



- Name:
- Date:

1

Which statement provides evidence that evolution is still occurring at the present time?

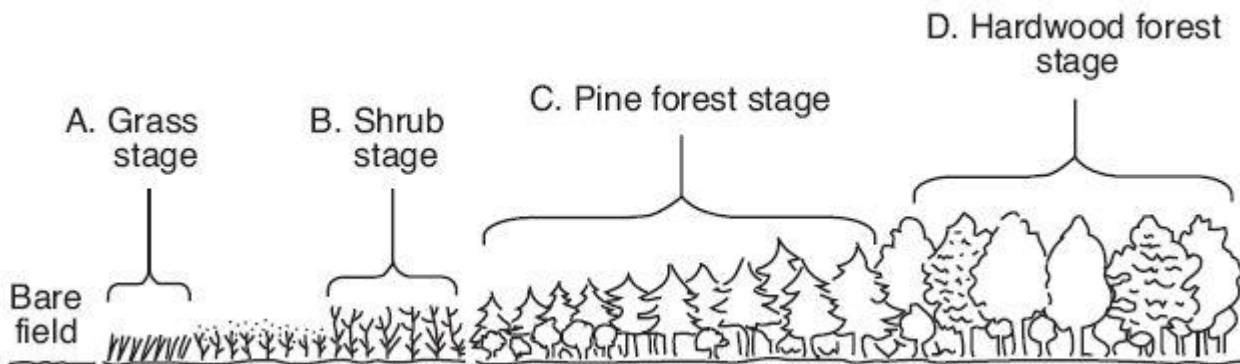
- (1) The extinction rate of species has decreased in the last 50 years.
- (2) Many bird species and some butterfly species make annual migrations.
- (3) New varieties of plant species appear more frequently in regions undergoing climatic change.
- (4) Through cloning, the genetic makeup of organisms can be predicted.

Answer:

3

2

The diagram below represents the various stages of ecological succession in New York State.



If the ecosystem is not altered, which stage would be the most stable?

- (1) grass
- (2) shrub
- (3) pine forest
- (4) hardwood forest

Answer:

4

3

Because of an attractive tax rebate, a homeowner decides to replace an oil furnace heating system with expensive solar panels. The trade-offs involved in making this decision include

- (1) high cost of solar panels, reduced fuel costs, and lower taxes
- (2) low cost of solar panels, increased fuel costs, and higher taxes
- (3) increased use of fuel, more stable ecosystems, and less availability of solar radiation
- (4) more air pollution, increased use of solar energy, and greater production of oil

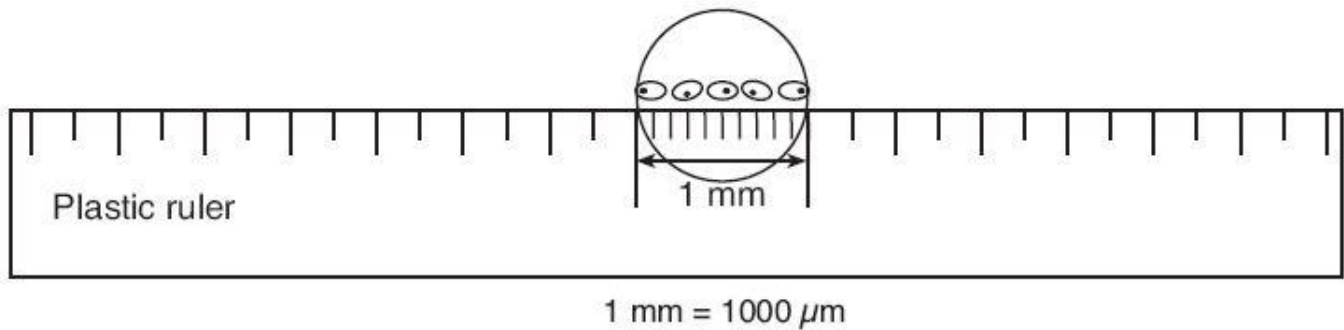
Answer:

1

4

A clear plastic ruler is placed across the middle of the field of view of a compound light microscope. A row of cells

can be seen under low-power magnification (100×).



What is the average length of a single cell in micrometers (μm)?

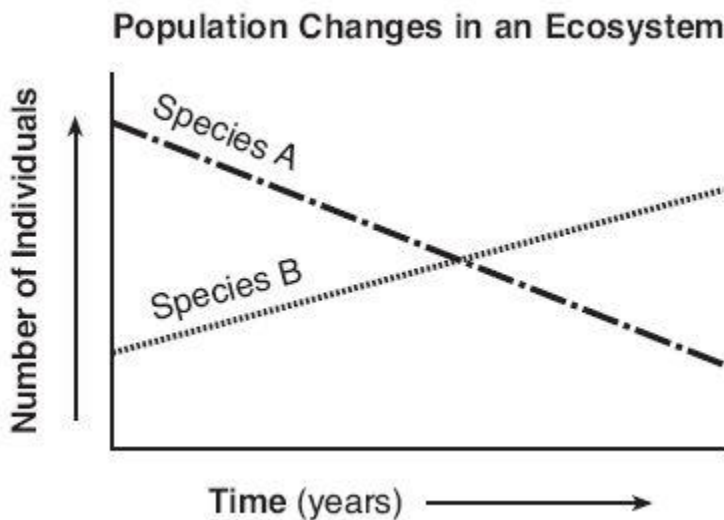
- (1) 10 μm
- (2) 100 μm
- (3) 200 μm
- (4) 2000 μm

Answer:

3

5

The graph below represents the populations of two different species in an ecosystem over a period of several years.



Which statement is a possible explanation for the changes shown?

- (1) Species A is better adapted to this environment.
- (2) Species A is a predator of species B.
- (3) Species B is better adapted to this environment.
- (4) Species B is a parasite that has benefited species A.

Answer:

3

6

A mineral supplement designed to prevent the flu was given to two groups of people during a scientific study. Dosages of the supplement were measured in milligrams per day, as shown in the table below.

Supplement Dosages

Group	Dosage (mg/day)
A	100
B	200

After 10 weeks, neither group reported a case of the flu. Which procedure would have made the outcome of this study more valid?

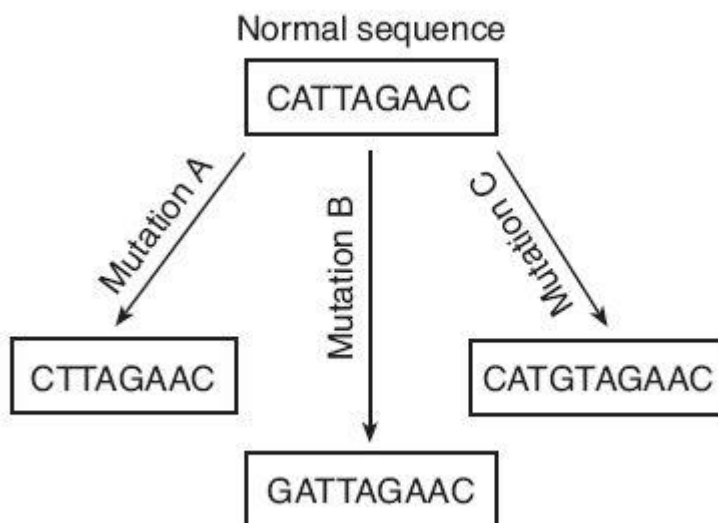
- (1) test only one group with 200 mg of the supplement
- (2) test the supplement on both groups for 5 weeks instead of 10 weeks
- (3) test a third group that receives 150 mg of the supplement
- (4) test a third group that does not receive the supplement

Answer:

4

7

The diagram below shows a normal gene sequence and three mutated sequences of a segment of DNA.



Which row in the chart below correctly identifies the cause of each type of mutation?

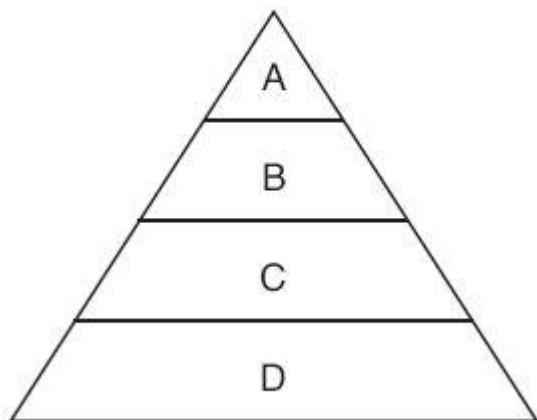
Row	Mutation A	Mutation B	Mutation C
(1)	deletion	substitution	insertion
(2)	insertion	substitution	deletion
(3)	insertion	deletion	substitution
(4)	deletion	insertion	substitution

Answer:

1

8

Base your answer to the following question on the energy pyramid below and on your knowledge of biology.



Which level includes organisms that receive their energy from level B?

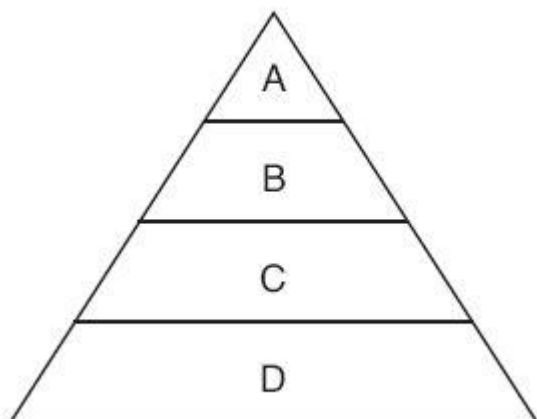
- (1) A
- (2) B
- (3) C
- (4) D

Answer:

1

9

Base your answer to the following question on the energy pyramid below and on your knowledge of biology.



Which level includes organisms that get their energy exclusively from a source other than the organisms in this ecosystem?

- (1) A
- (2) B
- (3) C
- (4) D

Answer:

The chart below compares the size of three structures: a gene, a nucleus, and a chromosome.

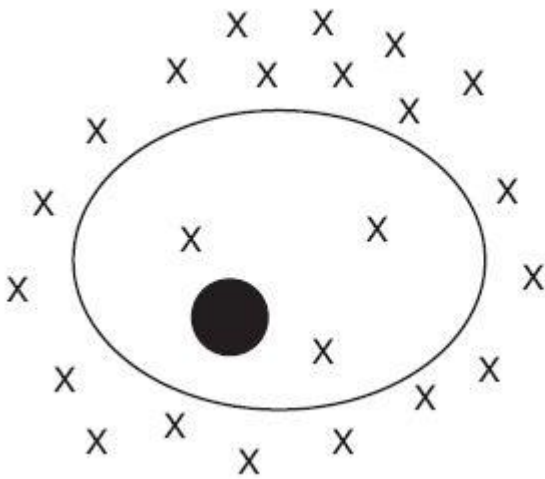
Size	Structure
smallest in size	A
↓	B
greatest in size	C

Based on this information, structure A would most likely be a

- (1) chromosome that is part of structure C
- (2) chromosome that contains structures B and C
- (3) nucleus that contains both structure B and structure A
- (4) gene that is part of structure B

Answer:

The diagram below shows molecules represented by X both outside and inside of a cell.

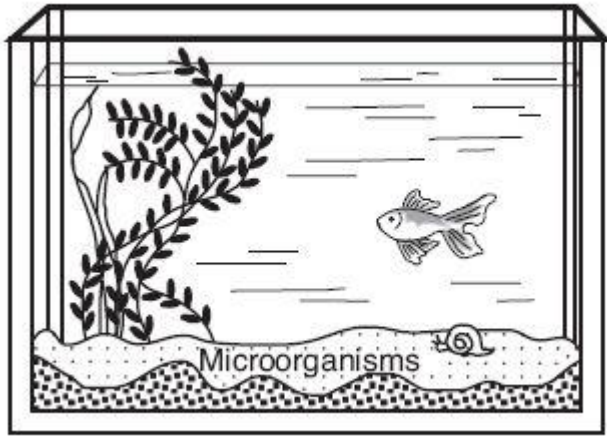


A process that would result in the movement of these molecules out of the cell requires the use of

- (1) DNA
- (2) ATP
- (3) antigens
- (4) antibodies

Answer:

Which statement most accurately predicts what would happen in the aquarium shown below if it were tightly covered and maintained in natural light for one month?



- (1) The water temperature would rapidly decrease.
- (2) The process of respiration in the snail would decrease.
- (3) The rate of reproduction of the fish would be affected.
- (4) The organisms would probably survive because materials would cycle.

Answer:

4

13

The data table below shows an effect of secondhand smoke on the birth weight of babies born to husbands and wives living together during pregnancy.

Effect of Secondhand Smoke on Birth Weight

	Wife: Nonsmoker Husband: Nonsmoker	Wife: Nonsmoker Husband: Smoker
Number of Couples	837	529
Average Weight of Baby at Birth	3.2 kg	2.9 kg

Based on these data, a reasonable conclusion that can be drawn about secondhand smoke during pregnancy is that secondhand smoke

- (1) is unable to pass from the mother to the fetus
- (2) slows the growth of the fetus
- (3) causes mutations in cells of the ovaries
- (4) blocks the receptors on antibody cells

Answer:

2

14

A limiting factor unique to a field planted with corn year after year is most likely

- (1) temperature
- (2) sunlight
- (3) water
- (4) soil nutrients

Answer:

15

Base your answer to the following question on the information below and on your knowledge of biology.

After the Aswan High Dam was built on the Nile River, the rate of parasitic blood-fluke infection doubled in the human population near the dam. As a result of building the dam, the flow of the Nile changed. This changed the habitat, which resulted in an increase in its population of a certain aquatic snail. The snails, which were infected, released larvae of the fluke. These larvae then infected humans.

This situation best illustrates that

- (1) the influence of humans on a natural system is always negative in the long term
- (2) the influence of humans on a natural system can have unpredictable negative impacts
- (3) human alteration of an ecosystem does not need to be studied to avoid ecological disaster
- (4) human alteration of an ecosystem will cause pollution and loss of finite resources

Answer:

2

16

Base your answer to the following question on the information below and on your knowledge of biology.

After the Aswan High Dam was built on the Nile River, the rate of parasitic blood-fluke infection doubled in the human population near the dam. As a result of building the dam, the flow of the Nile changed. This changed the habitat, which resulted in an increase in its population of a certain aquatic snail. The snails, which were infected, released larvae of the fluke. These larvae then infected humans.

The role of the snail may be described as a

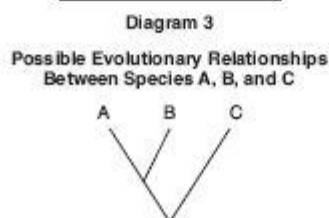
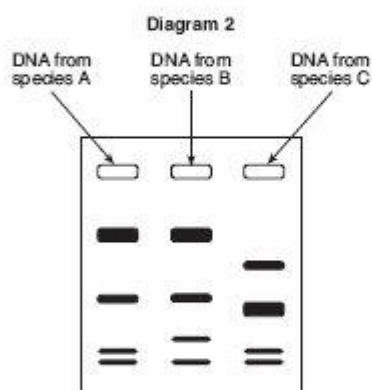
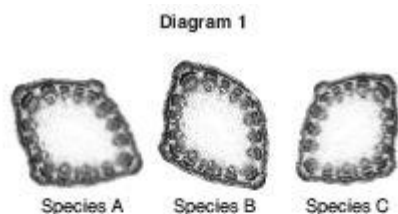
- (1) host
- (2) parasite
- (3) producer
- (4) decomposer

Answer:

1

Base your answers to the following questions on the information below and on your knowledge of biology.

Scientists attempted to determine the evolutionary relationships between three different plant species, A, B, and C. In order to do this, they examined the stems and DNA of these species. Diagram 1 represents a microscopic view of the cross sections of the stems of these three species. DNA was extracted from all three species and analyzed using gel electrophoresis. The results are shown in diagram 2. Based on the data they collected, they drew diagram 3 to represent the possible evolutionary relationships.



17

State why the evolutionary relationships shown in diagram 3 are *not* supported by the data provided by the stem cross sections in diagram 1. [1]

Scoring Guide:

Allow 1 credit. Acceptable responses include, but are not limited to:

- According to diagram 3, C should look different from A and B.
- The stem cross sections show that A, B, and C have similar stem structure, indicating that they are most likely closely related. Diagram 3 shows that only A and B are closely related.

18

Explain how the DNA banding pattern in diagram 2 supports the evolutionary relationships between the species shown in diagram 3. [1]

Scoring Guide:

Allow 1 credit. Acceptable responses include, but are not limited to:

- A and B have the most bands in common.

19

This technique used to analyze DNA involves the

- (1) synthesis of new DNA strands from subunits
- (2) separation of DNA fragments on the basis of size

- (3) production of genetically engineered DNA molecules
- (4) removal of defective genes from DNA

Answer:

2

20

Explain why information obtained through DNA analysis is a more reliable indicator of evolutionary relationships than observations of stem cross sections with a microscope. [1]

Scoring Guide:

Allow 1 credit. Acceptable responses include, but are not limited to:

- DNA analysis is more reliable since the more similar the DNA, the closer the relationship.
- Organisms can have similar features, but the DNA coding for these features can be very different.
- DNA analysis might reveal the actual genetic makeup.

21

A student added an enzyme to a test tube containing a sample of DNA. After a period of time, analysis of the DNA sample indicated it was now broken into three segments. The purpose of the enzyme was most likely to

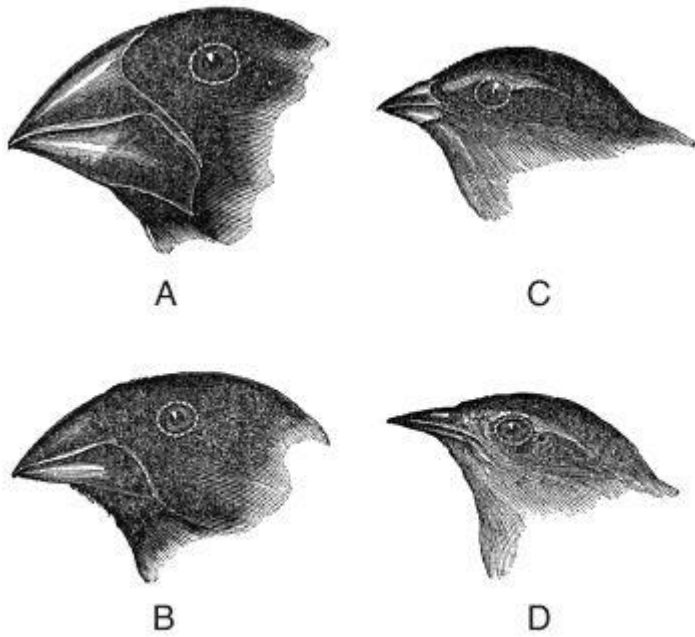
- (1) cut the DNA at a specific location
- (2) move the DNA to a different organism
- (3) copy the DNA for protein synthesis
- (4) alter the DNA sequence in the segment

Answer:

1

22

Base your answer to the following question on the diagram below and on your knowledge of biology. The diagram shows the heads of four different species of Galapagos Islands finches.



Source: <http://Darwin-online.org>

The four different types of beaks shown are most likely the result of

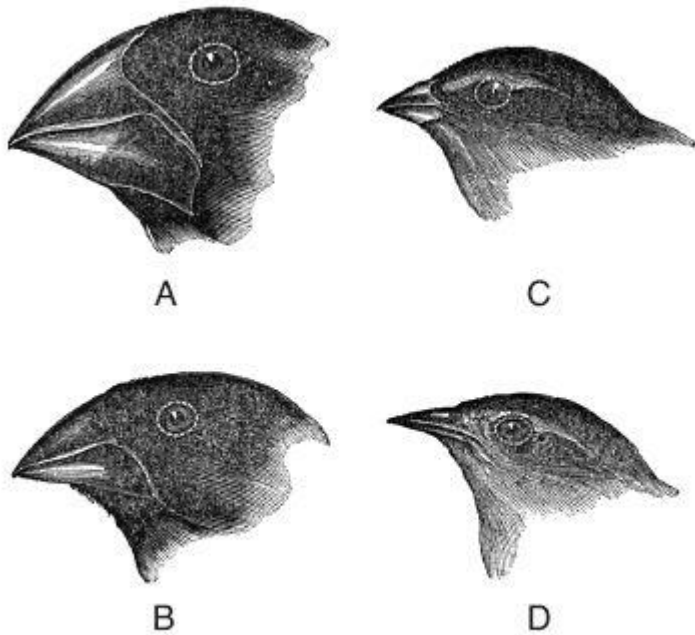
- (1) gene manipulation
- (2) natural selection
- (3) unchanging environmental conditions
- (4) patterns of behavior learned from parents

Answer:

2

23

Base your answer to the following question on the diagram below and on your knowledge of biology. The diagram shows the heads of four different species of Galapagos Islands finches.



Source: <http://Darwin-online.org>

Scientists observed that when two closely related species of predatory birds live in different areas, they seek prey early in the morning. However, when their territories overlap, one species hunts at night and the other hunts in the morning. When these two species live in the same area, they apparently modify their

- (1) habitat
- (2) niche
- (3) ecosystem
- (4) biodiversity

Answer:

2

24

An ecosystem that has almost the same number and type of organisms for many years is exhibiting

- (1) feedback
- (2) global instability
- (3) environmental change
- (4) equilibrium

Answer:

4

25

Which system is correctly paired with its function?

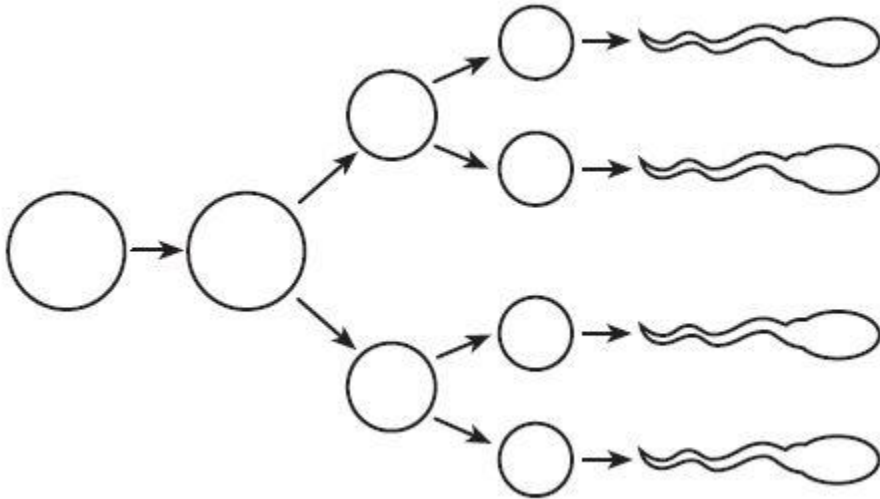
1. immune system - intake and distribution of oxygen to cells of the body
2. excretory system - remove potentially dangerous materials from the body
3. digestive system - transport energy-rich molecules to cells
4. circulatory system - produce building blocks of complex compounds

Answer:

2

26

Which statement concerning the reproductive cells in the diagram below is correct?



1. The cells are produced by mitosis and contain all the genetic information of the father.
2. If one of these cells fertilizes an egg, the offspring will be identical to the father.
3. Each of these cells contains only half the genetic information necessary for the formation of an offspring.
4. An egg fertilized by one of these cells will develop into a female with the same characteristics as the mother.

Answer:

3

27

Which set of functions is directly controlled by the cell membrane?

1. protein synthesis, respiration, digestion of food molecules
2. active transport, recognition of chemical messages, protection
3. enzyme production, elimination of large molecules, duplication of DNA codes
4. release of ATP molecules, regulation of cell reproduction, food production

Answer:

2

28

When a new viral infection appears in a population, scientists usually try to develop a vaccine against the virus. Which substances would most likely be contained in the new vaccine?

- (1) live bacteria that ingest viruses
- (2) white blood cells from an infected individual
- (3) weakened viruses associated with the infection
- (4) a variety of microbes that will attack the virus

Answer:

3

29

The human heart and lungs contain cells that

- (1) produce a hormone involved in respiration
- (2) have the same genetic information but perform different specialized functions
- (3) use one part of the genetic code to synthesize all enzymes needed by the cell
- (4) contain different numbers of DNA molecules

Answer:

2

30

The diversity of organisms present on Earth is the result of

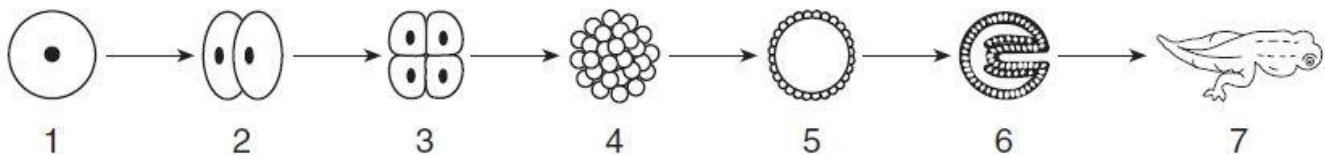
- (1) ecosystem stability (3) natural selection
- (2) homeostasis (4) direct harvesting

Answer:

3

31

Some stages in the development of an organism are represented in the diagram below.



Which levels of biological organization do stages 2 and 7 have in common?

- (1) cells and organs (3) tissues and organelles
- (2) cells and tissues (4) organelles and cells

Answer:

4

32

Plants in species A cannot fight most fungal infections. Plants in species B make a protein that kills many fungi. One possible way for humans to produce species A plants with the ability to synthesize this protein would be to

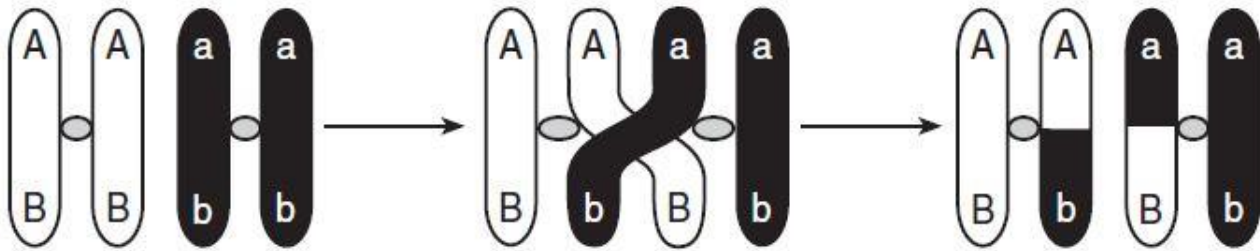
- (1) mutate fungal DNA and introduce the mutated DNA into species B using a virus
- (2) add DNA from species B into the soil around species A
- (3) insert the gene for the protein from species B into a chromosome in species A
- (4) cross species A and a fungus to stimulate the synthesis of this protein

Answer:

3

33

The diagram below shows a process that affects chromosomes during meiosis.



This process can be used to explain

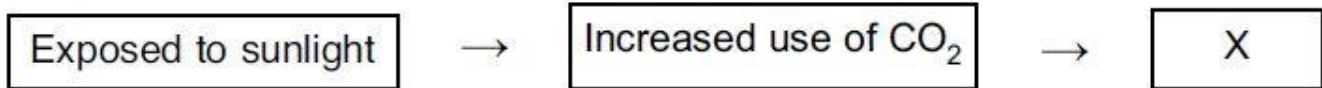
- (1) why some offspring are genetically identical to their parents
- (2) the process of differentiation in offspring
- (3) why some offspring physically resemble their parents
- (4) the origin of new combinations of traits in offspring

Answer:

4

34

Which phrase, if placed in box X, would correctly complete the flowchart shown below?



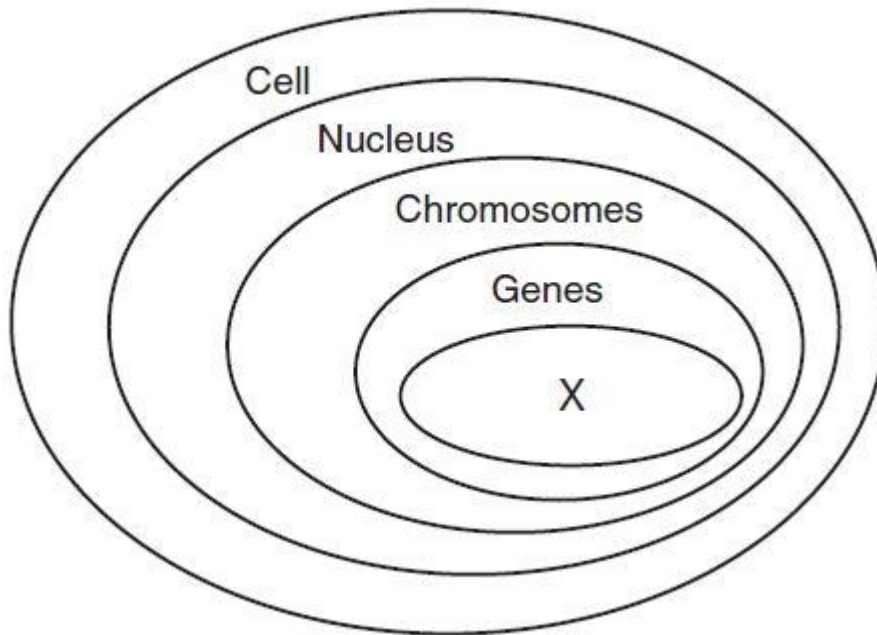
- (1) Increased use of starch in root cells
- (2) Increased concentration of glucose in leaf cells
- (3) Decreased ATP in root cells
- (4) Decreased concentration of oxygen in leaf cells

Answer:

2

35

The diagram below represents levels of organization within a cell of a multicellular organism.



The level represented by X is composed of

- (1) four types of base subunits
- (2) folded chains of glucose molecules
- (3) twenty different kinds of amino acids
- (4) complex, energy-rich inorganic molecules

Answer:

1

36

Scientists have discovered that the Oklahoma salamander, *Eurycea tynnerensis*, develops into its adult form in streams where the streambeds are made of fine, tightly packed gravel. Salamanders living in streams with streambeds made of large, loosely packed gravel remain immature. This situation is an example of

- (1) the production of gametes
- (2) faulty genes found in aquatic organisms
- (3) development influenced by the environment
- (4) the production of new organisms by environmental engineering

Answer:

3

37

Which statement is best supported by the theory of evolution?

- (1) Genetic alterations occur every time cell reproduction occurs.
- (2) The fossil record provides samples of every

organism that ever lived.

- (3) Populations that have advantageous characteristics will increase in number.
- (4) Few organisms survive when the environment remains the same.

Answer:

3

38

A chemical known as 5-bromouracil causes a mutation that results in the mismatching of molecular bases in DNA. The offspring of organisms exposed to 5-bromouracil can have mismatched DNA if the mutation occurs in

- (1) the skin cells of the mother
- (2) the gametes of either parent
- (3) all the body cells of both parents
- (4) only the nerve cells of the father

Answer:

2

39

A species that lacks the variation necessary to adapt to a changing environment is more likely to

- (1) develop many mutated cells
- (2) become extinct over time
- (3) begin to reproduce sexually
- (4) develop resistance to diseases

Answer:

2

40

A particular species of shark normally reproduces sexually. In captivity, it was found that a female could also reproduce asexually. One negative result from asexual reproduction is

- (1) increased gene recombinations
- (2) increased number of males produced
- (3) decreased number of eggs used
- (4) decreased biodiversity within the species

Answer:

4

41

Which situation involves a risk to a fetus due to the mother smoking during pregnancy?

- (1) decreased digestive activity in the stomach of the fetus

- (2) a decrease in the amount of oxygen in the ovary of the mother
- (3) inhalation of secondhand smoke by the fetus
- (4) toxins in the bloodstream of the mother

Answer:

4

42

Drugs to reduce the risk of rejection are given to organ transplant patients because the donated organ contains

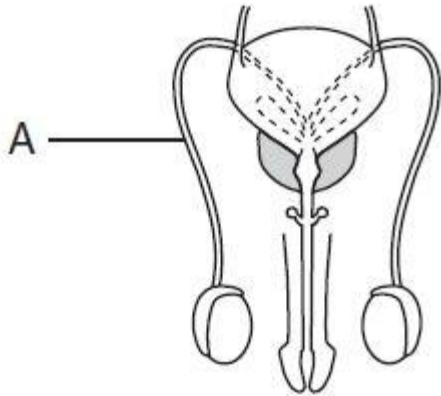
- (1) foreign antigens
- (2) foreign antibodies
- (3) DNA molecules
- (4) pathogenic microbes

Answer:

1

43

A reproductive system is represented in the diagram below.



If an injury occurred to the structure labeled A, the most likely result would be a problem with

- (1) delivery of sperm
- (2) production of gametes
- (3) production of hormones
- (4) excretion of urine

Answer:

1

44

The leaves of a plant are dotted with openings known as stomata. When open, stomata allow the plant to exchange gases and allow moisture to evaporate, helping to draw water from the roots up into the plant. These activities help the plant to

- (1) produce light energy

- (2) maintain homeostasis
- (3) decompose organic matter
- (4) synthesize minerals

Answer:

2

45

A stable ecosystem is characterized by having

- (1) predators that outnumber their prey
- (2) a continual input of energy
- (3) limited autotrophic nutrition
- (4) no competition between species

Answer:

2

46

The pedigree of Seattle Slew, a racehorse considered by some to be one of the fastest horses that ever lived, includes very fast horses on both his mother's side and his father's side. Seattle Slew most likely was a result of

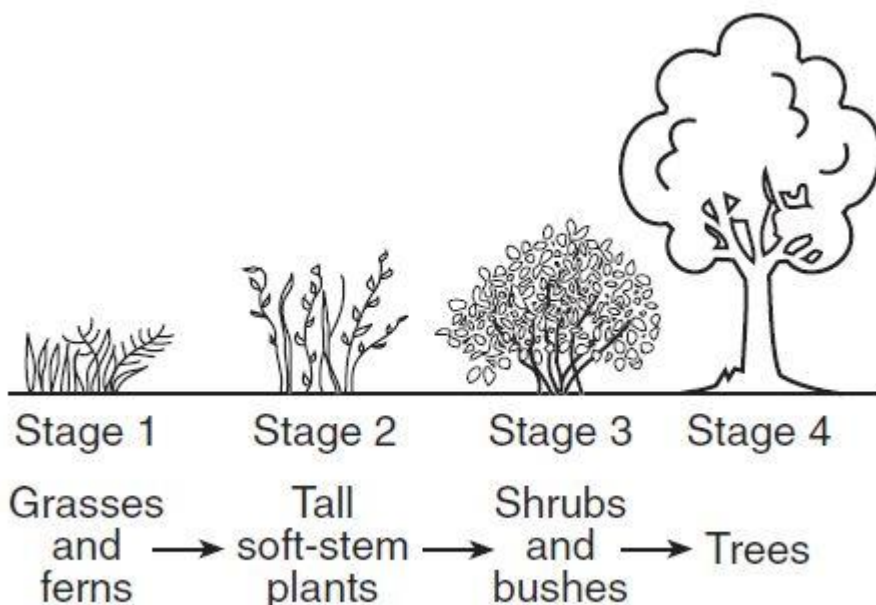
- (1) environmental selection
- (2) alteration of DNA molecules
- (3) selective breeding
- (4) a sudden mutation

Answer:

3

47

Changes in an ecosystem over a long period of time are shown in the diagram below.



These changes will most likely lead to a

- (1) stable ecosystem that can last for many years
- (2) loss of heterotrophs that cannot be recovered
- (3) long-term rise in environmental temperatures
- (4) forest consisting of only producers and decomposers

Answer:

1

48

Which situation indicates a serious organ system malfunction?

- (1) The ovary releases estrogen, which quickly binds to cell receptors.
- (2) Blood flow throughout the entire body is suddenly reduced.
- (3) White blood cells release enzymes in response to the proteins on inhaled pollen.
- (4) Mitochondria stop functioning in a unicellular organism exposed to pollutants.

Answer:

2

49

Which pair of organisms would most likely compete for the same ecological niche?

- (1) bacteria and fungi
- (2) deer and wolf
- (3) tree and fungi
- (4) deer and bacteria

Answer:

1

50

Rabbits introduced into Australia over one hundred years ago have become a serious pest. Rabbit populations have increased so much that they have displaced many native species of herbivores. Which statement best explains the reason for their increased numbers?

- (1) Rabbits have a high metabolic rate.
- (2) There are few native predators of rabbits.
- (3) Additional rabbit species have been introduced.
- (4) There is an increase in rabbit competitors.

Answer:

2

51

Which human activity would preserve finite resources?

- (1) deforestation

(2) removing carnivores from a forest

(3) recycling aluminum

(4) heating homes with fossil fuels

Answer:

3

52

Abandoned railroad tracks are overgrown with weeds. Ten years later there are small aspen trees growing in the middle of the tracks. This change is an example of

(1) ecological succession

(2) biological evolution

(3) genetic variation

(4) heterotrophic nutrition

Answer:

1

53

Which action would be least likely to harm endangered species?

(1) releasing more carbon dioxide into the atmosphere

(2) reducing the human population

(3) decreasing the amount of dissolved oxygen in the oceans

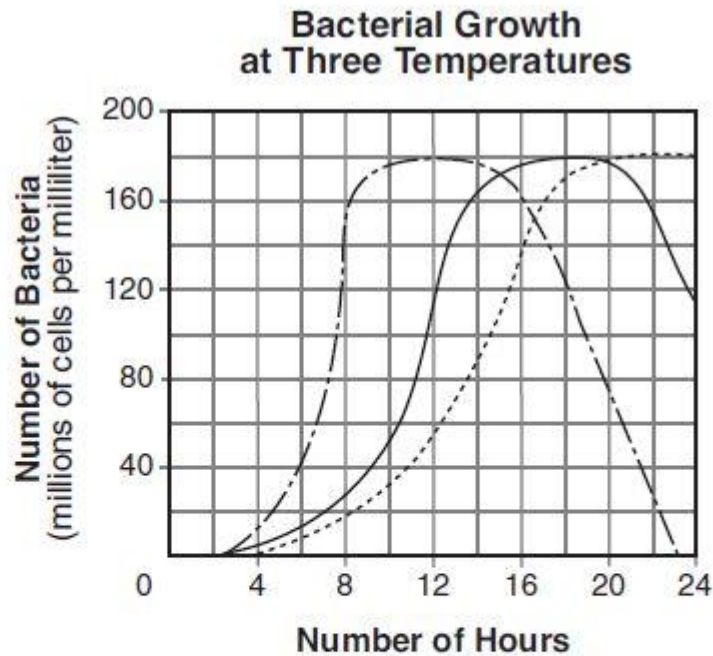
(4) reducing the thickness of the ozone layer

Answer:

2

54

The graph below represents the growth of bacteria cultured at three different temperatures over a period of 24 hours.



Which statement concerning the rate of cell division in the bacteria culture is correct?

- (1) Cell division is most rapid at 37°C between 6 and 8 hours after it began.
- (2) Cell division is most rapid at 25°C between 20 and 24 hours after it began.
- (3) Cell division is most rapid at 18°C between 4 and 8 hours after it began.
- (4) Cell division occurs at the same rate no matter what the temperature.

Answer:

1

55

A wet-mount slide preparation of a specimen is stained in order to

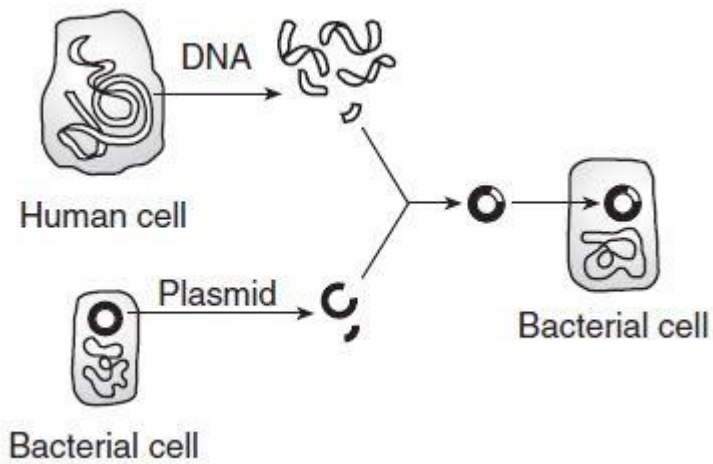
- (1) eliminate some organelles
- (2) make cell structures more visible
- (3) use the high-power lens
- (4) remove water from the slide

Answer:

2

56

Which set of terms correctly identifies the procedure shown in the diagram below and a substance produced by this procedure?



(1) selective breeding - growth hormone

(2) cloning - antibiotics

(3) genetic engineering - insulin

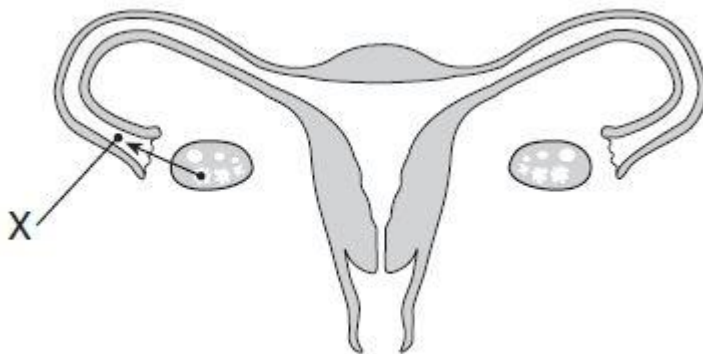
(4) replicating - glucose

Answer:

3

57

The diagram below represents structures found in a human female.



Which process results in the formation of structure X?

(1) mitosis (3) recombination

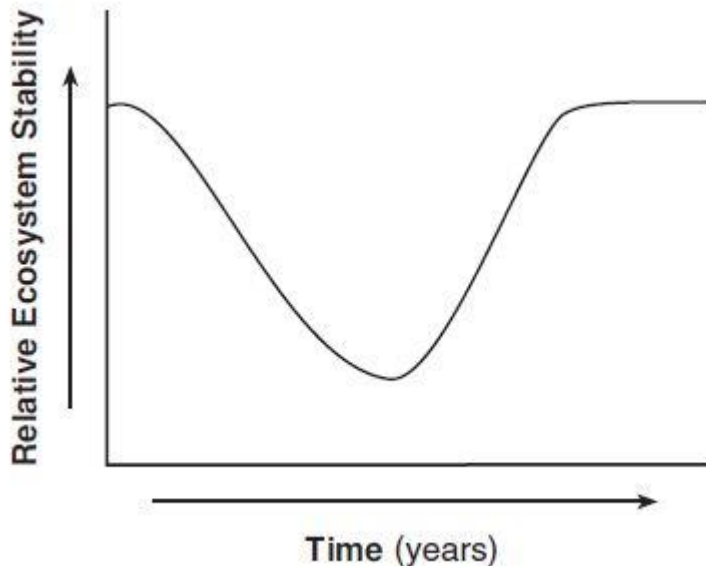
(2) meiosis (4) cloning

Answer:

2

58

The graph below shows changes in the stability of an ecosystem over a period of time.



Which statement best describes the change in ecosystem stability shown in the graph?

- (1) A stable ecosystem can be altered, then it can recover to a point of stability.
- (2) An ecosystem remains unchanged as its stability decreases.
- (3) The stability of an ecosystem remains unchanged but its biodiversity decreases.
- (4) A stable ecosystem cannot recover after it is altered.

Answer:

1

59

Two interactions between organisms are shown in the table below. X and Y do not represent the same organisms in the two interactions.

	Organism X	Organism Y
Interaction 1	predator	prey
Interaction 2	parasite	host

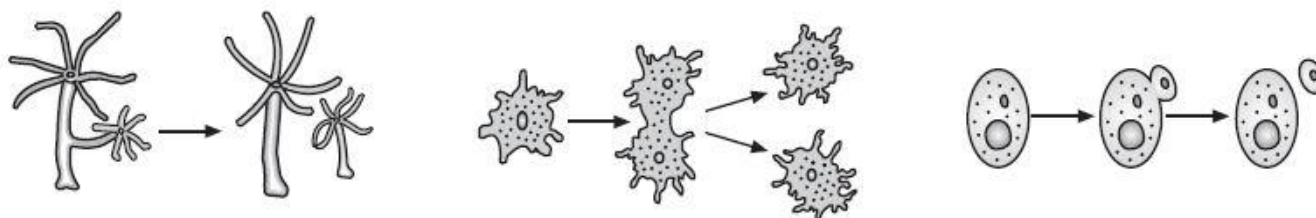
Which statement best describes the relationship between organism X and organism Y in each interaction?

1. Organism X is positively affected by the relationship and organism Y is negatively affected.
- 2.
3. Organism X is negatively affected by the relationship and organism Y is positively affected.
- 4.
5. Both organisms are positively affected by the relationship.
- 6.
7. Both organisms are negatively affected by the relationship.

Answer:

1

The diagrams below illustrate types of asexual reproduction.



Which statement correctly describes the offspring?

- (1) They vary genetically from the parent.
- (2) They are produced by the union of gametes.
- (3) They obtain nourishment from a placenta.
- (4) They result without the union of gametes.

Answer:

4

Base your answer to question 38 on the information below and on your knowledge of biology.

A reporter conducted a number of "on-the-street" interviews with people selected at random. The reporter found that many people gave responses similar to those of the person quoted below.

Question	Response of Person Interviewed
Would you be concerned if winters in this area became more severe and the cost of plowing and sanding snowy roads increased?	Of course I would be concerned. I can't afford higher taxes!
Would you be willing to pay more for a car that has better fuel economy if it would benefit the environment?	No! Cars that would use less gasoline would have to be much smaller. I like my big car—and besides that, it's safer.
If droughts became more common, would you be upset if you had to pay more for your food at the grocery store or a restaurant?	Definitely. My weekly food bill is too high already!
Would it bother you if the sea level increased a foot or two, causing many lowland areas to flood?	Not really. People could always move to higher ground. But I wouldn't want to see my taxes go up because we have to spend more on aid to help them move.
Are you concerned about global warming?	Not really. It doesn't affect me.

Which statement is best supported by these interviews?

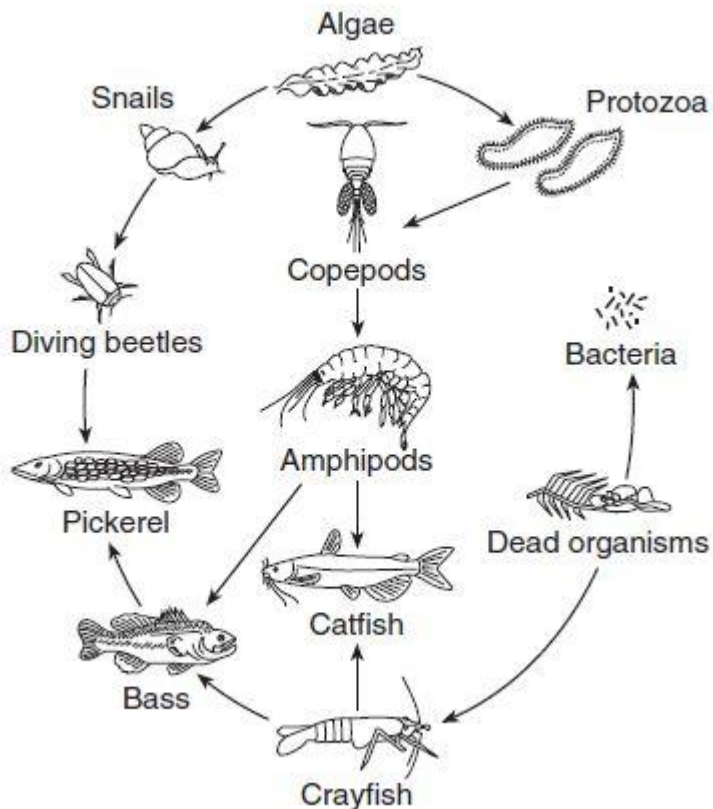
1. Many people are very aware of the possible effects of global warming.
- 2.
3. Many people care more about their personal comforts than about the possible effects of global warming.
- 4.
5. Many people are willing to sacrifice to reduce the possible effects of global warming.
- 6.
7. Many people are now taking action to reduce the possible effects of global warming.

Answer:

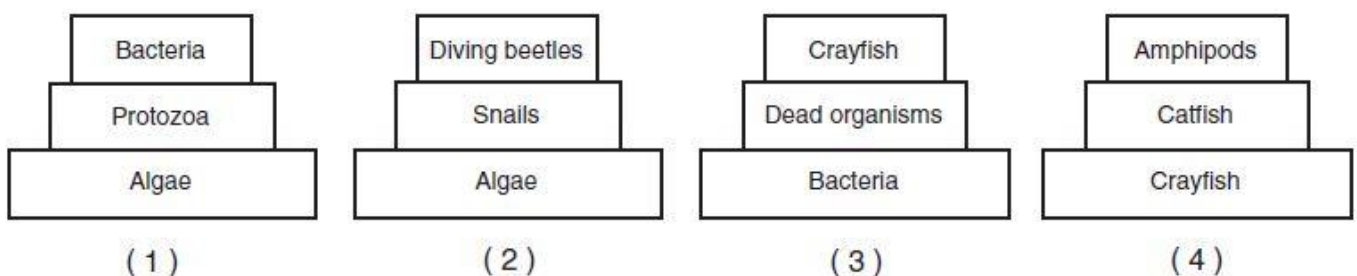
2

62

Base your answers to questions 39 and 40 on the diagram below, which represents a pond food web, and on your knowledge of biology.



Which energy pyramid most accurately shows the energy relationships between three organisms in this food web?



Answer:

2

63

Which statement best describes what will most likely happen if the amphipod population is removed from this food web?

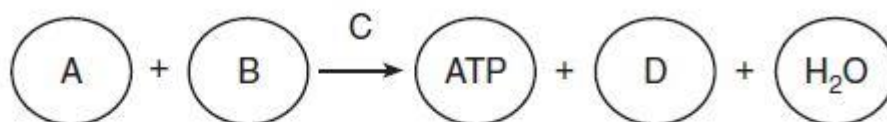
1. Population sizes of species at feeding levels both before and after amphipods will decrease.
- 2.
3. Population sizes of species at feeding levels both before and after amphipods will increase.
- 4.
5. Population sizes of species at feeding levels after amphipods will increase and before amphipods will decrease.
- 6.
7. Population sizes of species at feeding levels after amphipods will decrease and before amphipods will increase.

Answer:

4

64

A biological process that occurs in both plants and animals is shown below.



Which row in the chart below identifies the lettered substances in this process?

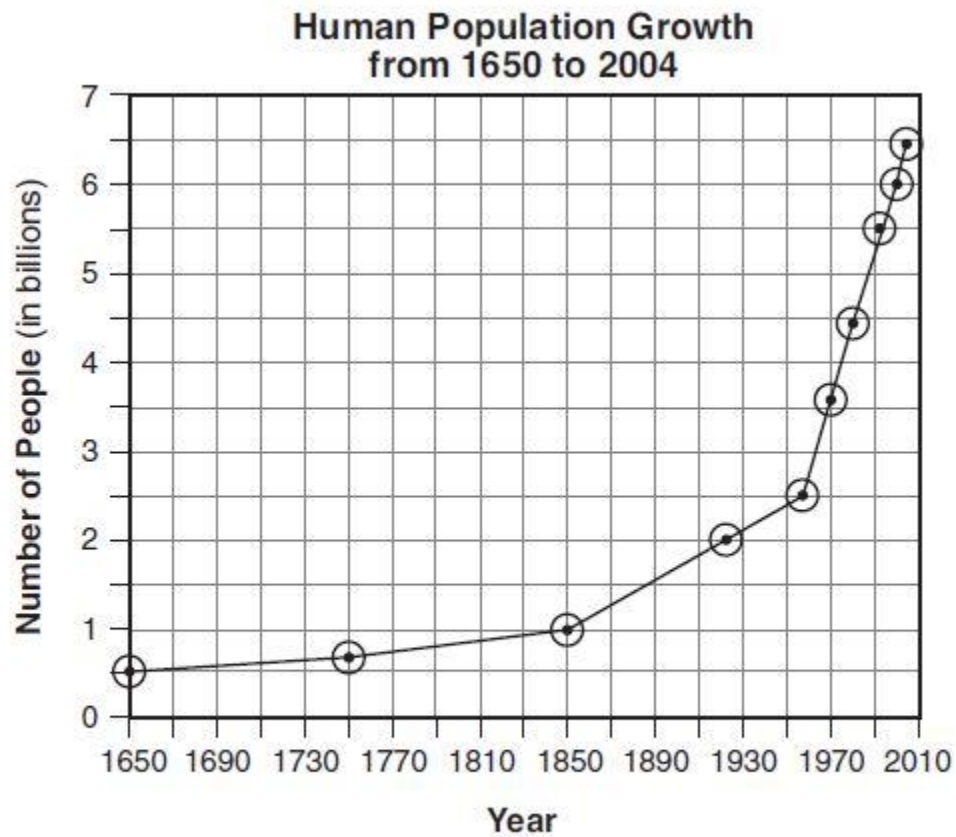
Row	A	B	C	D
(1)	O ₂	CO ₂	glucose	enzymes
(2)	glucose	O ₂	enzymes	CO ₂
(3)	enzymes	O ₂	CO ₂	glucose
(4)	glucose	CO ₂	enzymes	O ₂

Answer:

2

65

The graph below shows data on human population growth.



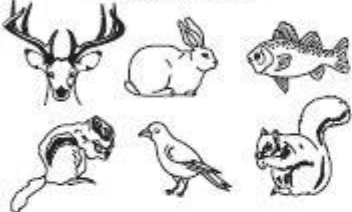
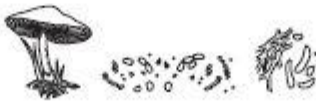
The trend shown on the graph would most likely result in

- (1) a decreased demand for deforestation
- (2) an increase in available freshwater
- (3) a decrease in air pollution
- (4) an increased demand for land use

Answer:

4

The diagram below represents the varying biodiversity in three ecosystems.

Ecosystem A	Ecosystem B	Ecosystem C
Carnivores 	Carnivores 	Carnivores 
Herbivores 	Herbivores 	Herbivores 
Autotrophs 	Autotrophs 	Autotrophs 
Decomposers 	Decomposers 	Decomposers 

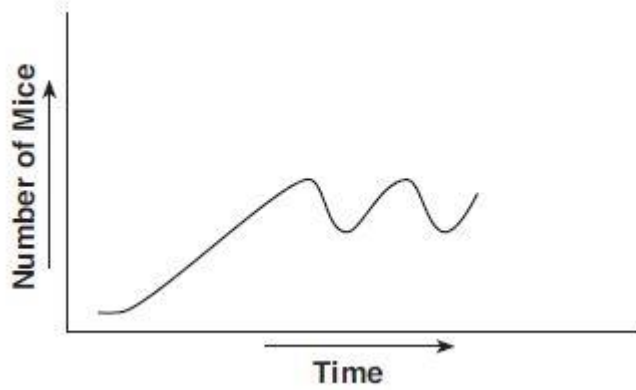
The level of biodiversity in ecosystem A is high because it has the

- (1) least variety of energy levels (3) greatest number of decomposers
(2) greatest variety of genetic material (4) least number of ecological niches

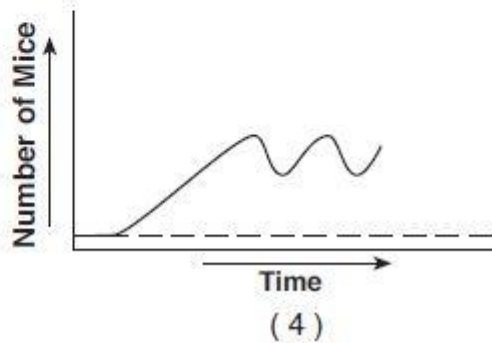
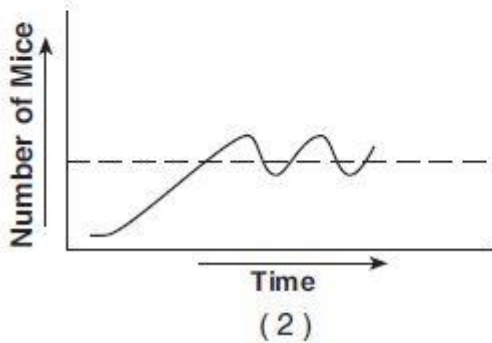
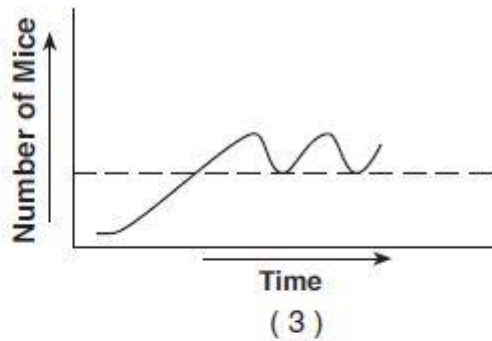
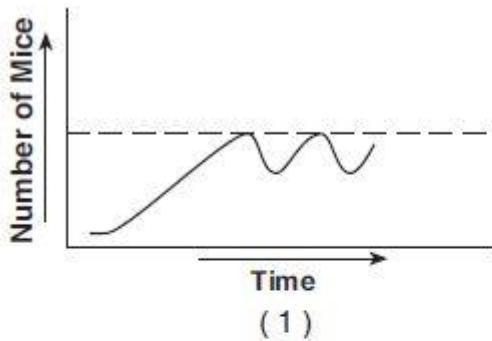
Answer:

2

The graph below shows the growth of a field mouse population in an ecosystem over time.



The dashed line indicating the carrying capacity for the mouse population is correctly shown on which graph?



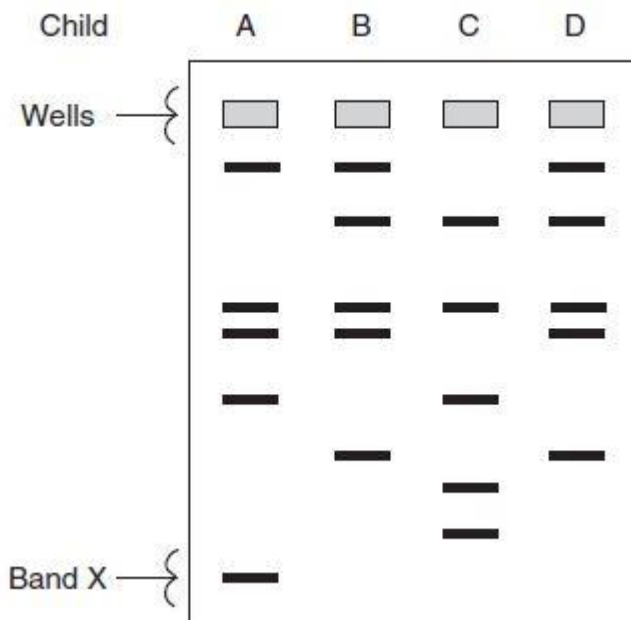
Answer:

2

68

Base your answers to question 64 on the information and diagram below and on your knowledge of biology.

DNA samples were collected from four children. The diagram below represents the results of a procedure that separated the DNA in each sample.



Band X represents the

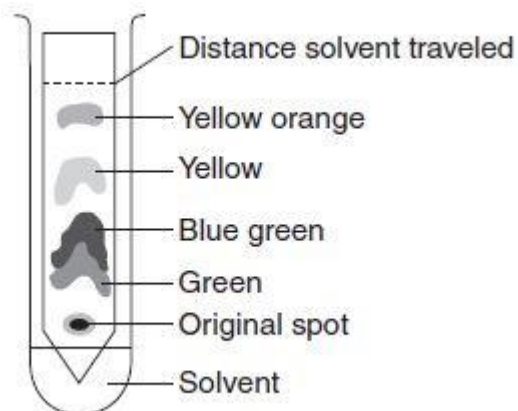
- (1) largest fragment of DNA that traveled the fastest
- (2) smallest fragment of DNA that traveled the fastest
- (3) largest fragment of DNA that traveled the slowest
- (4) smallest fragment of DNA that traveled the slowest

Answer:

2

69

A technique used to analyze pigments in spinach leaves is shown in the diagram below.



This technique is known as

- (1) paper chromatography
- (2) gene manipulation

(3) dissection

(4) staining

Answer:

1

70

A student conducted an experiment to determine if listening to different types of music would affect pulse rate. She thought that pulse rate would change with different types of music. Each person participating in her experiment listened to seven different selections of music for 30 seconds each. The pulse rates were taken after each 30-second interval of music. Based on her experiment, the student concluded that a person's pulse rate changed when listening to different types of music.

The component missing from this experiment is a

(1) prediction

(2) hypothesis

(3) control group

(4) research plan

Answer:

3

71

An experiment was carried out to determine whether drinking caffeinated soda increases pulse rate. The pulse rates of two groups of people at rest were measured. Group A was then given caffeinated soda and group B was given caffeine-free soda. One hour after drinking the soda, the pulse rates were measured. The participants in the experiment were all the same age, and they were all given the same amount of soda.

The dependent variable in this experiment is the

(1) type of soda given to each group

(2) amount of soda given to each group

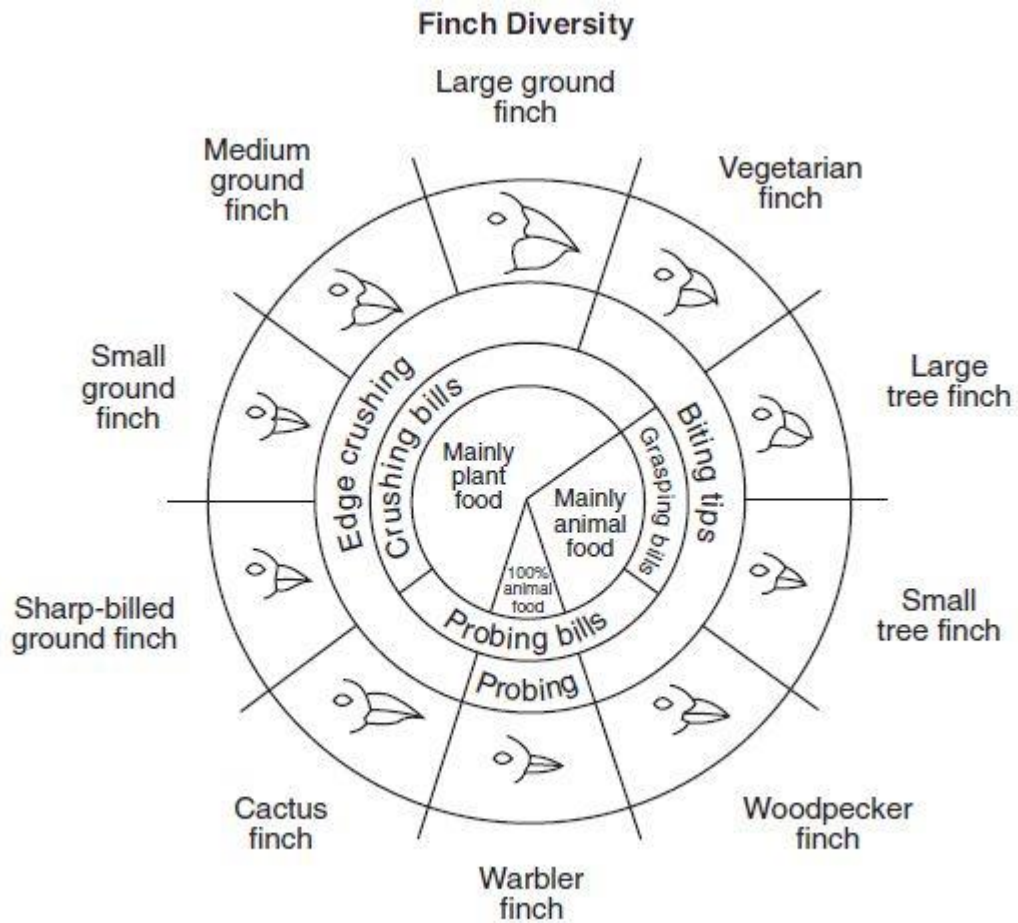
(3) pulse rate of each group

(4) age of participants in each group

Answer:

3

72

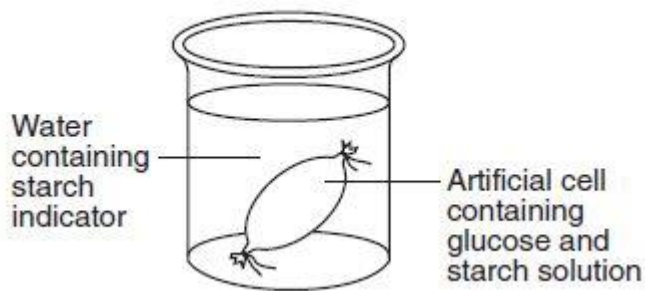


The differences observed in the bird beaks are most likely due to

- (1) asexual reproduction of these finch species
- (2) the selection for different shaped beaks that best suit different niches
- (3) the genetic recombination associated with mitotic cell division
- (4) the genetic engineering of the DNA of each of these species

Answer:

2



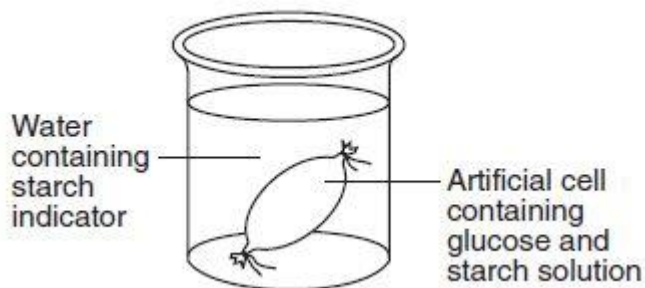
After two hours, the color of the liquid in the beaker did not change. This shows that

- (1) glucose moved from the artificial cell into the beaker
- (2) starch did not pass out of the artificial cell
- (3) starch was digested to glucose in the artificial cell
- (4) glucose molecules combined to produce starch in the artificial cell

Answer:

2

74



This laboratory setup would most likely be used to demonstrate

- (1) carbohydrate synthesis
- (2) active transport
- (3) diffusion
- (4) dehydration

Answer:

3

75

A species of bird known as Bird of Paradise has been observed in the jungles of New Guinea. The males shake their bodies and sometimes hang upside down to show off their bright colors and long feathers to attract females. Females usually mate with the "flashiest" males. These observations can be used to support the concept that

- (1) unusual courtship behaviors lead to extinction
- (2) some organisms are better adapted for asexual reproduction
- (3) homeostasis in an organism is influenced by physical characteristics

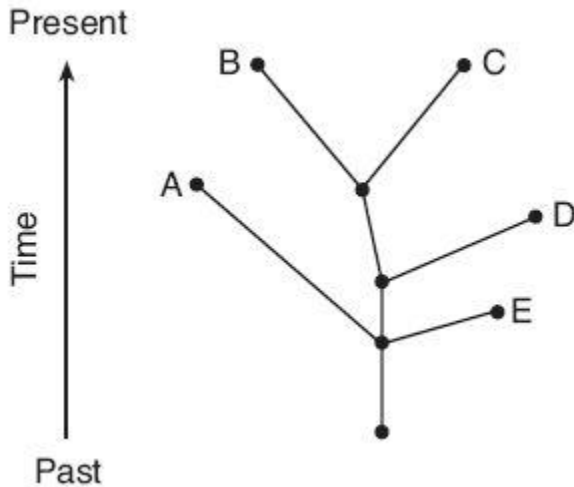
(4) behaviors that lead to reproductive success have evolved

Answer:

4

76

Which statement concerning the evolution of species A, B, C, D, and E is supported by the diagram below?



- (1) Species B and C can be found in today's environments.
- (2) Species A and D evolved from E.
- (3) Species A and C can still interbreed.
- (4) Species A, B, and E all evolved from a common ancestor and all are successful today.

Answer:

1

77

The diagram below represents a process that occurs during human reproduction.



(Not drawn to scale)

The process represented by the arrow will ensure that the

- (1) zygote contains a complete set of genetic information
- (2) gametes contain a complete set of genetic information
- (3) zygote contains half of the genetic information
- (4) gametes contain half of the genetic information

Answer:

1

78

Even though identical twins have the same genetic material, they may develop slightly different characteristics because

- (1) each twin receives different chromosomes from the egg
- (2) one twin may only have genes from the father

- (3) gene expression may be influenced by factors that switch genes on and off
- (4) a gene mutation may have occurred before the zygote divided

Answer:

3

79

What normally happens immediately after fertilization in sexual reproduction?

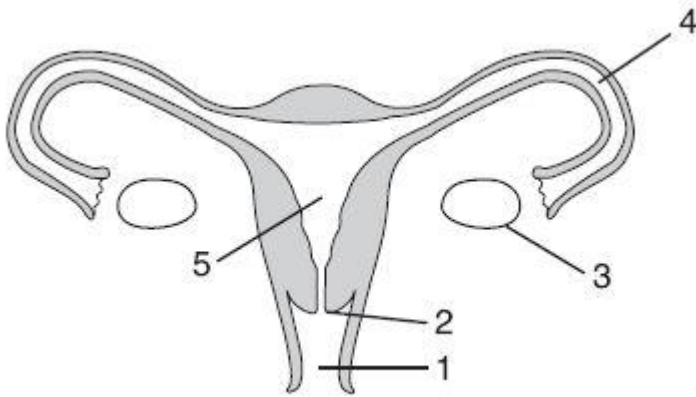
- (1) specialization of cells to form a fetus from an egg
- (2) production of daughter cells having twice the number of chromosomes as the parent cell
- (3) production of daughter cells having half the number of chromosomes as the parent cell
- (4) division of cells resulting in the development of an embryo from a zygote

Answer:

4

80

The human female reproductive system is represented in the diagram below.



Production of gametes and support of the fetus normally occur in structures

- (1) 1 and 2
- (2) 2 and 4
- (3) 3 and 5
- (4) 4 and 5

Answer:

3

81

Essential materials needed for development are transported to a human fetus through the

- (1) reproductive hormones
- (2) egg cell
- (3) placenta
- (4) ovaries

Answer:

3

82

The failure to regulate the pH of the blood can affect the activity of

- (1) enzymes that clot blood
- (2) red blood cells that make antibodies
- (3) chlorophyll that carries oxygen in the blood
- (4) DNA that controls starch digestion in the blood

Answer:

1

83

Young birds that have been raised in isolation from members of their species build nests characteristic of their species. This suggests that the nest-building behavior is

- (1) genetically inherited from parents
- (2) learned by watching members of their species
- (3) a disadvantage to the survival of the species
- (4) a direct result of the type of food the bird eats

Answer:

1

84

Some people with spinal cord injuries do not sweat below the area of the injury. Without the ability to sweat, the human body temperature begins to rise. Which statement would best describe this situation?

- (1) Feedback mechanisms regulate blood sugar levels.
- (2) Gene mutations are increased.
- (3) Energy from ATP is not available.
- (4) Dynamic equilibrium is disrupted.

Answer:

4

85

Decomposers are necessary in an ecosystem because they

- (1) produce food for plants by the process of photosynthesis
- (2) provide energy for plants by the process of decay
- (3) can rapidly reproduce and evolve
- (4) make inorganic materials available to plants

Answer:

4

86

A manatee is a water-dwelling herbivore on the list of endangered species. If manatees were to become extinct, what would be the most likely result in the areas where they had lived?

- (1) The biodiversity of these areas would not be affected.
- (2) Certain producer organisms would become more abundant in these areas.
- (3) Other manatees would move into these areas and restore the population.
- (4) Predators in these areas would occupy higher levels on the energy pyramid.

Answer:

2

87

A serious threat to biodiversity is

- (1) habitat destruction
- (2) maintenance of food chains
- (3) competition within a species
- (4) a stable population size

Answer:

1

88

Which action will result in the greatest *decrease* in rain forest stability?

- (1) removing one species of plant for medicine
- (2) harvesting nuts from some trees
- (3) cutting down all the trees for lumber
- (4) powering all homes with wind energy

Answer:

3

89

One way that humans could have a positive impact on local environments is to

- (1) generate waste products as a result of technological advances
- (2) use resources that are renewable
- (3) increase planting large areas of one crop
- (4) increase the use of pesticides

Answer:

2

Base your answers to questions 74 and 75 on the data table below and on your knowledge of biology.

Dietary Preferences of Finches

Species of Finch	Preferred Foods
A	nuts and seeds
B	worms and insects
C	fruits and seeds
D	insects and seeds
E	nuts and seeds

90

Based on its preferred food, species B would be classified as a

- (1) decomposer
- (2) producer
- (3) carnivore
- (4) parasite

Answer:

3

91

Which two species would most likely be able to live in the same habitat without competing with each other for food?

- (1) A and C
- (2) B and C

(3) B and D

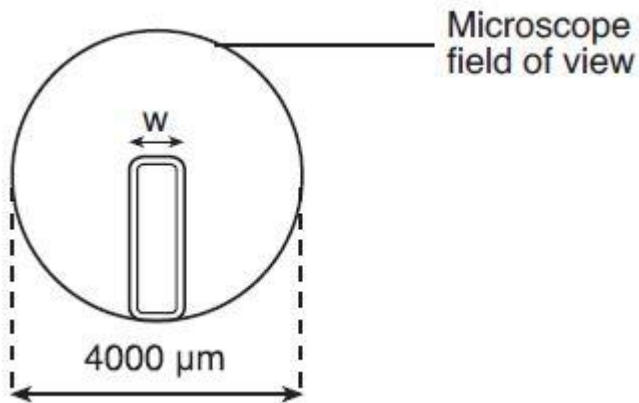
(4) C and E

Answer:

2

92

A plant cell in a microscopic field of view is represented below.



The width (w) of this plant cell is closest to

(1) 200 μm

(2) 800 μm

(3) 1200 μm

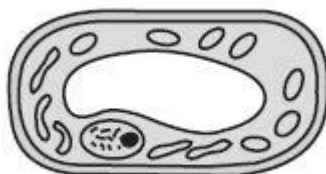
(4) 1600 μm

Answer:

2

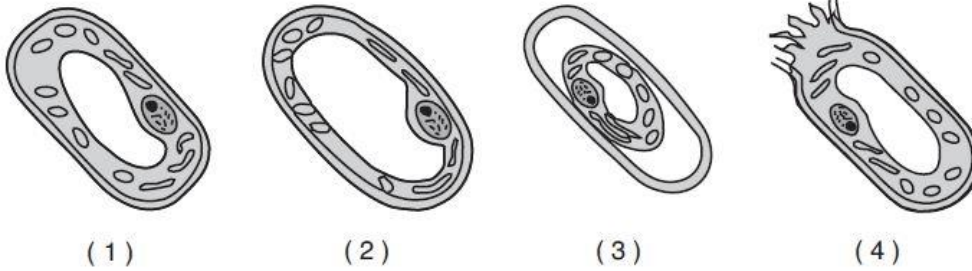
93

The diagram below represents a plant cell in tap water as seen with a compound light microscope.



Which diagram best represents the appearance of the cell after it has been placed in a

15% salt solution for two minutes?



Answer:

3

94

Why is a mushroom considered a heterotroph?

- (1) It manufactures its own food.
- (2) It divides by mitosis.
- (3) It transforms light energy into chemical energy.
- (4) It obtains nutrients from its environment.

Answer:

4

95

Three days after an organism eats some meat, many of the organic molecules originally contained in the meat would be found in newly formed molecules of

- (1) glucose
- (2) protein
- (3) starch
- (4) oxygen

Answer:

2

96

Which body system is correctly paired with its function?

- (1) excretory - produces antibodies to fight disease-causing organisms
- (2) digestive - produces hormones for storage and insulation
- (3) circulatory - transports materials for energy release in body cells
- (4) respiratory - collects waste material for digestion

Answer:

3

97

Which statement best explains why some cells in the reproductive system only respond to certain hormones?

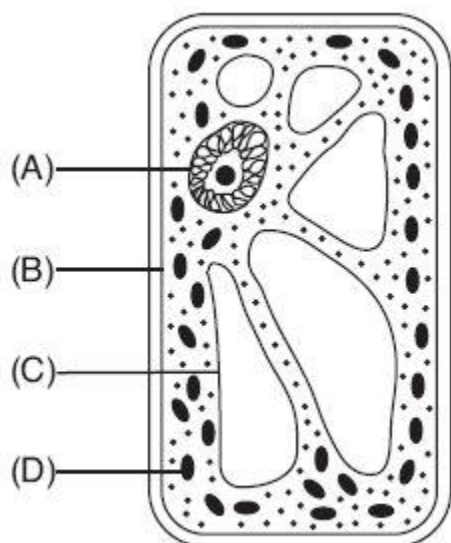
- (1) These cells have different DNA than the cells in other body systems.
- (2) These cells have specific types of receptors on their membranes.
- (3) Reproductive system cells could be harmed if they made contact with hormones from other body systems.
- (4) Cells associated with the female reproductive system only respond to the hormone testosterone.

Answer:

2

98

In the cell shown below, which lettered structure is responsible for the excretion of most cellular wastes?



- (1) A
- (2) B
- (3) C
- (4) D

Answer:

2

99

What is the main function of a vacuole in a cell?

- (1) storage
- (2) coordination
- (3) synthesis of molecules
- (4) release of energy

Answer:

1

100

If 15% of a DNA sample is made up of thymine, T, what percentage of the sample is made up of cytosine, C?

- (1) 15%
- (2) 35%
- (3) 70%
- (4) 85%

Answer:

2

101

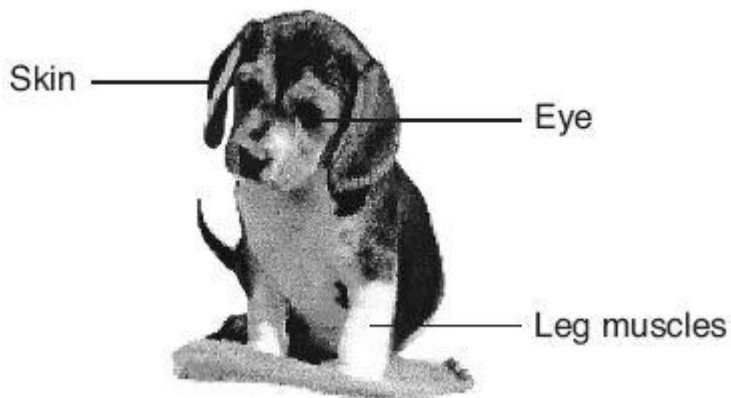
Global warming has been linked to a *decrease* in the

- (1) size of the polar ice caps
- (2) temperature of Earth
- (3) rate of species extinction
- (4) rate of carbon dioxide production

Answer:

1

Several structures are labeled in the diagram of a puppy shown below.



Every cell in each of these structures contains

- (1) equal amounts of ATP
- (2) identical genetic information
- (3) proteins that are all identical
- (4) organelles for the synthesis of glucose

Answer:

2

A characteristic that an organism exhibits during its lifetime will only affect the evolution of its species if the characteristic

- (1) results from isolation of the organism from the rest of the population
- (2) is due to a genetic code that is present in the gametes of the organism
- (3) decreases the number of genes in the body cells of the organism
- (4) causes a change in the environment surrounding the organism

Answer:

2

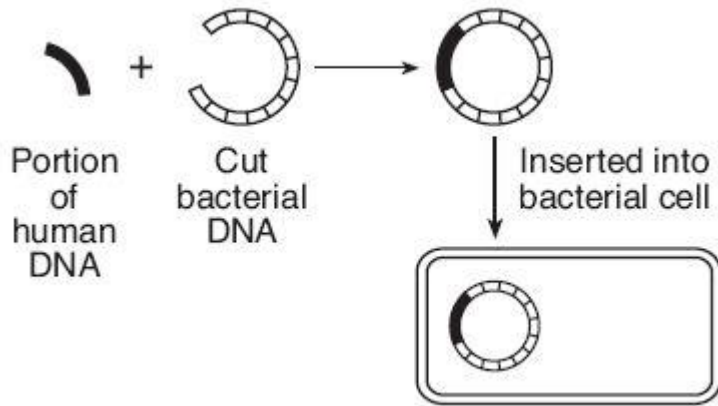
Agriculturists have developed some varieties of vegetables from common wild mustard plants, which reproduce sexually. Which statement best explains the development of these different varieties of vegetables?

- (1) Different varieties can develop from a single species as a result of the recombination of genetic information.
- (2) Different species can develop from a single species as a result of the effect of similar environmental conditions.
- (3) Mutations will occur in the genes of a species only if the environment changes.
- (4) Variations in a species will increase when the rate of mitosis is decreased.

Answer:

1

The diagram below represents a technique used in some molecular biology laboratories.



This technique is a type of

- (1) chromatography
- (2) gel electrophoresis
- (3) direct harvesting
- (4) genetic engineering

Answer:

4