups as well as multinational corporations
 - international agreements are difficult to enforce
 - disagreement among protest groups regarding importance
- population
 - massive growth along the Rhine River basin (50 million)
 - demands for living space and food supersede environmental issues
 - NIMBY philosophy and apathetic attitude toward issues
 - ignorance toward the severity of the pollution and resulting problems
- historical
 - over 200 years of industrialization is hard to change
 - area has been designated the “Industrial Heartland” of Europe
- diversification of the economy may provide solutions, but traditional ways are difficult to change

END OF KEY