

**GRADE 12 BIOLOGY
EXAM PRACTICE QUESTIONS
A SELECTION OF TYPICAL QUESTIONS**

UNIT A GENETICS

1. Alternate forms of a gene that influence the same characteristic and are found at the same location in homologous chromosomes are called:
 - a. Alleles
 - b. phenotypes
 - c. genotypes
 - d. prototypes

2. Mendel carried on most of his research with
 - a. Livestock
 - b. plants
 - c. guinea pigs
 - d. fruit flies

3. If the genotype is YySsTT then yST would represent
 - a. The genotype of the offspring
 - b. the phenotype of the offspring
 - c. a gamete of the parent
 - d. a possible zygote

4. Which of the following is represented by word descriptions such as tall/green
 - a. Phenotype only
 - b. genotype
 - c. both a and b
 - d. neither a or b

5. In humans brown eyes are dominant over blue eyes. A brown eyed woman who has a blue eyed child has the genotype
 - a. bb
 - b. Bb
 - c. BB
 - d. all of the above

6. In humans red hair is recessive to dark hair. What are the chances of a dark-haired couple having a red-haired child, if each had a red-haired parent.
 - a. 0
 - b. 1/4
 - c. 1/2
 - d. 3/4

7. Which cross will result in all of the offspring being hybrids for both traits? (two answers)
- a. **RRYY x RRYY** b. **RRYY x rryy**
c. **RrYy x RrYy** d. **rryy x rryy**
8. Which cross will result in **all** of the offspring being homozygous recessive for both traits?
- a. RRYY x RRYY b. RRYY x rryy
c. RrYy x RrYy d. rryy x rryy
9. Which cross will result in all of the offspring being homozygous dominant?
- a. RRYY x RRYY b. RRYY x rryy
c. RrYy x RrYy d. rryy x rryy
10. A left-handed woman marries a right-handed man who is heterozygous. If left handedness is recessive, how many different phenotypes are possible in their children.
- a. One b. two c. three d. four
11. If the blood type of parents were A and O, all possible blood types for the children would be:
- a. A, O b. A, B c. A, AB d. B, AB
13. If one parent has type B blood, and the other type AB, the child's blood type is
- a. A or O b. B or O c. A or B d. A, B, AB
14. A man with blood type AB could not be the father of a child with the blood type
- a. A b. B c. AB d. O

15. If a human being inherits two X chromosomes, this individual will be:
- a. Female
 - b. male
 - c. colour-blind
 - d. sterile
16. The exchange of DNA between chromosomes during meiosis is known as:
- a. Chromatic aberration
 - b. Crossing over
 - c. Genetic inheritance
 - d. Sperm production
17. A family has seven sons. The chance that their eighth child will be a daughter is:
- a. 1 in 7
 - b. 1 in 8
 - c. 1 in 2
 - d. 7 in 8
18. A colour-blind woman (recessive trait) will pass the allele to
- a. Her sons only
 - b. All her children
 - c. Her daughters only
 - d. None of her children
19. If an albino woman is married to a man with normal colouring, and they have an albino child, what is the genotype of the man?
- a. Homozygous
 - b. Heterozygous
 - c. Sex-linked
 - d. Male
- 20a. Amniocentesis reveals that the embryo has Tay Sachs disease (recessive disease). What are the genotypes of the parents if they appear normal (t =Tay Sachs)?
- a. Tt x Tt
 - b. TT x TT
 - c. tt x tt
 - d. none of the above

20b. What are the chances that a later child will have Tay Sachs?

- a. No chance b. 100% c. 25% d. 50%

22. If a mother is normal, but the father has Huntington's Disease (a Dominant trait), what are the chances of the child escaping the disease entirely?

- a. 75% b. 50% c. 25% d. 0%

23. In a pedigree chart it is noted that both parents have the characteristic and all the children have it. Under these circumstances, the characteristic

- a. Must be autosomal dominant
b. Must be autosomal recessive
c. Could be either autosomal dominant or recessive
d. Must be a sex-linked trait

24. If a woman is a carrier for the colour-blind allele and her husband is perfectly normal, what are the chances that a son will be colour-blind?

- a. None, since the father is normal
b. 50% since the mother is only a carrier
c. 100% because the mother has the gene
d. 25% because the mother is a hybrid

25. The four o'clock flower is a good example of incomplete dominance: R =red, R' = white, RR' =pink. If two hybrids are crossed, what are the chances that an offspring will have pink flowers?

- a. 25% b. 75% c. 100% d. 50%

27. A woman heterozygous for polydactyly (have more digits than normal) is married to a normal man. If polydactyly is dominant, what are the chances that their children will have six fingers or toes?

- a. 25% b. 50% c. 75% d. 0%

28. Maria has wavy hair (incomplete dominance) and marries a man with wavy hair. What are the chances they will have a child with wavy hair?

- a. 100% b. 75% c. 50% d. 25%

29. Traits associated with X-linked genes are generally transmitted from:

- a. A grandfather via a normal mother to her son
b. A grandfather via a normal mother to her daughter
c. A grandfather via a normal father to his son
d. A grandfather via a normal father to his daughter

30. When a colorblind man marries a normal visioned woman, the chances of them having a colorblind son would be:

- a. 50% b. 75% c. 100% d. 0%

2. Define the following in your own words:

a. Carrier:

b. Phenotype:

3. Give an example of a vestigial structure.

MULTIPLE CHOICE

Select the one **best** answer

1. If you (a guy) are concerned about eventually having male pattern baldness (a sex-linked trait) you should:

- a. see if your father has it
- b. not worry because your mom doesn't show it
- c. check to see if your uncles have it
- d. use GrowAgain shampoo

2. A farmer's use of the best livestock for breeding is an example of:

- A. natural selection.
- B. extinction.
- C. artificial selection.
- D. adaptation.

3. Why, according to our reading, did Darwin take so long to publish the Origin of Species? (*careful, this is really a dumb question but it does demonstrate how to be tactical on multiple choice questions!*)

- A. Darwin wanted to share his theory as quickly as possible once he returned from his voyage on the Beagle.
- B. It took twenty years for Darwin to develop a theory.
- C. Darwin suffered from a number of illnesses.
- D. Darwin was concerned about the reaction of others to the implications of his theory.
- E. All of the above.

4. Which of the following is evidence for Darwin's theory of common descent?

- A. There are patterns in the fossil record that suggest other species have diverged from a single ancestor species.
- B. There are biogeographic patterns in the distribution of species, for instance distinct bird species on an island tend to resemble one another, suggesting a common ancestor.
- C. There are common stages in the early embryological development of organisms representing several distinct vertebrate groups.
- D. Anatomical structures, such as forelimbs, in different groups appear to be modified versions of structures that might have been present in a common ancestor.
- E. All of the above.

5. Which of the following is **not** a part of Darwin's theory of natural selection?

- A. Individuals of a population vary
- B. Organisms tend to over-reproduce themselves
- C. There are limited resources for which individuals compete
- D. Modifications an organism acquires during its lifetime can be passed to its offspring
- E. Variations possessed by individuals of a population are heritable

BONUS QUESTION (Dihybrid Crosses)

6. In rabbits, grey hair is dominant to white hair. Also in rabbits, black eyes are dominant to red eyes.

GG = gray hair

Gg = gray hair

gg = white hair BB = black eyes

Bb = black eyes

bb = red eyes

A male rabbit with the genotype GGbb is crossed with a female rabbit with the genotype ggBb. The square is set up below. Fill it out and determine the phenotypes and proportions in the offspring.

The table does not get marks, just the answers to the questions

	Gb	Gb	Gb	Gb
gB				
gb				
gB				
gb				

How many out of 16 have grey fur and black eyes?

How many out of 16 have grey fur and red eyes?

How many out of 16 have white fur and black eyes?

How many out of 16 have white fur and red eyes?

1. Match the Letter from the far right column to the beginning of each statement

LETTER CHOICE		CHOICES
	A unit that determines heritable characteristics	A. Allele
	Varieties that always produce offspring identical to themselves	B. Homozygous
	The off spring of two different varieties	C. Hybrid
	When two alleles of a pair differ, the one that is hidden (suppressed)	D. Genotype
	A diagram that shows possible combinations of gametes	E. Segregation
	A breeding experiment that uses parents in one character	F. F ₂ Generation
	One of the alternative versions of a gene for a characteristic trait	G. True Breeding
	Relative numbers of organisms with various displayed traits	H. Heterozygous
	An organism that has two different displayed alleles for a gene.	I. Self-fertilization
	An organisms genetic makeup expressed in letter pairs	J. Dominant
	Separation of allele pairs that occurs during gamete formation	K. Monohybrid Cross
	Fertilization of a plant by pollen from another plant	M. Locus
	An organism that has two identical alleles for a gene	N. Phenotype
	The science of heredity	Q. Recessive
	The location of a gene on a chromosome	S. Gene
	What an organism looks like; its expressed traits	T. Phenotypic Ratio

	Offspring of the F ₁ generation	V. Cross Fertilization
	When pollen fertilizes eggs from the same flower	W. Punnet Square
	The transmission of traits from one generation to another	Y. Genetics
	When two alleles of a pair differ, the one that determines the appearance	Z. Heredity

2. If a blue-eyed woman had children with a homozygous brown-eyed man, what is the chance of any of their children having blue eyes. [Show the Punnett Square]. Blue eyes is a recessive trait

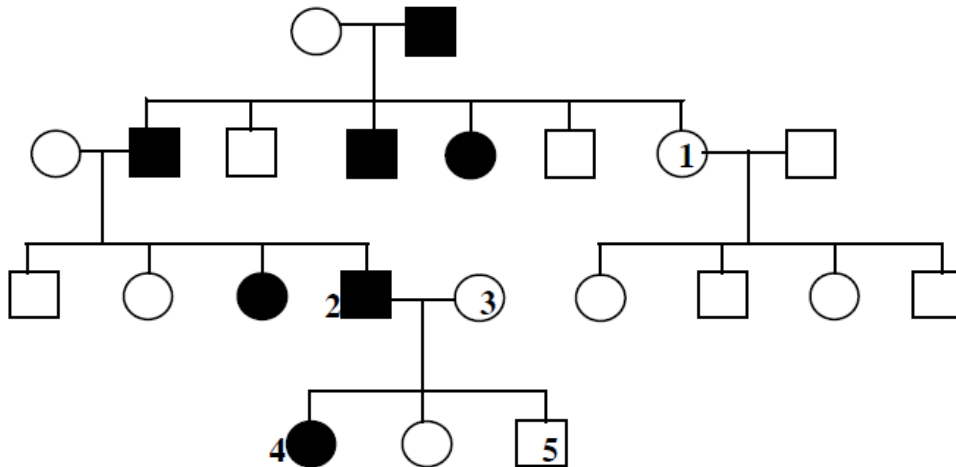
3. If a blue-eyed woman had children with a heterozygous brown-eyed man, what is the chance of any of their children having blue eyes. [Show the Punnett Square] Blue eyes is a recessive trait

4. If 2 heterozygous brown-eyed parents had children, what is the chance of any of their children having blue eyes. [Show the Punnett Square] Blue eyes is a recessive trait

5. In humans, red-green colour blindness is a sex-linked recessive trait. If a man and a woman produce a colour-blind son, which of the following must be true? (Circle one)

- The father is colour-blind.
- Both parents carry the allele for colour blindness.
- Neither parent carries the allele for colour blindness.
- The father carries the allele for colour blindness.
- The mother carries the allele for colour blindness.

6. In the following human pedigree, the filled symbols represent the affected individuals for some trait.



a. State the genotypes of individuals # 1- 5 in the following table using the letter "A". Use the uppercase letter to represent the dominant allele and lowercase letter to represent the recessive allele.

Individual	Genotype
1	
2	
3	
4	
5	

b. If individuals **#2** and **#3** have another son what are the chances that this son will be affected?

c. What is the most likely mode of inheritance for this pedigree? Explain why!
(ie: Autosomal Dominant, Autosomal recessive, sex-linked dominant, sex-linked recessive)

UNIT B

NOT DONE

UNIT C – EVOLUTION

3. What is the difference between a genome and a gene pool?

4. What two laws did Lamarck formulate? Provide an example of his laws.

5. Why do many organisms such as fish, produce hundreds even thousands of offspring?

7. Define: Natural Selection.

8. What are the 3 types of natural selection? Be able to provide examples for each.

9. Define Adaptation.

10. What are the three types of adaptations? Be able to provide examples for each.

11. What would happen to living things if they were not able to adapt? Provide an example of some organism that is/was not able to adapt.

13. What is the difference between Convergent and Divergent evolution? Provide examples of each.

14. Define Speciation. Why might this be a good thing? Why might this be a bad thing?

1. List the three types of adaptation under natural selection.

1. _____

2. _____

3. _____

2. In humans, the darkest eye color, brown, is dominant. Medium and light coloured eyes are considered recessive and less common.

a. If different races of man continue to interbreed – what colour eyes would be the most common in the future?

b. What type of natural selection would this be? Explain your reasoning.

UNIT D – BIODIVERSITY – CLASSIFICATION

1. List each category in the Linnaean Kingdom Classification system.

2. List the 5 Kingdoms. Identify a few characteristics from each Kingdom. Name at least one species from each Kingdom.

POTPOURRI OF QUESTIONS

TRUE OR FALSE

2. _____ There is solid overwhelming evidence that life originated from space.
3. _____ Most organisms tend to produce more offspring than are able to survive.
5. _____ The oldest living organisms that ever lived on earth are the Dinosaurs.
6. _____ Divergent evolution causes organisms and their body structures to become more similar.
7. _____ The use of hand-sanitizers and antibiotics is causing every generation of Bacteria to become stronger.
8. _____ ~~Amphibians live only on land.~~
9. _____ Over time, the human brain has become larger.
10. _____ Bacteria can survive for hundreds of years.
11. _____ The first signs of life started 4 million years ago.
12. _____ Dead organisms are considered to be part of the gene pool.
14. _____ All organisms in the phylum Chordata have a spinal chord.
15. _____ Reptiles are more recently evolved than Fish.
16. _____ Bats are mammals, just like whales and dolphins and humans.
17. _____ Stabilizing selection always leads to evolution.
18. _____ Scientific theory believes humans originated in Africa.
19. _____ To be considered a species – organisms must be able to reproduce and produce fertile offspring.
20. _____ Bacteria can be unicellular or multi-cellular.

1. Mimicry _____ Only the best adapted organisms survive and reproduce.
 2. Evolution
 3. Bacteria _____ The place where Darwin carried out most of his research.
 4. Closed Circulatory-System
 5. Endothermic (warm-blooded) _____ The process of change in the inherited traits of a population from one generation to the next.
 6. Geographic Isolation
 7. Coelomate _____ A type of structural adaptation where the organism blends in with its environment.
 8. Kingdom
 9. Acoelomate _____ An organism that has no nucleus.
 10. Camouflage _____ Having two separate holes for the mouth and anus.
 11. Genome
 12. Vertebrata _____ The name of the group that has vertebrae.
 13. Natural selection _____ Having all of your blood contained in vessels.
 14. Adaptation
 15. Galapagos _____ Having a steady body temperature that is not dependent on the outside environment.
- _____ Having one hole for the mouth and anus.
- _____ A type of structural adaptation where the organism pretends to look like another organism.

_____ The largest classification group an organism can belong to.

_____ All of the genetic material of an organism.

_____ A variation in an organism that allows it to better survive.

_____ A physical barrier that separates a species so they are no longer able to breed with one another.

9. Tell me TWO interesting/weird/gross/fun facts about anything you learned in these units.

UNIT E BIODIVERSITY – ECOLOGY AND CONSERVATION

7. Biodiversity refers to the variety of living things found on the planet. List three things that humans do, which reduce biodiversity

a. _____

b. _____

c. _____

2. Draw an energy pyramid for a five-step food chain. If 100 percent of the energy is available at the first trophic level (producer), what percentage of that energy is available at the highest trophic level?

3. Describe an example of how an **abiotic** factor might influence the organisms in an ecosystem. Respond with grammatically correct sentence(s)

5. Which of the following describes how ALL consumers get their energy?

- a. directly from the sun
- b. from eating primary producers
- c. from inorganic chemicals like hydrogen sulfide
- d. from eating organisms that are living or were once living

6. The total amount of living tissue at each trophic level in an ecosystem can be shown in a(n)

- a. energy pyramid.
- b. biomass pyramid.
- c. pyramid of numbers.
- d. biogeochemical cycle.

7. In the following food chain, which organism is the secondary consumer?

grass -----> rabbit -----> snake -----> hawk

- A. Grass
 - B. Rabbit
 - C. Snake
 - D. Hawk
8. Which of the following cannot be recycled?
- A. Nitrogen
 - B. Carbon
 - C. Water
 - D. Energy
9. The release of water vapor from the leaves of trees is called
- A. Evaporation
 - B. Precipitation
 - C. Condensation
 - D. Transpiration
10. Which of the following is an abiotic factor in an ecosystem?
- A. Bird
 - B. Tree
 - C. Rock
 - D. Deer
11. Mushrooms and other fungi are responsible for breaking down dead organic matter. In the ecosystem, they are called
- A. Producers
 - B. Consumers
 - C. Decomposers
 - D. Scavengers

12. The amount of energy that is passed from one organism to the next in a food chain is

- A. 5%
- B. 10%
- C. 15%
- D. 20%

13. On what trophic level would you find organisms that use the sun's energy directly to make their own food?

- A. 1
- B. 2
- C. 3
- D. 4

14. Nutrients move through an ecosystem in

- a. biogeochemical cycles.
- b. water cycles.
- c. energy pyramids.
- d. ecological pyramids.

16. An animal that only eats the flesh of another animal is called a

- A. Producer
- B. Herbivore
- C. Carnivore
- D. Omnivore

17. Which of the following organisms is an autotroph?

- A. Algae
- B. A bear
- C. A cheetah
- D. A fish

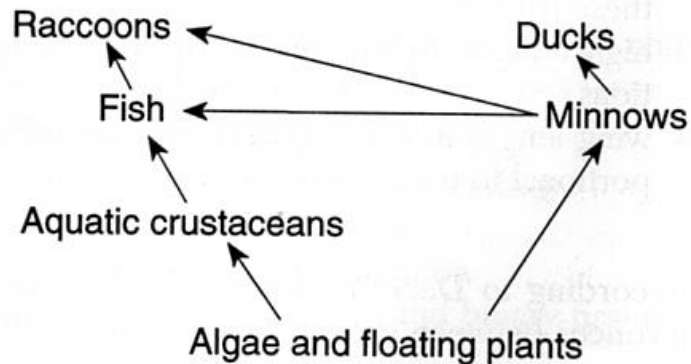
18. All the chipmunks in an area is called

- A. Community
- B. Population
- C. Habitat
- D. Abiotic

19. All of Earth's water, land, and atmosphere within which life exists is known as

- a. a population
- b. a community
- c. a biome
- d. the biosphere

20. Which statement *best* describes some organisms in the food web shown below?



- a. Minnows and fish are primary consumers.
- b. Algae and floating plants are decomposers.
- c. Aquatic crustaceans are omnivores.
- d. Raccoons, fish, and ducks are secondary consumers.

Define the Biosphere:

What effect does Latitude have on the climate of an area

Name two abiotic factors that might affect a biome

Explain the Greenhouse effect

ECOLOGY 3.1 **What Is Ecology?**

All of life on Earth exists in:

- a. an ecosystem.
- b. the biosphere.
- c. a biome.
- d. ecology.

2. Which term describes a group of different species that live together in a defined area?

- a. a population
- b. an ecosystem
- c. a community
- d. a biosphere

3. Name the different levels of organization within the biosphere, from smallest to largest.

5. Give an example of how a biotic factor might influence the organisms in an ecosystem

ECOLOGY 3.2

8. Primary producers are organisms that:
- a. rely on other organisms for their energy and food supply.
 - b. consume plant and animal remains and other dead matter.
 - c. use energy they take in from the environment to convert inorganic molecules into complex organic molecules.
 - d. obtain energy by eating only plants.
10. Which of the following describes how ALL consumers get their energy?
- a. directly from the sun
 - b. from eating primary producers
 - c. from inorganic chemicals like hydrogen sulfide
 - d. from eating organisms that are living or were once living
11. What is chemosynthesis?

ECOLOGY 3.3

14. The series of steps in which a large fish eats a small fish that has eaten algae is a:
- a. food web.
 - b. pyramid of numbers.
 - c. food chain.
 - d. pyramid of biomass.
15. The total amount of living tissue at each trophic level in an ecosystem can be shown in a(n):
- a. energy pyramid.
 - b. biomass pyramid.
 - c. pyramid of numbers.
 - d. biogeochemical cycle.

ECOLOGY 3.4 CYCLES OF MATTER

20. Nutrients move through an ecosystem in
- a. biogeochemical cycles.
 - b. water cycles.
 - c. energy pyramids.
 - d. ecological pyramids.

21. Which biogeochemical cycle does NOT include a major path in which the substance cycles through the atmosphere?
- a. water cycle
 - b. nitrogen cycle
 - c. carbon cycle
 - d. phosphorus cycle
22. List two ways in which water enters the atmosphere in the water cycle.
23. Explain the process of nitrogen fixation.
24. What is meant by “nutrient limitation”?

ENTIRE CHAPTER 3 ECOLOGY QUESTIONS - MULTIPLE CHOICE

1. A group of individuals that belong to a single species and that live together in a defined area is termed a(n):
- A population.
 - C community
 - B ecosystem.
 - D biome.
2. Which of the following is NOT true about matter in the biosphere?
- A Matter is recycled in the biosphere.
 - B Biogeochemical cycles transform and reuse molecules.
 - C The total amount of matter decreases over time.
 - D Water and nutrients pass between organisms and the environment.
3. Which is a source of energy for Earth’s living things?
- A wind energy only
 - B sunlight only
 - C wind energy and sunlight
 - D sunlight and chemical energy
4. Which of the following is a primary producer?
- A a producer, like algae
 - B a carnivore, like a lion
 - C an omnivore, like a human
 - D a detritivore, like an earthworm

5. Human activities, such as the burning of fossil fuels, move carbon through the carbon cycle. Which other processes also participate in the carbon cycle?

- A biological processes only
- B geochemical processes only
- C chemical processes only
- D a combination of biological, geological, and chemical processes

6. What are the physical, or nonliving components of an ecosystem called?

- A abiotic factors
- B temperate conditions
- C biotic factors
- D antibiotic factors

Open-Ended Response

9. What ultimately happens to the bulk of matter in any trophic level of a biomass pyramid—that is, the matter that does not get passed to the trophic level above?

CHAPTER 4 ECOSYSTEMS

4.1 CLIMATE

1. An increase in the greenhouse effect causes an increase in

- a. carbon dioxide.
- b. oxygen.
- c. temperature.
- d. water.

2. A small valley where the average temperature is usually higher than that of the surrounding countryside has its own

- a. weather.
- b. rainfall.
- c. climate.
- d. microclimate.

3. Distinguish between weather and climate.

4. Describe the three primary abiotic factors that produce Earth's major climate zones.

4.2 Niches and Community Interactions

7. A relationship in which one organism is helped and another organism is neither helped nor hurt is called

a. parasitism. b. competition. c. mutualism. d. commensalism.

8. The relationship between a tick and its host is an example of:

a. mutualism. b. parasitism.
c. commensalism. d. succession.

9. What is the difference between an organism's habitat and its niche?

10. What is the competitive exclusion principle?

4.3 Succession

14. Fires, hurricanes, and other natural disturbances can result in

a. commensalism. b. parasitism.
c. competition. d. succession.

15. The first organisms to repopulate an area affected by a volcanic eruption are called:

a. keystone species. b. primary producers.
c. climax species. d. pioneer species.

16. What type of succession takes place after lava from a volcanic eruption covers an area?

17. Describe two major causes of ecological succession.

4.4 Biomes

20. In a tropical rain forest, the dense covering formed by the leafy tops of tall trees is called the

a. canopy. b. niche. c. taiga. d. understory.

21. Permafrost characterizes the biome called

a. taiga. b. savanna. c. boreal forest. d. tundra.

22. What is a biome?

23. Why are plants generally few and far between in a desert?

4.5 Aquatic Ecosystems

27. Organisms that live near or on the ocean floor are called

a. parasites. b. plankton. c. benthos. d. mangroves.

28. What is the meaning of the term *plankton*? Name the two types of plankton.

29. What are three types of freshwater wetlands?

Use Science Graphics

The following table presents primary productivity (measured in grams of organic matter produced per year per square meter) for several ecosystems. Use the table below to answer questions 33 and 34.

Productivity of Aquatic and Land Ecosystems	
Ecosystem	Average Primary Productivity
Aquatic Ecosystems	
Coral reef	2500
Estuary	1800
Open ocean	125
Land Ecosystems	
Tropical rain forest	2200
Tropical savanna	900
Tundra	90

33. Interpret Tables According to the table, which ecosystem is most productive? Use what you know to explain that fact.

34. Infer The open ocean is among the least productive ecosystems, yet it contributes greatly to the overall productivity of the biosphere. How do you explain this paradox?

CHAPTER 4 ECOLOGY MULTIPLE CHOICE

1. The factor that generally has the greatest effect on determining a region's climate is its:

- A longitude.
- B abundant plant species.
- C distance from the equator.
- D closeness to a river.

2. All of the following are abiotic factors that affect global climate EXCEPT

- A latitude. C solar energy. B longitude. D ocean currents.

3. The way an organism makes its living, including its interactions with biotic and abiotic factors of its environment, is called the organism's:

A habitat. **C** lifestyle. **B** niche. **D** biome.

4. If a newly introduced species fills a niche that is normally occupied by a native species, the two species compete. One of the species may die out as a result of

A competitive exclusion.

B predation.

C commensalism.

D mutualism.

5. Photosynthetic algae are MOST likely to be found in

A the open-ocean benthic zone.

B the aphotic zone.

C the photic zone.

D ocean trenches.

6. The water in an estuary is

A salt water only.

B poor in nutrients.

C fresh water only.

D a mixture of fresh water and salt water.

7. In which biome do organisms have the greatest tolerance to dry conditions?

A tundra **C** tropical savanna

B desert **D** boreal forest