Science 20

Unit D: Changes in Living Systems

Assignment Booklet D1

Alberta
EDUCATION

FOR TEACHER'S USE ONLY

Summary

	Total Possible Marks	Your Mark
Chapter 1 Assignment	68	

Teacher's Comments

Science 20
Unit D: Changes in Living Systems
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Chapter 1 Assignment

This document is intended for	
Students	✓
Teachers	✓
Administrators	
Home Instructors	
General Public	
Other	

You may find the following Internet sites useful:

- Alberta Education, **http://www.education.gov.ab.ca**
- Learning Technologies Branch, **http://www.education.gov.ab.ca/ltb**
- Learning Resources Centre, **http://www.lrc.education.gov.ab.ca**

Exploring the electronic information superhighway can be educational and entertaining. However, be aware that these computer networks are not censored. Students may unintentionally or purposely find articles on the Internet that may be offensive or inappropriate. As well, the sources of information are not always cited and the content may not be accurate. Therefore, students may wish to confirm facts with a second source.

ASSIGNMENT BOOKLET D1
SCIENCE 20: UNIT D
CHAPTER 1 ASSIGNMENT

This Assignment Booklet is worth 68 marks out of the total 123 marks for the assignments in Unit D. The value of each assignment and each question is stated in the left margin.

Read all parts of your assignment carefully, and record your answers in the appropriate places. If you have difficulty with an assignment, go back to the textbook and review the appropriate lesson. Be sure to proofread your answers carefully before submitting your Assignment Booklet.

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Chapter 1 Assignment: The Biosphere of Life

For questions 1 to 5, read each question carefully. Decide which of the choices BEST completes the statement or answers the question. Place your answer in the blank space given.

1

_____ 1. An ecosystem includes

A. non-living (abiotic) components only
B. living (biotic) components only
C. both biotic and abiotic components
D. physiographic components only

1

_____ 2. When an angler decides to fish using a particular type of fly in a shaded part of a lake or stream, she demonstrates her understanding of

A. abiotic factors
B. biotic factors
C. stream ecosystems
D. all of the above

1

_____ 3. The soil in a flower pot, the amount of water added to the pot, the amount of sunlight received by the plant, the amount and type of fertilizer given, and the temperature of the air surrounding the pot all make up the plant's

A. abiotic factors
B. biotic factors
C. ecosystem
D. habitat

1

_____ 4. A rapid algal bloom can harm an aquatic ecosystem because

A. algae deplete the oxygen in the water
B. decomposing dead algae deplete the oxygen in the water
C. an extensive algal bloom blocks the sunlight for other organisms in the water
D. all of the above

(1) _____ 5. The petroleum industry only uses 1% of the available fresh water in Alberta for oilfield injection, while farmers use 47% for irrigation. Why are many citizens opposed to this use of water by the petroleum industry but are not concerned with this use of water for irrigation?

A. The petroleum industry has lots of money.

B. Food produced by irrigation is more vital than the oil produced by the petroleum industry.

C. Water used by the petroleum industry is injected deep underground and does not return to the hydrological cycle.

D. Farming is more important to the province than the petroleum industry is.

6. Match each description with the appropriate term listed. Place your answer in the blank space given.

i. ecosystem	ii. habitat	iii. nutrient
iv. algae	v. abiotic factor	vi. harmful algal bloom

(½) _____ a. an area where an organism lives

(½) _____ b. a physical, non-living part of an organism's environment

(½) _____ c. any element or compound that an organism needs for metabolism

(½) _____ d. all the organisms in an area as well as the abiotic factors with which they interact

(½) _____ e. microscopic, photosynthetic organisms that play a vital role in aquatic ecosystems

(½) _____ f. a rapid growth of algae that can deplete oxygen and block sunlight required by other organisms in an aquatic ecosystem

7. Decide whether each statement is true (T) or false (F). Place your answer in the blank space given.

(½) _____ a. Water temperature is an abiotic factor in a lake ecosystem.

(½) _____ b. Salt concentration in soil is a biotic factor for seed germination.

(½) _____ c. A low concentration of salt does not affect bean seed germination.

(½) _____ d. A high concentration of salt affects bean seed germination more than it affects sunflower seed germination.

(2) 8. What are two ways in which the habitat for begonias is different than the habitat for petunias?

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Return to page 3 of the Distance Learning Student Guide, and begin Lesson 1.2.

For questions 9 to 11, read each question carefully. Decide which of the choices BEST completes the statement or answers the question. Place your answer in the blank space given.

(1) _____ 9. Prairie-dog burrows help to aerate the soil so the prairie grasses grow well. Bison prefer to eat this rich vegetation in and around prairie-dog towns. This relationship is an example of

A. commensalism
B. mutualism
C. parasitism
D. none of the above

(1) _____ 10. A tapeworm lives in the intestines of an animal and absorbs nourishment from its host. If the tapeworm multiplies enough, eventually the host becomes weak and may die of some contracted disease. This relationship is an example of

A. commensalism
B. mutualism
C. parasitism
D. none of the above

(1) _____ 11. A peacrab lives in the shell of a feeding mussel. The peacrab eats tiny bits of food that the mussel filters in. What is the relationship between the peacrab and the mussel?

A. commensalism
B. mutualism
C. parasitism
D. predation

12. Match each description with the appropriate term listed. Place your answer in the blank space given.

i. biomass	ii. ecology	iii. population
iv. biological community	v. symbiosis	vi. competition

½ _____ a. A group of organisms of the same species interbreed and live in the same area at the same time.

½ _____ b. In this interaction, two or more organisms compete for the same resource.

½ _____ c. Interacting populations live in a certain area at the same time.

½ _____ d. This describes the dry mass of all the living organisms that occupy a habitat.

½ _____ e. This is a study of the interactions of living organisms with one another and with their environment.

½ _____ f. This long-lasting, ecological relationship benefits at least one organism of two different species that live in close contact.

13. Decide whether each statement is true (T) or false (F). Place your answer in the blank space given.

½ _____ a. Nutrients—such as nitrogen and phosphorus—that grasses need to grow are converted from decomposing organic matter by micro-organisms.

½ _____ b. Prairie-dog communities benefit numerous other species.

½ _____ c. Cowbirds become part of relationships classified as commensalism and mutualism.

½ _____ d. The great horned owl hunting the snowshoe hare at night has no effect on the ability of the lynx to live off the snowshoe hare.

2 14. Explain how bison that once roamed the prairies in large numbers were dependent on micro-organisms in the soil.

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Return to page 4 of the Distance Learning Student Guide, and begin Lesson 1.3.

For questions 15 to 19, read each question carefully. Decide which of the choices BEST completes the statement. Place your answer in the blank space given.

(1) _____ 15. Green plants, algae, and tiny aquatic organisms that convert light energy and store it in the chemical bonds of organic molecules are called

A. consumers
B. herbivores
C. producers
D. primary consumers

(1) _____ 16. Most people in Canada would be classified as

A. carnivores
B. herbivores
C. omnivores
D. producers

(1) _____ 17. An energy pyramid differs from a biomass pyramid because

A. the two pyramids are inverted to each other
B. an energy pyramid does not show organisms at each trophic level
C. an energy pyramid has fewer organisms at the top trophic level
D. an energy pyramid shows the amount of energy at each trophic level, while a biomass pyramid shows the mass transferred at each trophic level

(1) _____ 18. A food web is different from a food chain because a food web

A. does not begin with producers
B. shows the various trophic levels
C. does not show what each organism eats
D. is made up of various food chains that are part of an ecosystem

(1) _____ 19. A northern pike is considered to be a tertiary consumer because

A. it eats algae
B. it is such a large organism
C. it eats primary consumers such as snails
D. it eats other organisms, such as frogs and other fish, that eat secondary consumers

20. Match each description with the appropriate term listed. Place your answer in the blank space given.

i. trophic level	ii. primary consumer	iii. omnivore
iv. decomposer	v. secondary consumer	vi. food chain
vii. food web	viii. ecological pyramid	

(½) _____ a. the pathway along which food is transferred from one trophic level to the next trophic level

(½) _____ b. an organism that feeds on primary consumers

(½) _____ c. the division of species within an ecosystem based on their source of energy

(½) _____ d. an organism that eats both plants and animals

(½) _____ e. the interconnecting feeding relationships within an ecosystem

(½) _____ f. a small organism that breaks down complex, organic molecules into simpler organic molecules

(½) _____ g. a diagram that shows the relative amount of energy, the number of organisms, or the amount of matter contained at each trophic level in a food chain or food web

(½) _____ h. an organism that obtains its food by feeding on photosynthetic organisms

21. Decide whether each statement is true (T) or false (F). Place your answer in the blank space given.

(½) _____ a. An organism can only be at one trophic level in the energy pyramid.

(½) _____ b. A food chain always begins with the producers.

(½) _____ c. Another name for a secondary consumer is a carnivore.

(½) _____ d. A food web is made up of a number of food chains.

(2) 22. Explain the difference between a producer and a consumer.

(2) 23. In terms of the pyramid of numbers, explain why there are so few hawks and owls in a given area compared to the number of mice and prairie dogs that the hawks and owls feed upon.

Return to page 5 of the Distance Learning Student Guide, and begin Lesson 1.4.

For questions 24 to 26, read each question carefully. Decide which of the choices BEST completes the statement or answers the question. Place your answer in the blank space given.

(1) _____ 24. An example of a biotic factor in an aquatic ecosystem is

A. a pH of soil equal to 6.5
B. a water temperature equal to 13.5° C
C. the presence of coyote tracks
D. the presence of whitestem pondweed

(1) _____ 25. An example of an abiotic factor that is common to both terrestrial and aquatic ecosystems is

A. the pH of water
B. the amount of cloud cover
C. soil characteristics
D. the water temperature

(1) _____ 26. A soil temperature of 12.2° C at a depth of 10 cm is an example of which type of factor?

A. an abiotic factor in a terrestrial ecosystem
B. a biotic factor in a terrestrial ecosystem
C. an abiotic factor in an aquatic ecosystem
D. a biotic factor in an aquatic ecosystem

(2) 27. What is the purpose of the base line and the transect in Lesson 1.4?

Return to page 6 of the Distance Learning Student Guide, and begin Lesson 1.5.

For questions 28 to 32, read each question carefully. Decide which of the choices BEST completes the statement. Place your answer in the blank space given.

(1) _____ 28. It is most effective to water a lawn

A. early in the evening
B. early in the morning
C. in the afternoon
D. anytime during the day

(1) _____ 29. The carbon cycle begins with the process of

A. cellular respiration
B. oxidation
C. photosynthesis
D. transpiration

(1) _____ 30. A growing forest is valuable because it

A. removes carbon dioxide from the atmosphere
B. releases carbon dioxide into the atmosphere
C. removes methane from the atmosphere
D. uses oxygen from the atmosphere

(1) _____ 31. In the oxygen cycle, oxygen is

A. added to and removed from the atmosphere by photosynthesis

B. added to the atmosphere by decomposers and removed by photosynthesis

C. added to the atmosphere by cellular respiration and removed by photosynthesis

D. added to the atmosphere by photosynthesis and removed by cellular respiration and combustion

(1) _____ 32. A farmer plants alfalfa (a type of legume) to add nitrogen to the soil on his farm. The process through which nitrogen gas is converted into ammonia is known as

A. denitrification
B. nitrification
C. nitrogen fixation
D. fertilizing

33. Match each description with the appropriate term listed. Place your answer in the blank space given.

i. nitrification	ii. carbon sink	iii. ozone
iv. biogeochemical cycle	v. denitrification	vi. nitrifying bacteria
vii. transpiration	viii. humidity	

(½) _____ a. a series of chemical reactions involved in the movement of elements and compounds between living and non-living components of an ecosystem

(½) _____ b. a system that removes more carbon dioxide from the atmosphere than it returns

(½) _____ c. the atmosphere's moisture content

(½) _____ d. the process of converting ammonia into nitrates or nitrites

(½) _____ e. a molecule comprised of three oxygen atoms

(½) _____ f. a type of soil bacteria that converts ammonia into nitrates and nitrites

(½) _____ g. the loss of water vapour from a plant through its leaves

(½) _____ h. the process of converting nitrates in the soil into nitrogen gas

34. Decide whether each statement is true (T) or false (F). Place your answer in the blank space given.

(½) _____ a. Energy flows in only one direction through the trophic levels.

(½) _____ b. About 90% of chemical energy is used by organisms at each level.

(½) _____ c. A burning forest is an example of a carbon source.

(½) _____ d. Soil bacteria that convert ammonia into nitrates and nitrites are known as denitrifying bacteria.

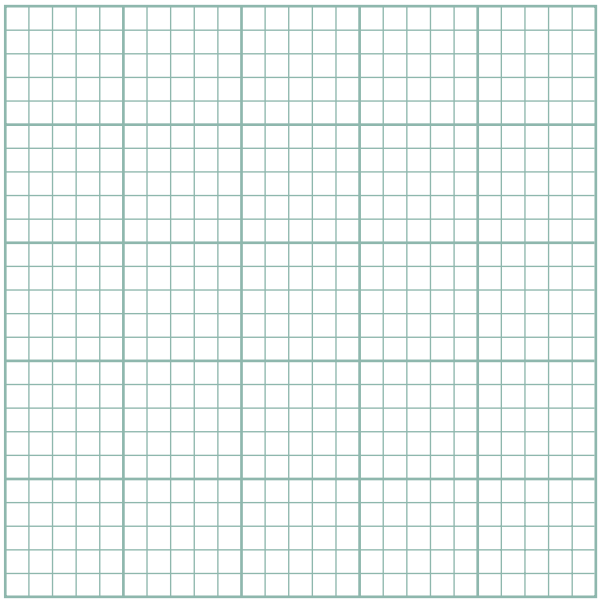
Use the following information to help you answer questions 35 and 36.

Heavy demands for water are depleting freshwater supplies. Although fictitious, the following chart shows an alarming trend that countries must consider when making decisions regarding water use.

TOTAL WORLD WATER USE (1950–2000)

Year	Total Use (km^3)
1950	903
1960	1117
1970	1964
1980	2496
1990	4381
2000	5529

(4) 35. Graph the world water use data in the following space. Remember to appropriately label and title your graph.



(1) 36. Extrapolate from the graph you completed in question 35. Predict the total world water use for 2010.

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Return to page 7 of the Distance Learning Student Guide, and begin Lesson 1.2.

For questions 37 to 39, read each question carefully. Decide which of the choices BEST completes the statement. Place your answer in the blank space given.

(1) _____ 37. The following illustrates the sequence of events that led to a decline in the caribou population due to habitat fragmentation.

I. Cleared forest areas attract moose to live in the area.
II. Human activities create open areas and cutlines throughout a habitat.
III. The caribou population declines due to increased predation.
IV. More wolves move into the area.
V. Cutlines and open areas allow wolves to spot and capture prey more easily.

The order of events beginning with habitat fragmentation and resulting in a decline in the caribou population is

A. I, II, III, IV, V
B. V, I, II, IV, III
C. II, I, V, IV, III
D. II, III, I, IV, V

(1) _____ 38. Three things that the boreal forest provides are

A. carbon dioxide, oxygen, and a reservoir for fresh water
B. oxygen, a sink for carbon, and a reservoir for fresh water
C. oxygen, nitrates, and carbon dioxide
D. oxygen, nitrogen, and a sink for carbon

(1) _____ 39. Your ecological footprint is affected by

A. the type of food you consume
B. the type of transportation you use
C. the type of housing you maintain
D. all of the above

40. Match each description with the appropriate term listed. Place your answer in the blank space given.

i. biodiversity ii. habitat destruction
iii. invasive species iv. habitat fragmentation

(½) _____ a. a species introduced to an area by human action that expands to threaten the area's variety of life

(½) _____ b. the conversion of formerly continuous habitat into patches separated by non-habitat areas

(½) _____ c. the variety of life in all its forms

(½) _____ d. the permanent alteration of vital characteristics in an organism's habitat

41. Decide whether each statement is true (T) or false (F). Place your answer in the blank space given.

(½) _____ a. Only an animal can be an invasive species.

(½) _____ b. Clearcutting an area of forest results in habitat destruction.

(½) _____ c. The elimination of one key species can affect the health of an entire ecosystem.

(½) _____ d. You should Rethink your basic assumptions about your lifestyle after you Reduce, Re-use, and Recycle materials you require for your lifestyle.

(2) 42. Describe how seismic exploration results in habitat fragmentation.

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(1) 43. Give one reason why an invasive species is able to establish itself in a new area.

_____

_____

Submit your completed Assignment Booklet D1 to your teacher for assessment.
Then return to page 8 of the Distance Learning Student Guide,
and begin the Chapter 1 Summary.