

Geography 12

August 2002 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	S	C	T	PLO	Q	K	S	C	T	PLO
1.	D	1	U	1	1B1	21.	C	1	K	2	2A1
2.	B	1	U	2	2C1b	22.	D	1	K	2	2A4
3.	A	1	U	2	2C2, 2C1d	23.	C	1	U	2	2A3
4.	C	1	U	2	2C1d	24.	A	1	U	2	2A3
5.	A	1	U	1	1A1	25.	D	1	U	2	2B4
6.	C	1	U	2	2C1b	26.	C	1	U	2	2A4
7.	C	1	U	2	2C3	27.	C	1	U	2	1C1
8.	C	1	U	1	1C2, 1B2, 1C1	28.	B	1	U	1	1C1
9.	B	1	U	2	2C1e	29.	A	1	U	1	1C1
10.	C	1	U	2	2C1e	30.	D	1	U	2	2B1
11.	D	1	U	2	2D1	31.	D	1	U	2	2B4
12.	C	1	U	2	2D3b	32.	A	1	U	2	2B3
13.	C	1	U	2	2D3b	33.	C	1	U	2	2B3
14.	B	1	U	2	2D4, 3C1	34.	C	1	U	2	2B4
15.	C	1	U	2	2D3d	35.	D	1	U	1	1C1
16.	C	1	U	2	2D3d	36.	B	1	U	1	1C1
17.	A	1	K	3	3A1	37.	B	1	U	1	1C1
18.	B	1	U	1	1A1, 3C1	38.	B	1	U	1	1C1
19.	D	1	K	3	3C1	39.	B	1	U	2	2D3c
20.	D	1	K	3	3A2	40.	D	1	U	2	2D3c

Multiple Choice = 40 marks

Part B: Written Response

Q	B	C	S	T	PLO
1.	1	H	6	1	1B4
2.	2	U	4	2	2D3c, 2D3a
3.	3	U	4	2	2D2
4.	4	H	5	3	3B1
5.	5	U	3	1	1C2, 2B3, 2B4
6.	6	U	5	3	3A4
7.	7	H	3	1	1A3, 3C1
8.	8	H	5	3	3C1
9.	9	H	5	2	2B5
10.	10	H	10	2, 3	3C4, 2D4, 3C3

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.**

Use the air photograph on page 17 and the topographic map on page 19 to answer question 1.

1. Based on the data provided, explain how the physical geography of the Yarmouth area has influenced human activity. Answer in **paragraph** form. **(6 marks)**

Response:

<p>Explanation</p>	<ul style="list-style-type: none">• A well-protected harbour, likely a ria, has resulted in the development of a small port. Several wharves and quays are apparent, as is a ferry terminal. Yarmouth is a trans-shipment point.• The flat terrain of the region has been used to build an airport and encouraged rail lines which lead to the wharves and oil tank farms.• The irregular coastline determined the means of transportation in the region: bridges, roads and ferry routes are the result.• Oil is probably used for thermal generation of power.• Off-shore fishing was clearly an important industry for the locals as shown by the fish plants and the docks. The inlets provide protected waters for the shellfishery.• Throughout the region farms dot the landscape, likely family homesteads cut out of the mixed forests of this part of Nova Scotia.• Fresh water has been a concern as evidenced by the reservoirs that dot the landscape.• The forests of the region have been harvested to clear the land for farming and for lumber, as several sawmills are present.• The natural beauty of the beaches and headlands, the local history, as well as its many motels, combine to make tourism much more important than some of the traditional industries.• The estuaries of the region provide ideal conditions for spawning fish and migratory birds. On the other hand, the marshes limit development.• Urban expansion and development have been limited by swamps.• Sand bars and reefs are hindrances to inland water navigation.• Hilly terrain has influenced rail and road transportation.• Mild climate encourages agriculture in summer months.
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Select one of the following features to answer question 2.
Indicate your selection with a ✓.

Limestone Cave

Cirque

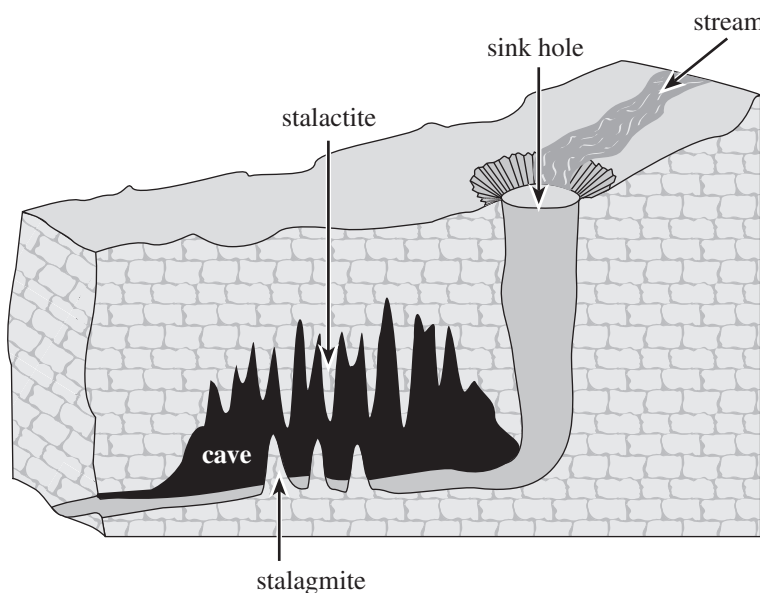
2. Sketch and clearly label a diagram(s) of one of the features.

Explain how the feature is formed.

(4 marks)

Response:

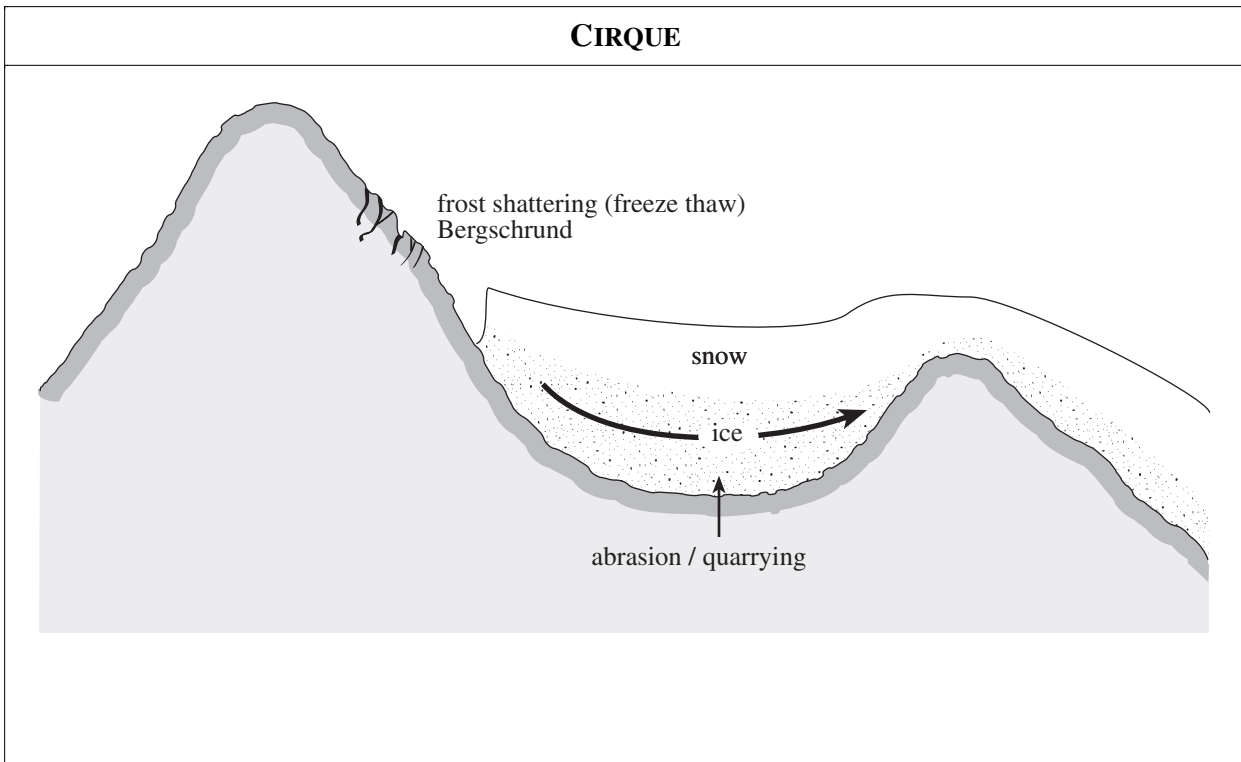
LIMESTONE CAVE



- Carbonic acid dissolves limestone.
- Dissolving of limestone creates caves or the roof collapses forming a sink hole.
- There is evaporation of water containing calcium carbonate.
- There is deposition of calcium carbonate on the ceiling (stalactite) and cave floor (stalagmites).
- Stalactites and stalagmites may join, forming rock columns.
- Flowstone may form on the sides or bottom of the cave.
- Clints grykes may form on karst topography.

Note to Markers:
This question to be marked holistically. The explanation may be shown in the diagram.

Response:



- A cirque is a semi-circular, steep-sided basin cut into the side of a mountain, or at the head of a valley. Snow falls and accumulates in a depression, eventually forming ice. Freezing temperatures will lead to frost shattering. Gravitational forces pull the ice downhill.
- Rocks will be quarried from the mountain by the ice. As the ice forms and moves there will be plucking; transported rock fragments will abrade the rock, forming a bowl-shaped feature called a cirque. As the ice melts from the cirque, there will be headward erosion.

Note: Ice does not need to be present to receive marks.

Note to Markers:

This question is to be marked holistically. The explanation may be shown in the diagram.

Use the following statement to answer question 3.

The building of permanent structures on vulnerable slopes requires knowledge and understanding of the factors which influence mass wasting.

3. a) **Outline** two factors that may cause mass wasting. **(2 marks)**

Response:

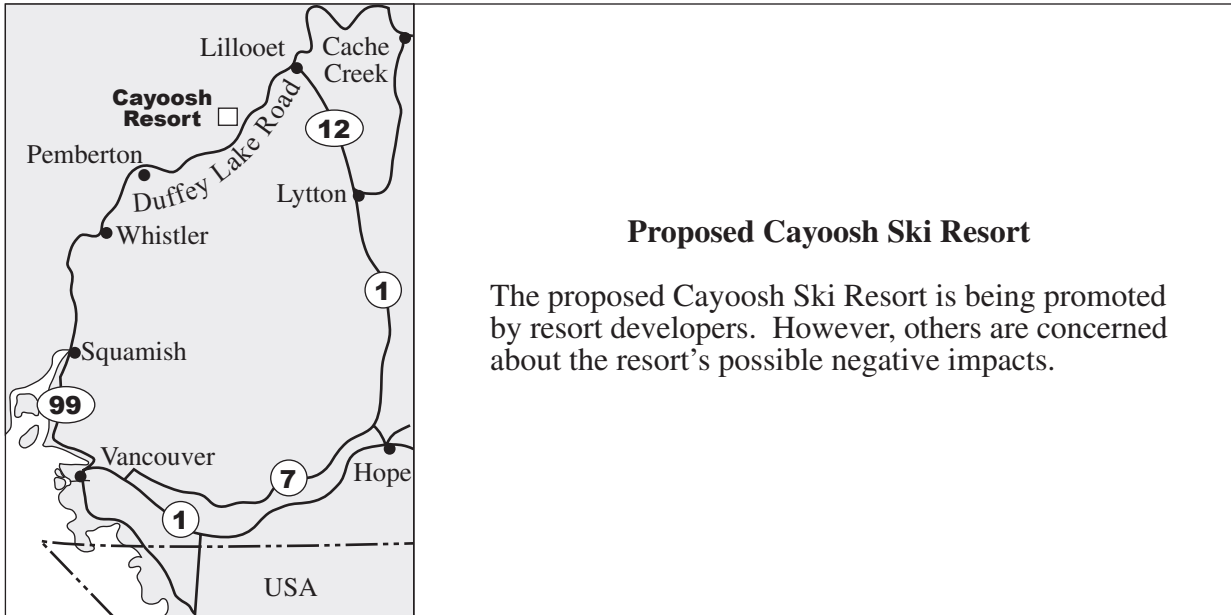
Causes of Mass Wasting	<ul style="list-style-type: none">• steep slopes and gravity—steeper gradient results in increased mass wasting• heavy rainfall—lubrication of soil• clear-cut logging and removal of vegetation—increased run-off, unconsolidated material and soil erosion.• road construction—undercuts weaken rock and soil structure• site preparation for home construction—weakens rock and soil structure• loose soil—susceptible to impact of heavy rainfall• earthquake activity will act as a trigger to mass wasting• temperatures may cause freeze/thaw weathering, melting, increasing mass wasting• cleavage or jointing of bedrock
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- b) **Suggest** two ways to minimize the impact of mass wasting. **(2 marks)**

Response:

Ways to Minimize Impact of Mass Wasting in Urban Regions	<ul style="list-style-type: none">• In addition to “fragile slope” by-laws, local governments can restrict pedestrian and vehicular traffic.• Selective or patch logging can be used on slopes rather than clear-cut logging (carefully planned logging activities).• Plant vegetation to stabilize the slopes.• Use screens and nets to channel scree.• Bolt rock faces.• Build retaining walls.• Cement rock faces.• Hydroseed hillsides (hillside vegetation).• Use culverts to divert water during heavy rains.• Use rock scaling.• Use wood shavings and sawdust on hillsides.• Implement avalanche control techniques.
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Use the following information to answer question 4.



4. Assess the advantages and disadvantages of the proposed Cayoosh Ski Resort. (5 marks)

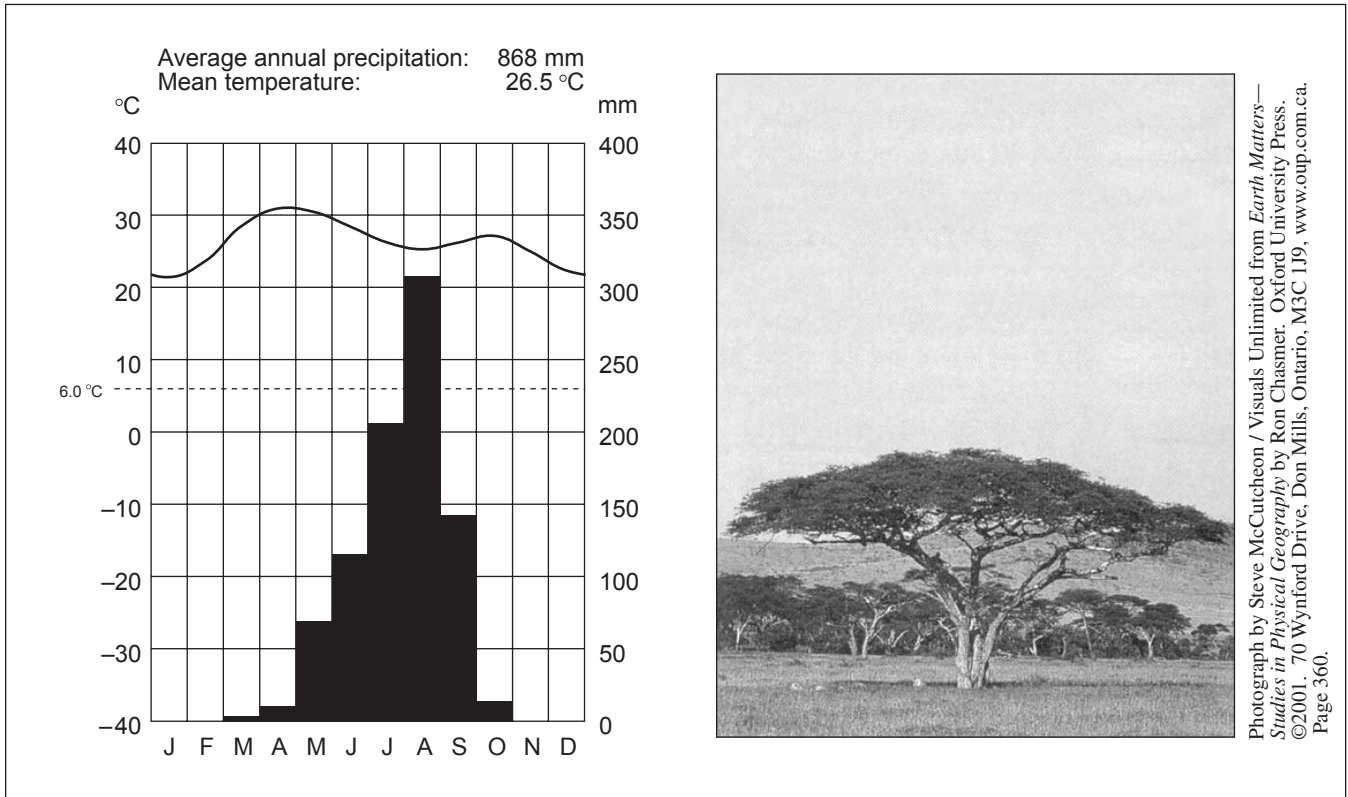
Response:

<p>Advantages of the Proposed Cayoosh Ski Resort</p>	<ul style="list-style-type: none"> • Direct and indirect employment opportunities will provide both short-term and long-term jobs—infusing large amounts of capital into the region will also increase the tax base and provide regional and provincial government agencies with much needed revenues. • Development will improve infrastructure leading to year-round access. • Improvements in transportation and communication networks will further serve to open the area up to other forms of development. • Development will also increase services to those in the region (health and education). • Ski season from late October or early November running through May. • Heavy snowfall due to orographic precipitation provides ideal ski conditions. • Diversification of economy. • Preserve First Nations lands and culture in the area.
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Disadvantages of the Proposed Cayoosh Ski Resort

- Habitat loss, damage and destruction are often irreversible.
- The impact on the food chain would be significant. The proposed Cayoosh Resort would essentially disrupt the natural balance of this region. Disruptions in the food chain have implications for predatory species further up the chain, and those preyed upon further down the chain.
- The influx of large numbers of people will place strains on the region as it would be forced to battle with issues ranging from sewage and garbage disposal, to the construction of transportation arteries and the supply of a variety of services (power, gas, telephone and television hookups).
- The ski resort provides short-term economic gain and employment at the expense of the natural environment.
- Promote the region as an ecotourism destination spot.
- Increased garbage will threaten animal habitat.

Use the following information to answer question 5.



5. a) **Identify** the natural vegetation associated with the biome represented by the data above.

(1 mark)

Response:

Vegetation	<ul style="list-style-type: none"> • savanna • tropical savanna • tropical grassland • long grass, elephant grass • acacia • baobab, bottle trees • xerophytes • macrotherm • tropophytes
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b) **Explain** one way the vegetation has adapted to the biome's climatic conditions.

(1 mark)

Response:

Adaptations	<ul style="list-style-type: none">• deciduous trees (lose leaves to reduce evapotranspiration)• widely spaced trees due to competition for water• thick trunks to store water• grass lies dormant during the dry season• tap roots to capture groundwater• wide branches to shade roots from the sun• shallow, extensive root system (to obtain water before evaporation)• xerophyte—drought resistant plants• tropophyte—plant adapts to seasonal climatic changes
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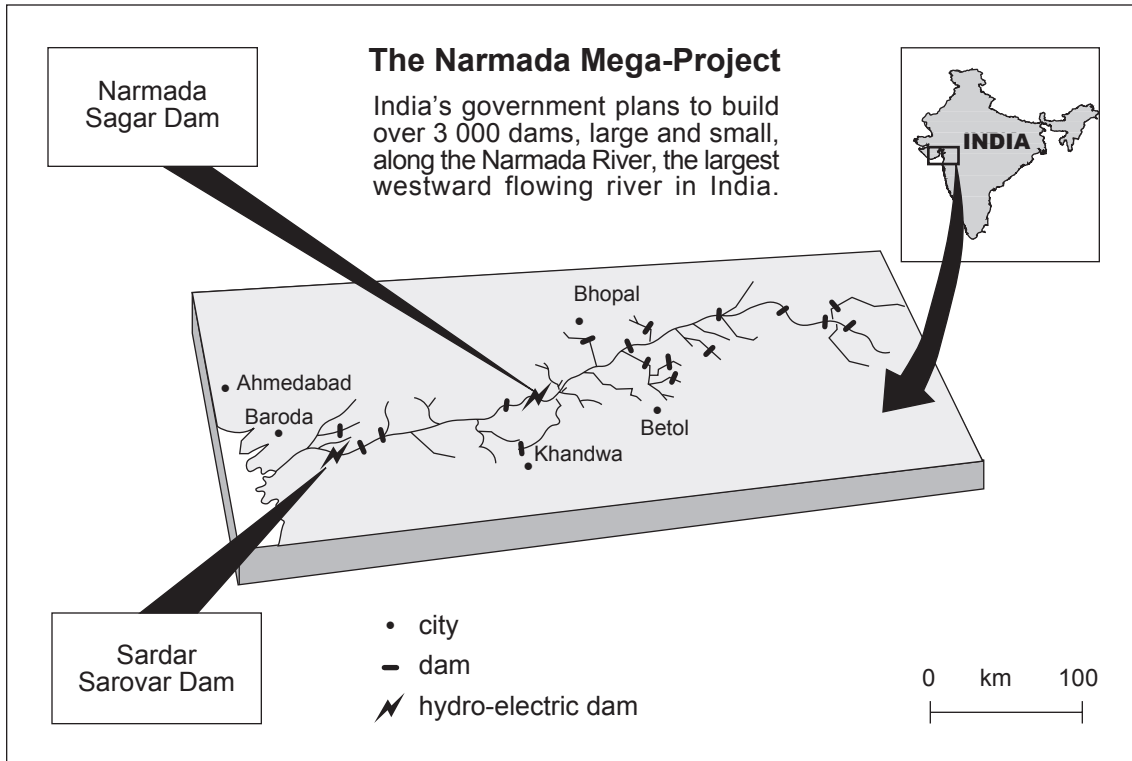
c) **Outline** one major threat to this biome.

(1 mark)

Response:

Threats	<ul style="list-style-type: none">• trophy hunting, poaching• natural brush fires• groundwater overdraft• species depletion• global warming• drought• desertification• overpopulation• overgrazing• urban development• agriculture
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Use the following map to answer question 6.



Based on information from: "Battle over the Narmada Mega-Project," *World Geography: Case Studies* edited by Vincent Bunce and David Lambert. Cambridge University Press ©1995. 40 West 20th Street, New York, NY. 10011-4211 USA.

6. a) **Suggest** two benefits, other than the generation of hydro-electric power, that may result from the Narmada mega-project. **(2 marks)**

Response:

Benefits	<ul style="list-style-type: none"> • irrigation • job creation • flood control • foreign capital through potential sale of power • spin-off industries (fishing, agriculture) • fresh-water reservoir for domestic use • tourism and recreation • reduces the reliance on biomass and fossil fuels • increased standard of living
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b) **Outline** three potential problems associated with the Narmada mega-project. (3 marks)

Response:

Problems	<ul style="list-style-type: none">• flooding of resources<ul style="list-style-type: none">– forests– minerals– farm land• wetlands dry up• microclimate change• displacement of people• siltation of the reservoir• the huge cost to construct the dams• loss of water-borne nutrients for fish• increased irrigation may cause salinization• weight of water in reservoirs may trigger earthquakes• reservoirs may act as breeding grounds for mosquitoes• parasitic diseases• mercury poisoning from rotting vegetation• loss of sand and sediment for build up of delta and beaches
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7. a) **Explain** why people are unwilling to have garbage dumps located near their neighbourhoods.

(1 mark)

Response:

<p>People are unwilling to have garbage dumps located in their area because</p>	<ul style="list-style-type: none"> • birds, flies and rats may spread disease. • toxic wastes seep into nearby groundwater. • the smell of the landfill reduces property values. • disposable products (diapers) may provide breeding grounds for bacteria. • there is noise and air pollution from the increased traffic associated with landfills. • of the “not in my back yard” attitude (NIMBY).
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b) **Identify** and **explain** two ways to reduce the amount of waste put into landfills.

(2 marks)

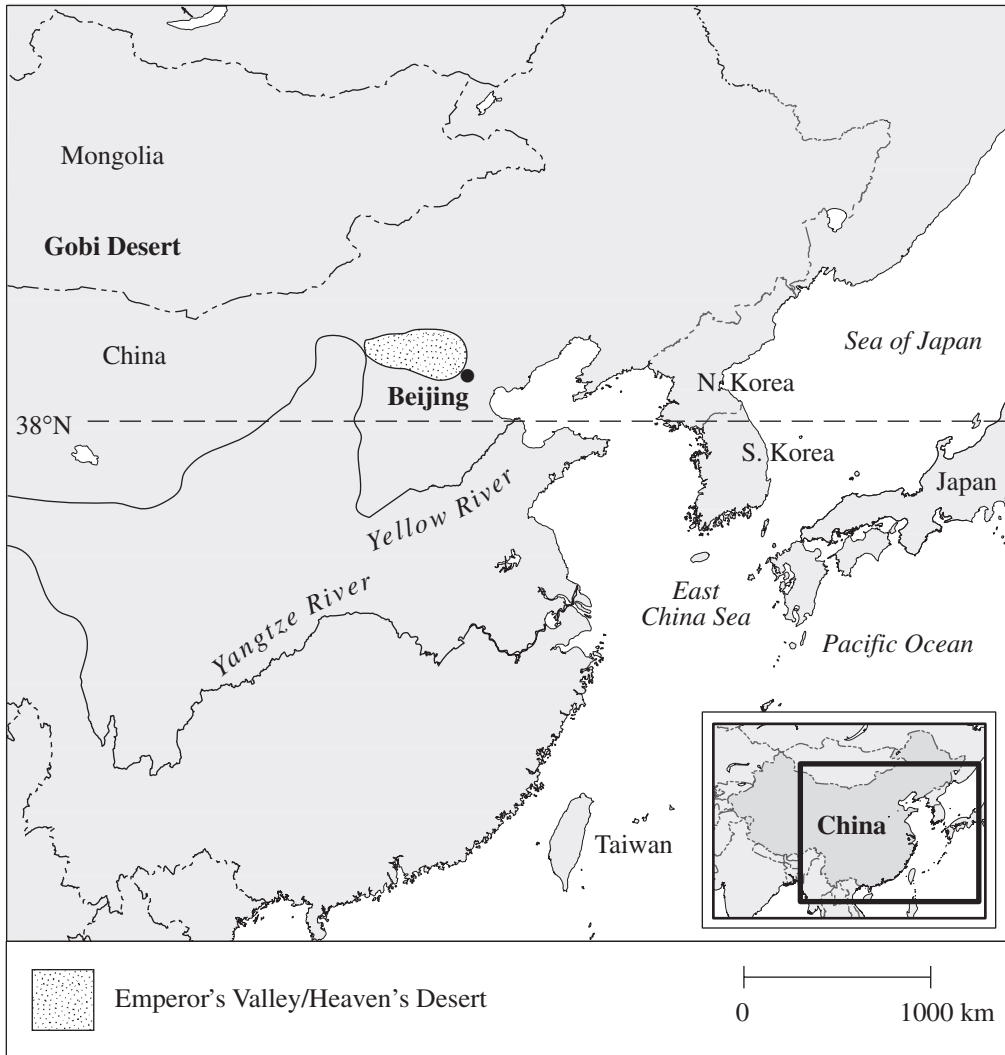
Response:

<p>Ways to Reduce the Impact of Landfills on the Environment</p>	<ul style="list-style-type: none"> • re-use (financial incentive) • charge higher tipping fees (forces people to reduce garbage) • use controlled incineration (gets rid of waste and at the same time produces energy) • use biological alternatives (bacteria-eating treatment plants) • recycle plastic (convert to other products) • reduce packaging (impose government restrictions) • encourage waste management programmes (blue box program) • impose fines and enforce laws for non-compliance • educate the public (reduce, re-use, recycle) • transport garbage to old quarries and mines
<p>Note to Markers: Reduce, Re-use, Recycle as a simple list is worth one mark.</p>	

Use the following information to answer question 8.

Heaven's Desert, China

In just one hundred years, the once lush Emperor's Valley has turned into Heaven's Desert. Sand dunes, just 70 kilometres northwest of Beijing, are on the move toward China's capital at a rate of five metres per year.



8. a) **Explain** how agriculture and forestry practices have contributed to the expansion of China's Heaven's Desert. (2 marks)

Response:

Agriculture	<ul style="list-style-type: none"> • Overgrazing from too many animals on a small area of land. • Livestock graze on the leaves of small shrubs and grasses (short and long). • Continual grazing in a region does not allow for the regeneration of vegetation and can lead to the ultimate loss of vegetation entirely. • The loss of vegetative coverage decreases overall transpiration rates and alters microclimates. • Overcultivation removes humus which is necessary to bind the soil and reduce soil erosion.
Forestry	<ul style="list-style-type: none"> • Vegetation is being cleared. • The roots of the trees no longer bind the soils together, exposing them to the elements (sun and rain), making them vulnerable to a variety of erosional agents. • The loss of trees decreases the overall transpiration rates and alters the climate of a region.

- b) **Outline** three strategies that Chinese officials could use that might reduce the expansion of Heaven's Desert. (3 marks)

Response:

Strategies to Reduce the Expansion of Heaven's Desert	<ul style="list-style-type: none"> • Establish an afforestation program (agroforestry). • Use wind-barriers and shelterbelts (Green Wall of China). • Reduce dependency on livestock by using alternative foodstuffs as a protein source (fish). • Increase farmer education on soil conservation. • Improve irrigation practices (drip irrigation). • Increase the development and use of alternative energy sources (wind power, solar, tidal). Reduce dependence on fuelwood. • Implement strict one-child policy or improved family planning methods. • Distribute foreign aid at grassroots level. • Chinese government could subsidize transfer of farmland to natural vegetation. • Improve breeding of livestock.
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Refer to the following cartoon to answer question 9.



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From: *Environmental Science: Working with the Earth*, 5th Edition by G. Tyler Miller Jr. © 1995 ITP International Thompson Publishing, Wadsworth Publishing, Belmont, California, USA 94002. P. 252.

9. a) **Identify** two causes of ozone depletion.

(2 marks)

Response:

Threats to Ozone	<ul style="list-style-type: none">• aerosol spray propellants (chlorofluorocarbons—CFCs)• plastic foam and Styrofoam for packaging and insulation• coolants for refrigeration and air conditioners• solvents to clean electronic equipment and microchips• industrial solvent used in dry cleaning (carbon tetrachloride)• agricultural fumigant• fire suppressant (halons)• pesticides sterilize soil (methyl bromide)• industrial solvent for cleaning metal and electronic parts (methyl chloroform)
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b) **Suggest** three impacts of ozone depletion.

(3 marks)

Response:

Impacts of Ozone Depletion	<ul style="list-style-type: none">• melanoma (skin cancer)• cataracts (eye problems)• respiratory health concerns (smog due to increased ground-level ozone)• crop loss due to reduced photosynthesis<ul style="list-style-type: none">– food shortages (wheat, rice, corn, soybeans)• increased farm costs<ul style="list-style-type: none">– free-range animals (livestock and chickens) will need shelter to avoid a reduction in their productivity• loss of plankton<ul style="list-style-type: none">– impact on food chain– reduced fish yields for sport and commercial fishers– global warming and reduced air quality (plankton takes in carbon dioxide)• mutation of animals• weather reports which include U.V. readings• improved sunscreen products (suntan lotion, body gloves)• protective clothing (body suits) to reduce impact of U.V. rays• weaken immune system of animals• restrict leisure activities• public health initiatives (people at beaches spraying suntan lotion on people, public awareness programs)
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Use the Case Study data on pages 34 and 35 to answer question 10.

10. Using your understanding of geography and the data provided:

- **outline** the ways in which human activity has damaged the aquatic ecosystems in Chesapeake Bay;
- **suggest** ways to reduce the impact of human activity on the region;
- **explain** why it is difficult to implement resource management strategies in this area.

Answer in **multi-paragraph** form.

(10 marks)

Response:

<p>Ways Human Activity Has Damaged the Aquatic Ecosystems in Chesapeake Bay</p>	<ul style="list-style-type: none">• contamination of freshwater by industry, agriculture, urban run-off• toxic chemicals enter the food chain• removal of wetlands for development (urban, industry, port facilities, agriculture, recreation) means wetlands no longer filter water• pollution and overfishing have reduced the number of fin and shellfish• ships and pleasure craft may have oil or fuel leaks• cargo ships require the channel to be dredged• possible leaks from oil refineries and nuclear power plants• air pollution from the power plants in the area (acid rain)• more people living in the region means more cars, thus more air pollution (increased from 3.7 to 15.5 million)• agriculture<ul style="list-style-type: none">– chemical fertilizer and manure trigger eutrophication and algae blooms– removal of natural vegetation increases erosion (siltation)• urban development<ul style="list-style-type: none">– domestic sewage– effluent from septic tanks– run-off from roads, lawns, golf courses• industry<ul style="list-style-type: none">– thermal pollution– waste water– settling ponds• nuclear power plants<ul style="list-style-type: none">– thermal pollution– disposal of radioactive waste• tourism activities<ul style="list-style-type: none">– pleasure craft pollute water (oil and gas)
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<p>Ways to Reduce the Impact of Human Activity on the Region</p>	<ul style="list-style-type: none"> • limit fishing • restrict channel dredging • protect and restore wetlands • limit shoreline development • eliminate septic tanks • improve treatment of storm water • upgrade sewage treatment facilities • develop more efficient settling ponds • establish hatcheries to increase fish population • plant trees next to tributary shorelines to reduce siltation • require inspection of ships and pleasure craft for fuel leaks • encourage citizen action (education, reducing, re-using, recycling) • create an authority, that involves all levels of government, to oversee the management of the area • create legislation that <ul style="list-style-type: none"> – restricts chemical use on farms, lawns, golf courses – raises air quality standards (emission levels for cars and industry) – improves water quality (treatment)
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**Difficulties in
Implementing Resource
Management Solutions**

- government regulations
 - three levels of government must agree
 - six different states located within the watershed
 - lack of political will
- economics
 - strict environmental legislation may force industry to close (loss of jobs, tax revenue)
 - power of lobby groups (industry, agriculture, corporations)
 - costly to correct damage (Who will pay?)
- geography of the area
 - large number of tributaries carry pollution in from other areas
 - estuary doesn't naturally flush itself
 - destruction of wetlands prevents natural filtration
- population growth
 - seven major cities and many towns within the watershed, require infrastructure
- historical problem
 - long-term damage is difficult to correct

END OF KEY