Chapter 5 Drill

Directions: Each of the questions or incomplete statements below is followed by five suggested answers or completions. Select the one that is best in each case. For answers and explanations, see Chapter 13.

1. The relationship between a tick and a bird is best described as which of the following?
   (A) Commensalism
   (B) Mutualism
   (C) Parasitism
   (D) Neutralism
   (E) Competition

2. When two species live in the same habitat and use exactly the same resources, which of the following will probably occur?
   (A) The two species can live together indefinitely.
   (B) One of the species will eventually go extinct.
   (C) One species will evolve into a parasite.
   (D) The two species do not interact.
   (E) This competition does not occur in nature.

3. Organisms use different resources in the same habitat, and in this way avoid competition. This is referred to as
   (A) the Law of Tolerance
   (B) hunting and gathering
   (C) predator-prey relationship
   (D) resource partitioning
   (E) commensalism

4. Which of the following is true about the roles of both parasites and predators in ecosystems?
   (A) Predators and parasites can act as environmental resistance and allow the host population to grow.
   (B) Predators are generally smaller and parasites support many predators.
   (C) Predators generally have specialized means to capture prey.
   (D) Predators and parasites can divide the host population so that both can feed off the hosts.
   (E) Parasites and predators eliminate the weak and sick, leaving the strongest to reproduce.

5. All of the following are true concerning the characteristics of a climax community EXCEPT
   (A) the adult plants are small in size
   (B) there are many different species of plants
   (C) there is a mixture of decomposers, producers, and consumers
   (D) most of the organisms are specialists in their niche requirements
   (E) there is a large amount of biomass

6. Which of the following describes the direction of the flow of energy in a food chain?
   (A) From parasite to host
   (B) From predator to prey
   (C) From prey to predator
   (D) From one mutual to another
   (E) From prey to commensal

7. Which of the following element's cycles includes long-term storage in rocks and a short storage time in the atmosphere?
   (A) Sulfur
   (B) Carbon
   (C) Nitrogen
   (D) Calcium
   (E) Uranium

8. The current trend where some species of bacteria have become resistant to antibiotics is best described as
   (A) genetic diversity
   (B) speciation
   (C) extinction
   (D) macroevolution
   (E) microevolution

9. Large herds of grazing mammals are most likely to be located in a
   (A) rain forest
   (B) estuary
   (C) coniferous forest
   (D) grasslands
   (E) desert
Directions: Each set of lettered choices below refers to the numbered questions or statements immediately following it. Select the one lettered choice that best answers each question or best fits each statement. A choice may be used once, more than once, or not at all in each set.

Questions 10-14 refer to the process of succession.

(A) Inertia
(B) Disturbance
(C) Primary succession
(D) Secondary succession
(E) Tolerance

10. When late succession plants are not disturbed by early succession plants

11. When succession starts from an area where humans once farmed

12. When a community starts from bare rock

13. The tendency of an ecosystem to maintain its overall structure

14. An event that will instigate the process of succession

Questions 15-19 deal with types of species.

(A) specialist species
(B) keystone species
(C) native species
(D) alien species
(E) indicator species

15. The species that normally live and thrive in a habitat

16. Species that play a pivotal role in the habitat

17. A species whose decline indicates damage to the habitat

18. A nonnative species

19. A species with a narrow niche, which can only live in a certain habitat
Free-Response Question

Students from a local high school participated in a study of Hillside Pond. After safely taking samples of some small fish, a fish-eating hawk, some pond water, some zooplankton, and a fish that preys on the small fish, they determined the average concentration of compound “X” in each sample. The table below summarizes their data.

<table>
<thead>
<tr>
<th>Organism</th>
<th>Compound “X” concentration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Small fish</td>
<td>0.1 ppm</td>
</tr>
<tr>
<td>Hawk</td>
<td>3.0 ppm</td>
</tr>
<tr>
<td>Pond water</td>
<td>0.1 ppb</td>
</tr>
<tr>
<td>Zooplankton</td>
<td>0.2 ppb</td>
</tr>
<tr>
<td>Predatory fish</td>
<td>1.0 ppm</td>
</tr>
</tbody>
</table>

(a) Describe one process that would cause compound “X” to contaminate the pond’s water.
(b) Draw a food chain that illustrates the correct trophic order in the pond. Include the concentrations of compound “X” for each part of the chain.
(c) Describe a process that would explain the different concentrations of compound “X” in each organism.
(d) Describe one real-life example of a substance that behaves like compound “X” in the oceans. Give one negative effect that the substance might have on humans.
REFLECT ACTIVITY
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Chapter 6 Drill

Directions: Each of the questions or incomplete statements below is followed by five suggested answers or completions. Select the one that is best in each case. For answers and explanations, see Chapter 13.

1. Populations have all the following characteristics EXCEPT
   (A) density  
   (B) dispersion  
   (C) habitat  
   (D) gene pool  
   (E) size

2. Which of the following describes individuals leaving a population?
   (A) Birth rate  
   (B) Carrying capacity  
   (C) Immigration  
   (D) Emigration  
   (E) Environmental resistance

3. A population has a growth rate of 2 percent per year. How long will it take for this population to double?
   (A) 70 years  
   (B) 40 years  
   (C) 35 years  
   (D) 15 years  
   (E) 2 years

4. An age-structure pyramid is used to
   (A) study the immigration rates in a population  
   (B) calculate the doubling time of a population  
   (C) study the carrying capacity of a habitat  
   (D) determine what the density-dependent factors are for a population  
   (E) study the number and ages of people in a country

5. Which of the following are exhibited by k-select organisms?
   I. Slow maturation  
   II. Many small offspring  
   III. Reproduction occurs late in life
   (A) I only  
   (B) II only  
   (C) III only  
   (D) I and II only  
   (E) I and III only

6. A population cycle that is marked by regular increases and decreases in its numbers is correctly said to be
   (A) boom-and-bust  
   (B) irruptive  
   (C) stable  
   (D) logistic  
   (E) irregular

7. The demographic transition model is used to study the
   (A) effects of migration patterns  
   (B) influence of industrialization on population growth or decline  
   (C) location of large population centers  
   (D) benefits of mass transportation projects  
   (E) negative effects of pollution on the habitat

8. Which disease is having a severe negative impact on the population in sub-Saharan Africa today?
   (A) Lung cancer  
   (B) Heart disease  
   (C) HIV/AIDS  
   (D) Alzheimer’s  
   (E) Down syndrome

9. Which of the numbers below is closest to the population of India?
   (A) 1 billion  
   (B) 900 million  
   (C) 300 million  
   (D) 50 million  
   (E) 2 million

10. Which of the following is a density independent population factor?
    (A) Number of parasites in the population  
    (B) Number of predators in the population  
    (C) Competition for resources  
    (D) Disease  
    (E) Habitat destruction
11. When a population encounters environmental resistance it is most likely to
   (A) continue its high growth rate
   (B) mutate to form and continue growing
   (C) slow down its growth rate
   (D) move to a higher growth rate
   (E) have no effect on the growth rate

12. A population’s growth can best be calculated using which of the following?
   (A) Births + immigration – deaths + emigration
   (B) Immigration + emigration
   (C) Emigration + births
   (D) Births + emigration – deaths + immigration
   (C) Immigration – emigration

13. Overexploitation of a species can happen by all of the following Except
   (A) excessive hunting
   (B) use of a species for food
   (C) use of species as a pet
   (D) habitat destruction
   (E) habitat conservation
Directions: Each set of lettered choices below refers to the numbered questions or statements immediately following it. Select the one lettered choice that best answers each question or best fits each statement. A choice may be used once, more than once, or not at all in each set.

Questions 14-18 refer to the following characteristics of populations.

(A) birth rate
(B) total fertility rate
(C) mortality rate
(D) life expectancy
(E) replacement birth rate

14. The number of people who die per 1,000 in the population

15. The average number of years a person can be expected to live

16. The average number of offspring a woman is expected to have

17. The number of individuals born per 1,000 in the population

18. The number of children a couple must have to replace themselves

19. Poverty can affect population in all of the following ways EXCEPT

(A) causing premature deaths
(B) increasing total fertility rate
(C) decreasing total fertility rate
(D) forcing the use of resources in unsustainable ways
(E) emigration
Free-Response Question

A habitat’s carrying capacity imposes limits on the growth of populations and their consumption of resources.

(a) Define the term "carrying capacity." Give two examples of how carrying capacity can impose limits on a population.
(b) Explain how a population’s consumption of natural resources might be controlled. Give two examples of how nature slows down the consumption of natural resources by a population.
(c) Describe two ways human activity can raise a habitat’s carrying capacity for humans.
REFLECT ACTIVITY
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Chapter 7 Drill

Directions: Each of the questions or incomplete statements below is followed by five suggested answers or completions. Select the one that is best in each case. For answers and explanations, see Chapter 13.

1. Which of the following correctly describes the process of smelting?
   (A) Separating the desired metal from other elements in the ore
   (B) Cleaning up drainage from mines
   (C) Detoxifying harmful chemicals
   (D) Removing ore from underground mines
   (E) Making gasoline

2. In a very polluted river it costs $3 per kilogram to remove the first 80% of the pollution. It costs $25 per kilogram to remove the last 20% of the pollutant. This phenomenon is correctly referred to as:
   (A) cost-benefit analysis
   (B) external costs
   (C) marginal costs
   (D) marginal benefit
   (E) externalities

3. Which of the following correctly describes the process of clear-cutting?
   (A) Some mature trees are left to provide shade for younger trees.
   (B) Only trees with commercial value are cut down.
   (C) A few mature trees are left to reseed the land after cutting.
   (D) All the commercially usable trees in an area are cut down.
   (E) Trees are planted between rows of other crops.

4. Moderate irrigation with groundwater over a long period of time can cause:
   (A) salinization
   (B) waterlogging
   (C) desertification
   (D) succession
   (E) leeching of minerals from the soil

5. All of the following are problems created by the deforestation of rainforests EXCEPT
   (A) increased erosion
   (B) loss of biodiversity in the area
   (C) changes in local rainfall levels
   (D) an increase in the availability of grazing land
   (E) loss of soil fertility

6. Greenbelts are useful to
   (A) slow the process of urban growth
   (B) get more crops out of farmland
   (C) maintain borders around a person’s home property
   (D) prevent erosion
   (E) hide unwanted objects from people’s view

7. Which of the following government agencies is responsible for the management of federal rangeland?
   (A) The U.S. Park Service
   (B) The U.S. Bureau of Mines
   (C) The Bureau of Land Management
   (D) The Environmental Protection Agency
   (E) The U.S. Commerce Department

8. Which of the following is NOT a renewable resource?
   (A) Air
   (B) Soil
   (C) Copper ore
   (D) Water
   (E) Biodiversity

9. Nations have overfished international waters and have depleted many commercially important fish species. This is a good example of which of the following?
   (A) International agreements
   (B) The Tragedy of the Commons
   (C) The Rule of 70
   (D) Trade barriers
   (E) Sustainability

10. Which of the following best describes industrialized agriculture?
    (A) Consumes large amounts of fossil fuels, pesticides, and water
    (B) Uses human labor and draft animals to grow crops
    (C) Rows of crop plants are interspersed with rows of trees
    (D) Uses little water or fossil fuels; relies on human labor
    (E) Crops are grown on small plots of land
11. The international trade in endangered species is regulated by which of the following?
   (A) The Endangered Species Act
   (B) Marine Mammal Protection Act
   (C) The National Environmental Policy Act
   (D) RCRA
   (E) CITES

12. Which of the following are problems that have emerged with the overuse of pesticides?
   I. Better crop yield
   II. Pesticide-resistant pests
   III. Improved human health
   (A) I only
   (B) II only
   (C) III only
   (D) I and III only
   (E) I, II, and III

13. Which of the following is true concerning the use of National Parks?
   (A) They can be used for cutting timber as well as recreation.
   (B) They can be used for mining as well as recreation.
   (C) They can be used only for camping, fishing, and boating.
   (D) They can be used for conservation of natural habitat as well as livestock grazing.
   (E) They can be used for military activities and the development of natural gas reserves.

14. The acid most commonly found in mine drainage is
   (A) carbonic acid
   (B) sulfuric acid
   (C) hydrochloric acid
   (D) acetic acid
   (E) citric acid

15. The World Trade Organization strives to
   (A) protect endangered species on land
   (B) regulate the global fishing industry
   (C) move toward the globalization of all the nations
   (D) establish rules for the free flow of economic goods and services between countries
   (E) decrease competition for goods among nations
Directions: Each set of lettered choices below refers to the numbered questions or statements immediately following it. Select the one lettered choice that best answers each question or best fits each statement. A choice may be used once, more than once, or not at all in each set.

Questions 16-19 refer to the various methods used to catch fish.
(A) drift net
(B) long-line fishing
(C) aquaculture
(D) bottom trawling

16. A weighted net is dragged across the sea floor

17. Marine organisms are raised in a bay or confined area

18. This floats through the water indiscriminately catches everything in its path

19. Baited hooks attached to lines are dropped off the side and then reeled back onboard
Free-Response Question

1. The irrigation of farmland is vital to the production of the world’s food supply. In China, 87 percent of the water withdrawn is used for irrigation. In the United States, this figure approaches 41 percent. Most of the water is applied to the land in a process called gravity irrigation, in which the water is simply allowed to flow, via the force of gravity, into the fields.

(a) Describe one positive and one negative impact of gravity irrigation.
(b) Describe one alternative to gravity irrigation. Give one positive and one negative effect of that practice.
(c) Massive irrigation programs can also impact underground water supplies. Describe one negative impact that irrigation might have on those supplies.
(d) Dams are often used to create irrigation water reservoirs. Describe two positive and two negative impacts that a large dam would have on the immediate area around it.
REFLECT ACTIVITY
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Chapter 8 Drill

Directions: Each of the questions or incomplete statements below is followed by five suggested answers or completions. Select the one that is best in each case. For answers and explanations, see Chapter 13.

1. A fuel's net energy yield is correctly defined as
   (A) how much of this fuel is left in the world
   (B) how much time it takes to extract and transport
   (C) a comparison between the amount of pollution the fuel generates and the amount of useful energy produced
   (D) a comparison between the costs of mining, processing, and transporting a fuel and the amount of useful energy the fuel generates
   (E) a comparison between the amount of fuel in reserve and the speed at which the fuel is being removed

2. A regular light bulb has an efficiency rating of 3 percent. For every 1.00 joule of energy that bulb uses, the amount of useful energy produced is
   (A) 1.03 joules of light
   (B) 1.03 joules of heat
   (C) 0.97 joules of light
   (D) 0.03 joules of light
   (E) 0.03 joules of heat

3. Methane gas and ethanol are two examples of biogases that are produced in which of the following processes?
   (A) The distillation of oil
   (B) The pressurization of natural gas
   (C) The anaerobic digestion of biomass
   (D) The catalytic reaction of coal and limestone
   (E) The breakdown of water by electricity

4. Hybrid car engines have which of the following types of motors?
   (A) Gasoline powered only
   (B) Natural gas powered only
   (C) Electric powered only
   (D) Gasoline and natural gas powered engines
   (E) Gasoline and electric powered engines

5. All of the following are ways to increase energy efficiency EXCEPT
   (A) using low volume shower spray heads
   (B) insulating your home thoroughly
   (C) switching incandescent light bulbs to fluorescent bulbs
   (D) leaving room lights on
   (E) increasing fuel efficiency of vehicles

6. A typical coal-burning power plant uses 4,500 tons of coal per day. Each pound of coal produces 5,000 BTUs of electrical energy. How many BTUs are produced each day from this plant?
   (A) $4.5 \times 10^6$
   (B) $0.45 \times 10^{10}$
   (C) $11.5 \times 10^8$
   (D) $4.5 \times 10^8$
   (E) $0.25 \times 10^6$

7. Which of the following produces the least amount of carbon dioxide while generating electricity?
   (A) Oil
   (B) Coal
   (C) Wind turbines
   (D) Wood
   (E) Diesel fuel

8. How much energy, in kWh, is used by a 100-watt computer running for 5 hours?
   (A) 500 kWh
   (B) 200 kWh
   (C) 100 kWh
   (D) 50 kWh
   (E) 0.5 kWh

9. Photovoltaic cells produce electricity by
   (A) a system of mirrors that focuses sunlight onto a heat collection device
   (B) using the sun's energy to create a flow of electrons in a material such as silicon
   (C) breaking down organic molecules and releasing energy
   (D) warming air, which spins a turbine
   (E) acting as a catalyst to burn oil cleanly

10. A sample of radioactive material has a half-life of 20 years. It has an activity of 2 curies. How many years does it take for the material to have an activity level of 0.25 curies?
    (A) 20 years
    (B) 40 years
    (C) 60 years
    (D) 80 years
    (E) 100 years
11. The term vampire appliances correctly refers to appliances that
(A) generate more power than they consume
(B) consume electricity even when they are not operating
(C) are EnergyStar rated
(D) are programmed to turn themselves off at midnight each night
(E) have more than one transformer

12. All non-renewable resource power plants use heat to
(A) make hot air that generates power
(B) create powerful magnetic fields that make electricity
(C) create powerful water jets that spin turbines
(D) produce steam to turn electric generators
(E) split water into hydrogen and oxygen that is then burned to make electricity
Free-Response Question

1. Nuclear power plants have been described as being part of the solution to the problem of the United States’ dependency on foreign energy. Currently, some 20 percent of the electricity produced in the United States is generated by nuclear power.
   
   (a) Describe the key parts of a nuclear power plant. Describe the roles of the following: core, fuel rods, coolant, and heat exchanger.
   
   (b) Describe two practical methods of dealing with the long-term storage of the highly radioactive wastes produced by a power plant.
   
   (c) Describe one positive impact that a nuclear power plant might have on air pollution.
   
   (d) Opponents of nuclear power plants point out the problems caused by thermal pollution of nearby rivers. Describe how the thermal pollution occurs and one method to reduce this problem.
REFLECT ACTIVITY

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