TEST BANK

FOR

CAMPBELL BIOLOGY · NINTH EDITION

CONCEPTS & CONNECTIONS

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(1946-2004)

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CHAPTER 1

EXPLORING LIFE

1.1 Multiple Choice Questions

1) Which statement about the properties of life is *false*?
A) Organisms have the ability to take in energy and use it.
B) Organisms have the ability to respond to stimuli from the environment.
C) Organisms have the ability to reproduce.
D) Organisms have an unchanging, constant internal environment.

2) Life is organized in a hierarchical fashion. Which sequence correctly lists that hierarchy from least inclusive to most inclusive?
A) Ecosystem, population, organ system, cell, community, molecule, organ, organism, organelle, tissue.
B) Cell, molecule, organ system, organ, organelle, population, tissue, organism, ecosystem, community.
C) Molecule, cell, organism, organ system, tissue, population, organ, organelle, community, ecosystem.
D) Molecule, organelle, cell, tissue, organ, organ system, organism, population, community, ecosystem.

3) Which statement best describes the relationship between a tissue and an organ system?
A) The tissue level of organization is more inclusive than the organ system level.
B) Tissues are not composed of cells; organ systems are composed of cells.
C) A tissue cannot exist unless it is a component of an organ system, whereas an organ system can exist independently of tissues.
D) An organ system includes tissues.

4) The tree in your backyard is home to two cardinals, a colony of ants, a wasp's nest, two squirrels, and millions of bacteria. Together, all of these organisms represent a(n) ___.
A) Species.
B) Community.
C) Population.
D) Ecosystem.

5) If you eat a hamburger, you are mainly eating ground-up beef muscle. What levels of organization are represented in this ground-up muscle?
A) Organism, population, and community.
B) Organ, organ system, and organism.
C) Organelle, cell, and tissue.
D) Tissue, organ, and organ system.

6) Which statement about ecosystems is *false*?
A) Bacteria and fungi recycle energy within an ecosystem.
B) Plants and other photosynthetic organisms are producers in ecosystems.
C) Chemical nutrients cycle within an ecosystem.
D) In the process of energy conversions within an ecosystem, some energy is converted to heat.

7) In an ecosystem, energy ____.
A) Cycles along with chemical nutrients.
B) Typically flows from consumers to producers to decomposers.
C) Typically flows from producers to a series of consumers.
D) Comes ultimately from bacteria.

8) Which statement about genetics is *true*?
A) Genes are proteins that produce DNA.
B) DNA is made up of six different kinds of nucleotides.
C) Differences among organisms reflect different nucleotide sequences in their DNA.
D) Each DNA molecule is a single strand of nucleotides.

9) Which statement about bacteria is *true*?
A) Archaea belong to the same domain.
B) Bacteria do not use the same genetic code as organisms in other domains.
C) All bacteria are multicellular organisms.
D) Bacteria are in a domain of their own.

10) Members of the kingdom Animalia ____.
A) Can obtain their food either by absorption or by photosynthesis.
B) Can obtain their food by eating other organisms.
C) Make their own food through photosynthesis.
D) None of them.

11) The kingdom Fungi includes species ____.
A) Such as mushrooms and plants.
B) That obtain food by ingesting other organisms.
C) That use photosynthesis to obtain food.
D) That obtain food by decomposing dead organisms and absorbing the nutrients.

12) Which of the following is a group within the domain Eukarya?
A) Fungi.
B) Archaea.
C) Bacteria.
D) None of them.

13) Organisms belonging to the kingdom Plantae ____.
A) Are photosynthetic.
B) Obtain food by decomposing the remains of dead organisms and absorbing the nutrients.
C) Are unicellular.
D) None of them.

14) The teeth of grain-eating animals (such as horses) are usually broad and ridged. This makes the teeth suitable for grinding and chewing. Meat-eating animals (such as lions) have pointed teeth that are good for puncturing and ripping flesh. This illustrates ____.
A) A result of natural selection only.
B) The connection between form and function only.
C) A food web.
D) A result of natural selection as well as the connection between form and function.

15) Which of the following statements is *not* consistent with Darwin's theory of natural selection?
A) Individuals in a population exhibit variations, some of which are passed from parents to offspring.
B) Individual organisms experience genetic change during their life spans to better fit their environment.
C) Factors in the environment result in some organisms having better reproductive success than others.
D) Natural selection can lead to the appearance of new species.

16) An antibiotic kills 99.9% of a bacterial population. You would expect the next generation of bacteria to ____.
A) Be just as susceptible to that antibiotic as was the previous generation.
B) Be more resistant to that antibiotic.
C) Die out due to the drastic decrease in population size.
D) Be more contagious than the prior generation.

17) Which statement about evolution is *true*?
A) Individuals evolve within the span of their own lifetimes.
B) Organisms evolve structures in response to needs.
C) Evolution is deliberate and purposeful.
D) Evolution can result in adaptations.

18) A hypothesis is ____.
A) The same as a theory.
B) A proposed explanation for a set of observations.
C) An explanatory idea that is broad in scope and supported by a large body of evidence.
D) A widely accepted idea about a phenomenon.

19) You notice that over the past month, many students on campus have started wearing a new style of school sweatshirt. You think to yourself that perhaps the bookstore has recently started selling this new sweatshirt style. This is an example of a(n) ____.
A) Experimental question.
B) Type of observation.
C) Hypothesis.
D) Experiment.

20) A theory is a(n) ____.
A) Idea that has been proven.
B) Concept in the early stages that still needs to be tested.
C) Description of a belief that invokes the supernatural.
D) Explanation of an idea that is broad in scope and supported by a large body of evidence.

21) To be scientifically valid, a hypothesis must be ____.
A) Part of a theory.
B) Controlled.
C) Reasonable.
D) Testable and falsifiable.

22) The role of a control in an experiment is to ____.
A) Provide a basis of comparison to the experimental group.
B) Prove that a hypothesis is correct.
C) Ensure repeatability.
D) None of them.

23) A scientist performs a controlled experiment. This means that ____.
A) The experiment is repeated many times to ensure that the results are accurate.
B) The experiment proceeds at a slow pace to guarantee that the scientist can carefully observe all reactions and process all experimental data.
C) Two versions of the experiment are conducted, one differing from the other by only a single variable.
D) One experiment is performed, but the scientist controls the variables.

24) Basic science discoveries often lead to the development of technology, and the development of technology often leads to new scientific discoveries. Which of the following is *not* an accurate pairing of a technology and a discovery?
A) Measurement of atmospheric CO_2 and understanding of climate change.
B) Sequencing of genomes and understanding evolutionary relationships among organisms.
C) Genetic engineering and creation of new drugs.
D) Invention of the microscope and creation of evolutionary trees.

25) Which statement is *not* an example of evolution that has resulted from human activity?
A) Many strains of bacteria are now resistant to some commonly used antibiotics.
B) Like certain other crops, domesticated strawberries are larger than wild strawberries.
C) Because of hunting, organisms such as bears and wolves are fewer in number.
D) Some insect species are now resistant to pesticides.

26) Watching salt crystals form as ocean water evaporates, a student says, "Look-more and more crystals are appearing. The ocean water is alive!" Which statement is an accurate evaluation of the student's remark?
A) The student is correct: Crystals are ordered structures and they are reproducing, so the ocean water is alive.
B) The student is correct because crystals are formed by processing energy from the sun to create new structures, so ocean water is alive.
C) The student is incorrect because the solution is processing energy from the sun rather than gaining energy from other organisms, so the ocean water is not alive.
D) The student is incorrect because all of the crystals reproduce the same kind of crystals with no variation to provide adaptation, so the ocean water is not alive.

27) During a discussion about ecosystems, a student says, "Plants eat sunlight, and animals eat other organisms." Which response to the student's comment is most accurate?
A) Plants don't eat sunlight; they eat sugars that they get from the soil.
B) Plants don't eat sunlight; they use sunlight to make sugars.
C) Plants eat sunlight, but they also eat other organism such as decomposers.
D) Plants eat sunlight, but animals also eat bacteria, which are not considered organisms.

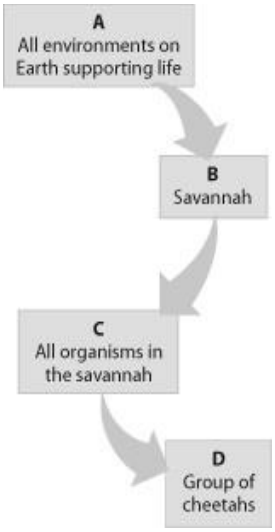
28) Which statement about ecosystems is *false*?
A) Energy cycles from organisms through the atmosphere and back to the organisms.
B) Carbon cycles from the atmosphere through organisms and back to the atmosphere.
C) Energy of sunlight is converted to energy stored in sugar molecules.
D) Most energy that enters the ecosystem leaves the system as heat.

29) Which sequence is *not* a correct pathway of energy through an ecosystem?
A) Insects → birds → bacteria.
B) Plants → insects → birds.
C) Plants → birds → bacteria.
D) Bacteria → plants → birds.

30) Which statement provides the best evidence that there is a common genetic code that demonstrates the unity of life?
A) Bees, birds, and bats all have wings and fly.
B) Many insects can pollinate only a particular species of plant due to many generations of evolutionary adaptation.
C) Through genetic engineering, a gene from a firefly can be inserted into a bacterium to make it glow.
D) None of them.

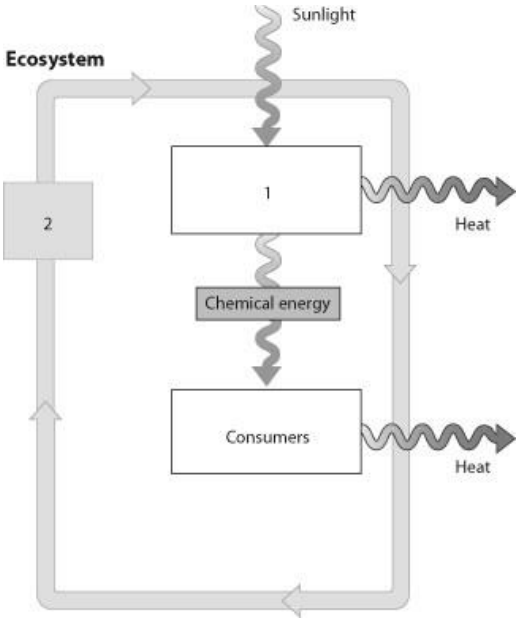
1.2 Art Questions

1) Which level in the hierarchy shown is a community?



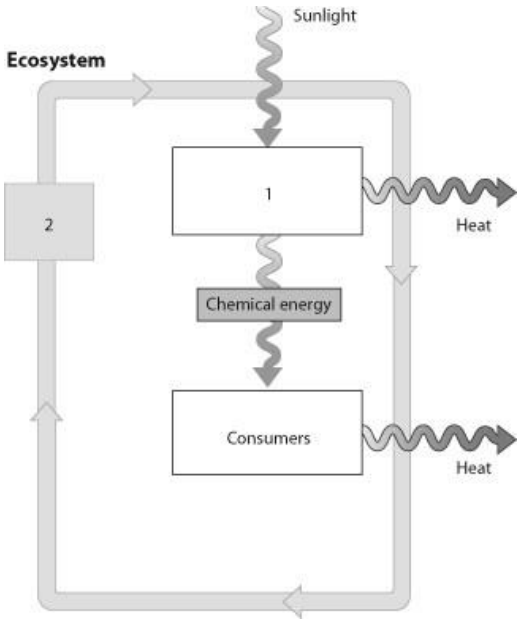
A) Level A.
B) Level B.
C) Level C.
D) Level D.

2) Which of the following organisms belongs to the group represented in box 1?



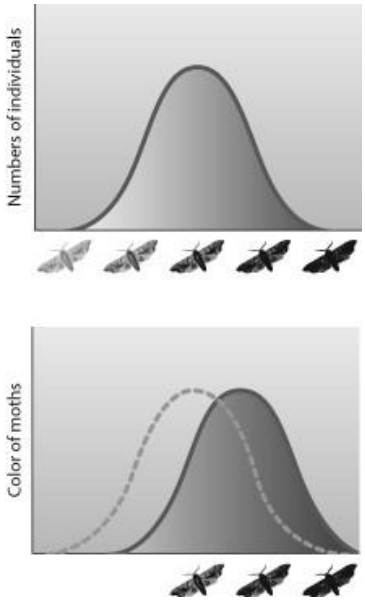
A) Giraffe.
B) Tree.
C) Decomposing bacteria.
D) Leopard.

3) The box numbered 2 represents which process?



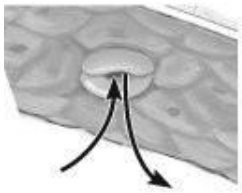
A) Cycling of energy.
B) Decomposers acting on all parts of the system.
C) Cycling of matter.
D) Gases in the atmosphere that can block sunlight.

4) When a scientist examined museum specimens of a particular moth species, she noticed that the variation in color was distributed as shown in the first graph. She was surprised because her data from current collections indicated the distribution of colors shown in the second graph. Which hypothesis about the cause of this shift in the range of genetic variation is the most likely to be supported by examination of the distribution of colors in a collection assembled at a time between that of the collection of the museum specimens and her current specimens?

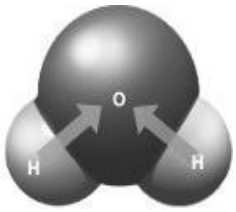


A) Darker moths tend to lay more eggs than light moths.
B) Birds prefer to eat lighter moths rather than darker moths.
C) The bark of the tree on which moths landed became darker over time.
D) Darker moths were more likely to survive and have offspring over time.

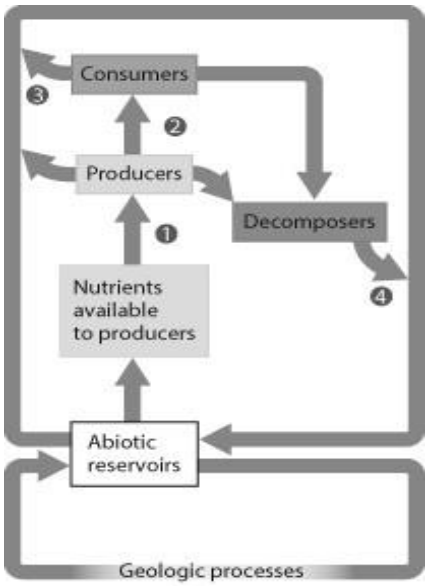
5) Which model is best studied through a systems approach?
A) Model of O_2/CO_2 exchange in a leaf.



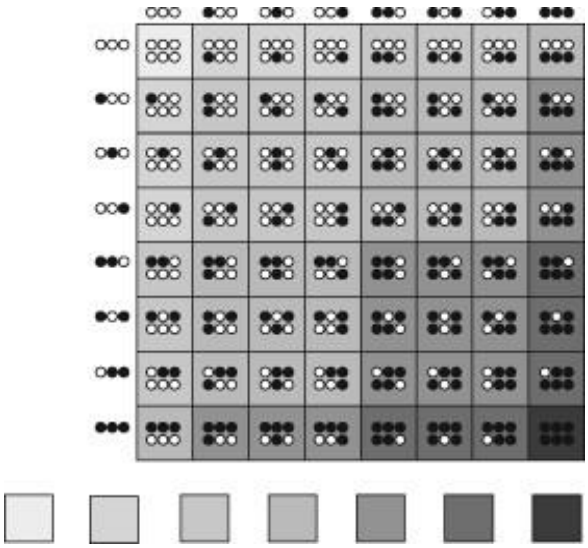
B) Model of arrangements of atoms in a molecule.



C) Model of the biogeochemical cycling of nutrients.



D) Model of skin color inheritance.



1.3 Scenario Questions

After reading the paragraph below, answer the questions (1-2) that follow.

Researchers set up a study to determine whether large doses of a nutritional supplement would shorten the length of time it takes to recover from a cold. Three thousand volunteers were split into two groups. For two weeks, members of group A took 3,000 mg of the supplement daily. Group B received 3,000 mg of a placebo (sugar pill). At the end of the two-week period, the researchers inserted live cold viruses directly into the noses of all the volunteers. The volunteers in both group A and group B continued to take their daily pills. All the volunteers got colds, and there was no significant difference in the length of time the colds lasted.

1) Which was the experimental group?
A) Group A only.
B) Group B only.
C) All 3,000 volunteers.
D) None of them.

2) To have confidence that the results of the experiment were valid, you'd also want to know ____.
A) Whether any volunteers had colds at the start of the experiment.
B) Whether the volunteers exercised daily.
C) Whether the volunteers all worked for the same company.
D) None of them.

After reading the paragraph below, answer the questions (3-5) that follow.

Researchers have created a robot that has a very thin leg that is moved by cardiac (heart) cells contracting in unison. The robot, made of a polymer similar to that used in making contact lenses, is bathed in heart cells with supporting cells, which then attach to the robot and provide movement as they contract.

3) If the creators of the robot wanted to provide evidence that it is alive, which of the following properties would be best to use as evidence?
A) The robot can move.
B) The robot must be bathed in a liquid medium to provide nutrition for its cells.
C) New robots can be reproduced by researchers using the same manufacturing process.
D) The robot has two different types of cells, fibroblasts and cardiac cells.

4) All of the cardiac cells working together can cause the robot leg to move in a way that individual cells could not. This is an example of ____.
A) Adaptation.
B) Emergent properties of cells.
C) Energy flow through an ecosystem.
D) Internal environment regulation.

5) The robot's cardiac cells, working together in synchrony, could be considered at what level in life's hierarchy of organization?
A) Organism.
B) Organelle.
C) Tissue.
D) Organ system.

After reading the paragraph below, answer the questions (6-9) that follow.

Scientists interested in knowing the best way to restore an area after a temporary road was built through it completed a study comparing two treatments: (1) restoring the contour of an area so that there was no longer a depression or cut-through where the road was previously and (2) simply abandoning the area to allow vegetation to return on its own. They wanted to know whether either or both of these treatments would return the aboveground vegetation and the belowground soil properties to their original state, as seen in a similar area where there had never been a road.

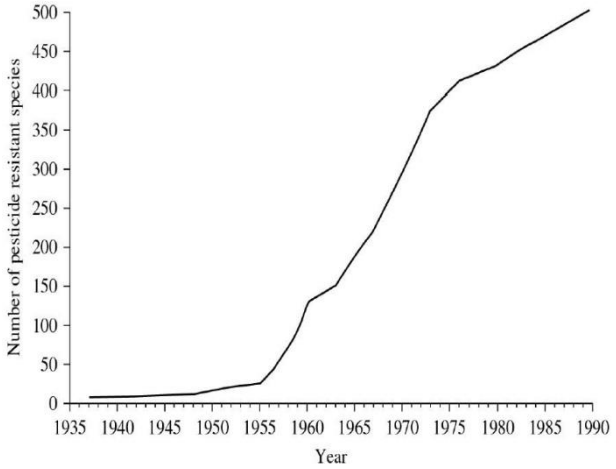
6) This study was focused on which level of life's hierarchy?
A) Organism.
B) Community.
C) Population.
D) Ecosystem.

7) Which statement best describes data that the scientists should collect and how they should be compared?
A) Comparison of plant species in the recontoured area, the abandoned area, and the never-roaded area.
B) Comparison of properties of soil and plant species in the contoured area and abandoned area.
C) Comparison of soil properties and species of plants present in the contoured area with that of the never-roaded area; and that of the abandoned area with that of the never-roaded area.
D) Comparison of soil properties only among all three areas since soil properties will determine plant species.

8) In this experiment, the area that had never had a road is useful to the experiment because ____.
A) At least three samples are necessary to have a valid experiment.
B) The area never roaded serves as a control for the experimental variables of recontoured and abandoned.
C) The researchers need to know what species of plants were common to all three areas.
D) Since all three areas had existed for the same amount of time, the third area allowed time to be controlled as a variable.

9) The researchers concluded, "These findings support the prediction that recontouring accelerates the rehabilitation of key ecohydrologica properties toward reference dynamics." What does this mean?
A) Recontouring makes the vegetation in the area grow out of control.
B) Recontouring allows the water properties of the system to return to normal faster.
C) Abandonment is the better treatment for restoration.
D) Their original prediction that recontouring would produce greater plant diversity was supported.

After reading the paragraph below, answer the questions (10-12) that follow.



This graph shows an increase in the number of species of pesticide-resistant insects from 1935 to 1990.

10) What is the best title for this graph?
A) Insect numbers over time.
B) Pesticide use over time.
C) Species of insects resistant to pesticides over time.
D) Number of insect offspring showing resistance to pesticides over time.

11) How did this increase in resistant species occur?
A) Insects became more prevalent during the 1900s.
B) Insects that were killed by pesticides did not have offspring, but those who were resistant did.
C) Pesticide use promoted genetic changes that caused new species to arise.
D) Insects needed to survive pesticides, so they gained new mutations for resistance.

12) Based on the graph, during what decade did pesticide application likely become prevalent?
A) 1940s.
B) 1950s.
C) 1980s.
D) 1990s.