

VIRGINIA STANDARDS OF LEARNING

Spring 2008 Released Test

END OF COURSE BIOLOGY

Form S0118, CORE 1

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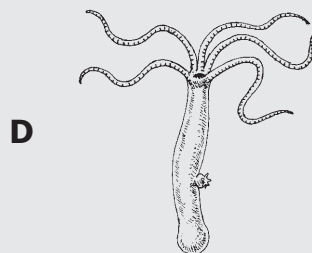
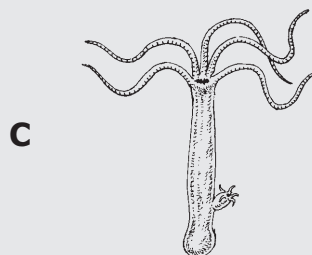
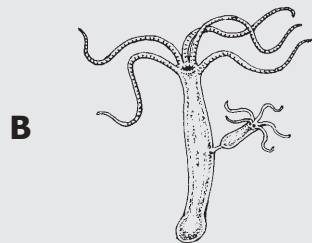
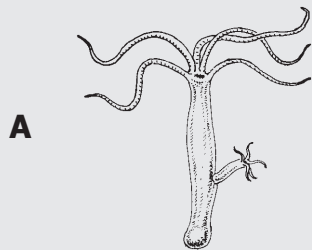
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Directions

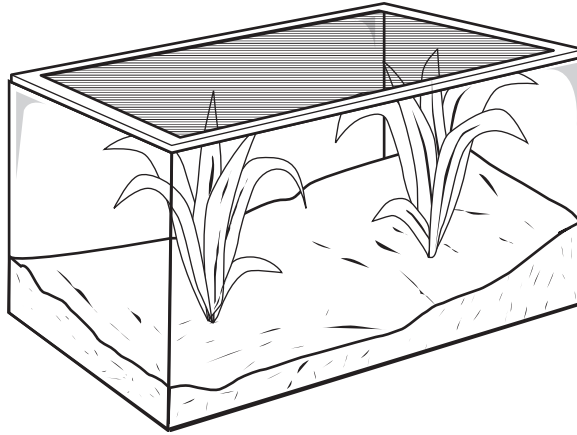
Read each question and choose the best answer. Then fill in the circle on your answer document for the answer you have chosen.

SAMPLE

The following pictures show some stages during asexual reproduction of a hydra. Which picture shows the first step?



1









A student constructs several terrariums like the one shown. Each terrarium is exposed to a different amount of sunlight each day. In order to determine the ideal amount of sunlight, which of the following variables must be held constant?

- A** Type of plants
- B** Growth rate of plants
- C** Wavelengths of sunlight
- D** Amount of sunlight received

2 Which of the following is evidence to support the idea that two different species might have a common ancestor?

- F** Their fossils were discovered in the same location.
- G** Many of their genes are the same.
- H** Their methods of respiration are alike.
- J** They use the same means of locomotion.

Reproduction and Development of Three Animals

Organism	Sea Anemone	Frog	Monkey
Type of Reproduction	Asexual or sexual	Sexual	Sexual
Early Stage			
Adult			

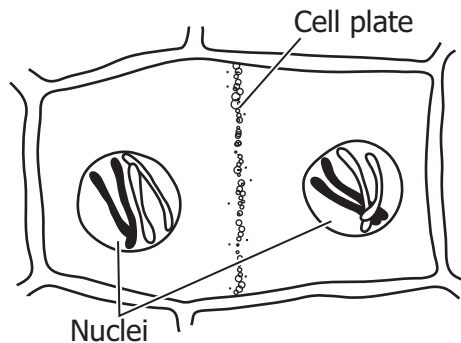
The information in the table supports which conclusion?

- A** Frogs are more closely related to monkeys than to sea anemones.
- B** Frogs, monkeys, and sea anemones are classified into different kingdoms.
- C** Sea anemones are more complex than frogs or monkeys.
- D** Sea anemones and monkeys are adapted to similar environments.

4 Bacteria adapt more quickly than elephants to environmental changes. Which *best* explains this difference?

- F** Bacteria reproduce more rapidly.
- G** Individual bacteria grow more steadily.
- H** Bacterial populations are more isolated.
- J** Individual bacteria have more genes.

Cell in Cytokinesis



A student looking through a light microscope saw this cell in cytokinesis. This cell is *most* likely from —

- A a plant
- B a virus
- C an animal
- D a bacterium

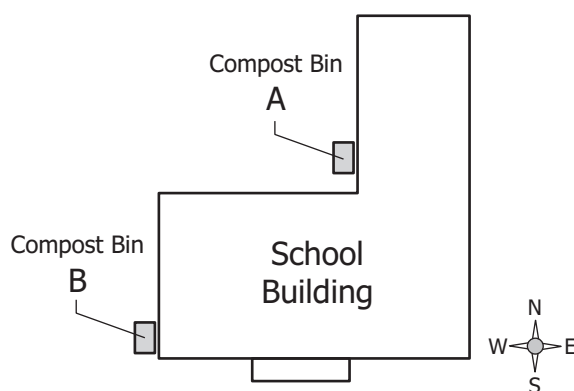
6 A geneticist studying fruit flies hypothesizes that short wings are a recessive trait coded for by a single gene. Which observation is *most* likely to have led her to form this hypothesis?

- F Flies have wing lengths ranging from very long to very short.
- G Flies with long wings are less likely to survive.
- H Flies with long wings can produce offspring with short wings.
- J Flies with short wings prefer to mate with flies with long wings.

7 What do phototropism and geotropism enable plants to do?

- A** Grow toward needed resources
- B** Prevent invasion by insect colonies
- C** Defend themselves against herbivores
- D** Develop pesticide resistance by exchanging DNA

8



As part of an experiment to measure decomposition rates of different materials, students put food scraps from the cafeteria in compost bin A and leaves and grass clippings in compost bin B for six weeks. Students in first period measured the temperature in bin A, and students in sixth period measured the temperature in bin B. What is the *greatest* error in the students' experimental design?

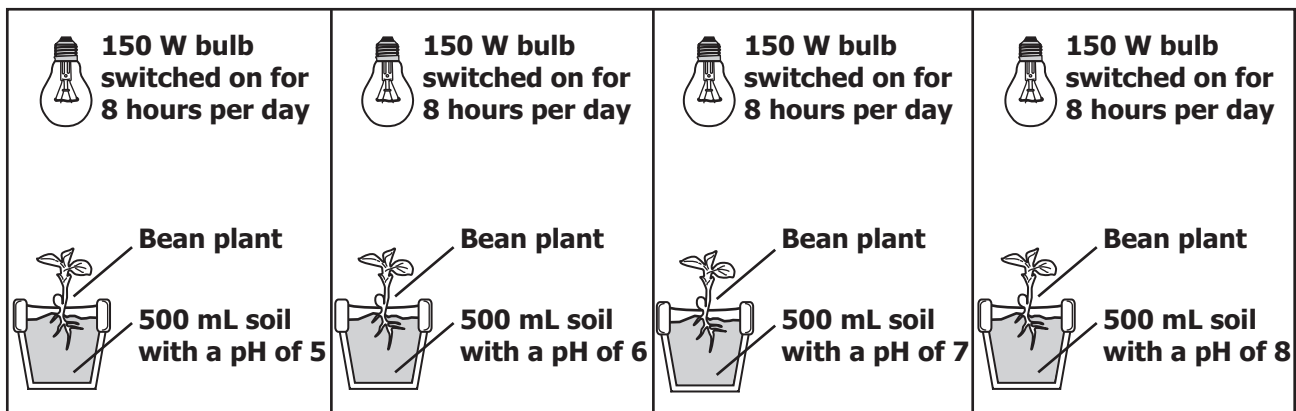
- F** There are too many uncontrolled variables in the experiment.
- G** Temperature is the only dependent variable in the experiment.
- H** The materials chosen decompose too rapidly.
- J** The students put equal masses of materials in each bin.

9 Scientists are using genetic engineering to develop a wheat crop that is resistant to a particular kind of moth. How would they determine if the plants are moth-resistant?

- A** Determine the length of the moth reproductive cycle in normal wheat.
- B** Determine whether moths in test wheat can be controlled with chemical sprays.
- C** Monitor numbers of moth species infesting normal wheat.
- D** Monitor moth populations in fields planted with test and normal wheat.

10

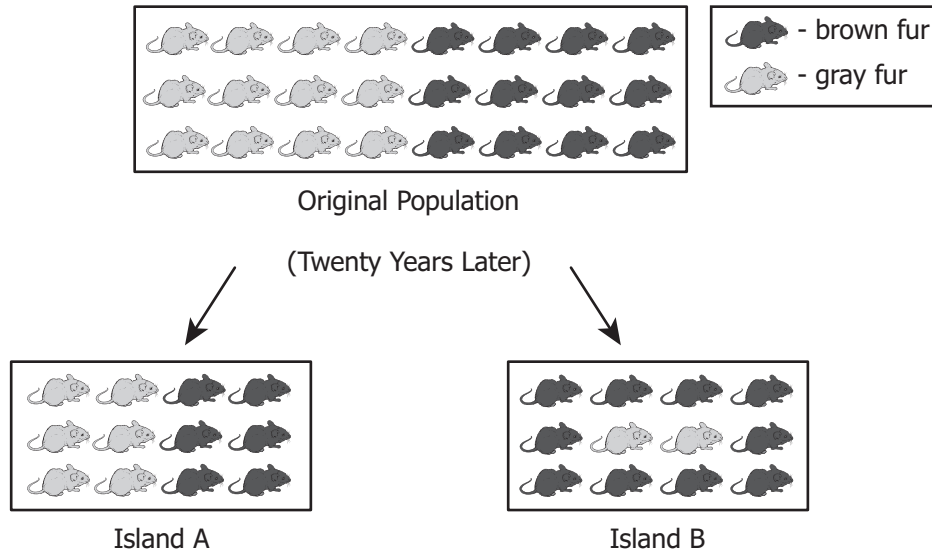
Experimental Setup



The diagram shows a setup for a plant investigation. Which variable is *most* likely being tested?

- F** Hours of light exposure
- G** Plant species
- H** Soil volume
- J** Soil pH

A Population of Mice



A population of mice is evenly divided into two groups, and each group is placed on an isolated island with no existing mouse population. Which statement *best* explains the difference in the mouse populations on Island A and Island B at the end of the 20 years?

- A** On Island A, the allele for gray fur was dominant, while on Island B, the allele for brown fur was dominant.
- B** More brown mice were in the half of the original population that was sent to Island B than in the group sent to Island A.
- C** Conditions on Island B favored the brown-furred individuals, while both fur colors were evenly advantaged on Island A.
- D** The recapturing of mice on Island A and Island B was done differently.

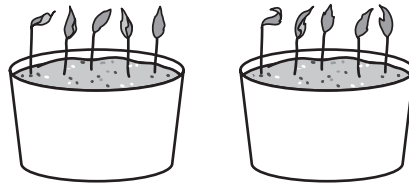


In 1665 Robert Hooke observed a thin slice of cork under a microscope and presented a drawing similar to the one shown. Hooke called the structures he observed —

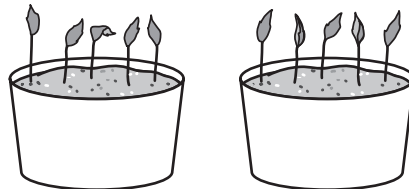
- F** chloroplasts
- G** root hairs
- H** stomata
- J** cells

13 The eastern meadowlark and the western meadowlark are two closely related bird species. The two species avoid interbreeding because they have different mating songs. This is an example of —

- A** adaptive radiation
- B** behavioral isolation
- C** geographic isolation
- D** artificial selection



Cuttings in sand with pH 6.0



Cuttings in sand with pH 8.0

Twenty cuttings were taken from one plant and planted in four containers of sand. Two containers had a pH of 6.0, and two had a pH of 8.0. When the cuttings matured, all of those grown in a pH of 6.0 had pink flowers, and all of those grown in a pH of 8.0 had blue flowers. One explanation for these results is that the sand at one pH contained a dye that changed the flower color. The *best* alternative explanation for these results is that —

- F the difference in pH caused the genes for flower color to be expressed differently
- G a mutation occurred in the plant before the cuttings were taken and caused the difference
- H by mistake, the scientist took some cuttings from the wrong plant
- J by random chance, different flower colors developed on the plants grown at different pH

15 A student hypothesizes that green algae will grow fastest when exposed to blue light. To test this hypothesis, the student should design an experiment with which independent variable?

- A Color of algae
- B Rate of algae growth
- C Color of light that algae are exposed to
- D Amount of time per day that algae are exposed to light

16 Virginia's Great Dismal Swamp is largely a red maple forest. Previously, there were more bald cypress and white cedar trees in the area. Tree cutting, extensive draining, and the prevention of natural forest fires have changed the balance of tree species. The balance has shifted because these actions have —

- F** preserved the amount of soil in the swamp
- G** decreased the amount of sunlight needed by cypress
- H** increased the rate of cellular respiration in cedar
- J** altered the pattern of succession in the swamp

17 Fungi obtain nutrients by —

- A** photosynthesis
- B** chemosynthesis
- C** absorption
- D** ingestion

Plant Observations

Mosses and liverworts – nonvascular, low-growing, rootlike structures

Ferns – vascular, spores, roots, stems, and leaves

Gymnosperm – vascular, naked seeds, needle-or scale-like leaves, roots, stems, seed in cones

Angiosperm – vascular, seeds enclosed in fruit, flowers, roots, stems, leaves



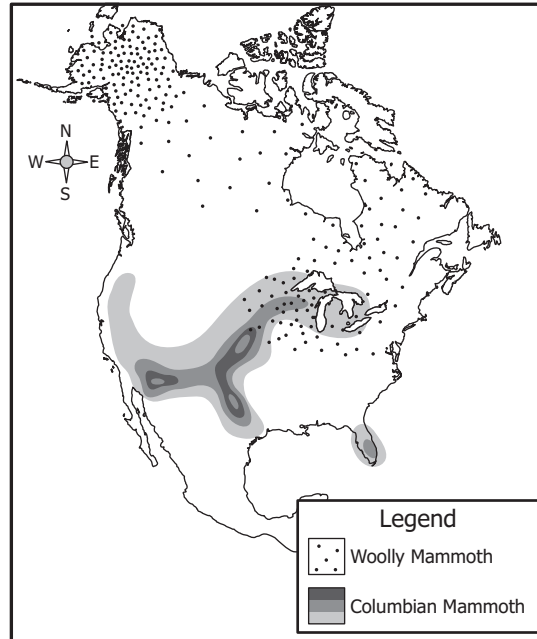
A student observed different types of plants and recorded the data shown. Based on the drawings and information in the chart, these plants are *most likely* —

- F gymnosperms
- G angiosperms
- H mosses
- J ferns

- 19 One student in a class becomes sick with a fever and cough. Two days later, three other students in the same class become sick with the same symptoms. This is evidence that the illness is *most likely* caused by —

- A cold weather
- B a pathogen
- C a genetic mutation
- D nutritional deficiencies

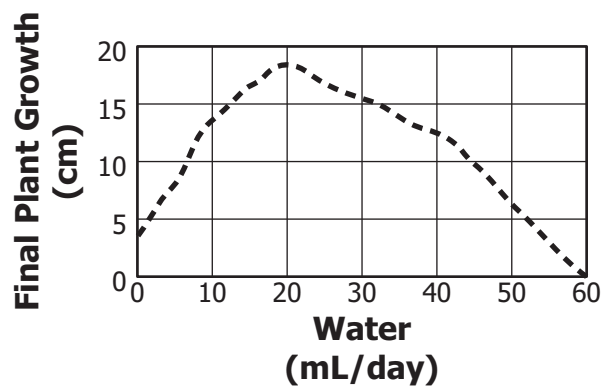
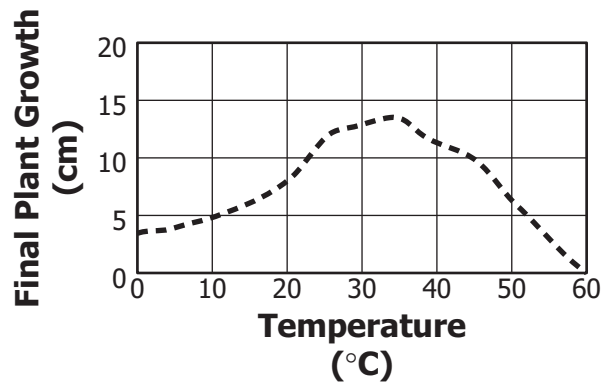
Fossils of Mammoths



The map shows where woolly mammoth and Columbian mammoth fossils have been found in North America. What kind of information does this map provide for paleontologists?

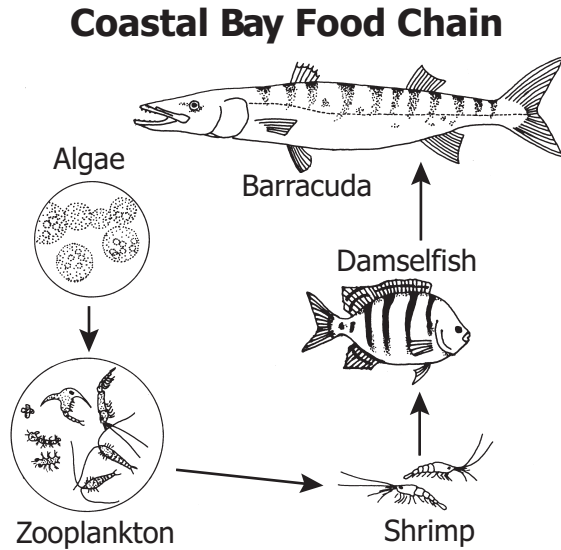
- F** The range of each mammoth species
- G** The seasonal migration routes of mammoths
- H** Where mammoths were most hunted
- J** Where mammoths moved as the climate changed

Plant Growth Experiments



The graphs show the results of two separate experiments on the same species of plant. Students now want to determine how the use of rainwater or bottled water affects the growth of this plant. Which conditions should be used for optimal growth as the two water types are tested?

- A 20°C, 10 mL/day
- B 25°C, 35 mL/day
- C 30°C, 45 mL/day
- D 35°C, 20 mL/day



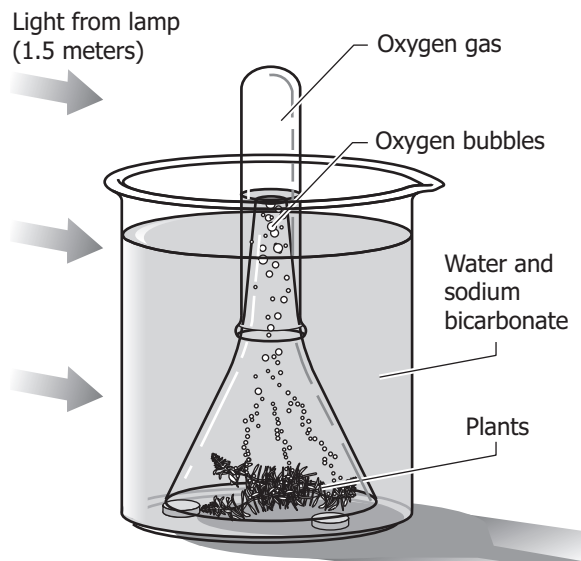
This food chain can be found in the coastal waters of Virginia. The population of which organisms in the food chain would be the *first* to decline if commercial fishing over-harvested shrimp?

- F** Algae
- G** Zooplankton
- H** Damselfish
- J** Barracuda

23 Many Northern Hemisphere birds respond to seasonal environmental changes by —

- A** hibernating
- B** mutating
- C** migrating
- D** estivating

Photosynthesis Experiment



The picture shows a student's experiment with *Elodea*, a common aquatic plant. Which change in this experiment is *most* likely to increase the volume of oxygen gas that accumulates in the top of the tube?

- F Use fewer plants
- G Replace the beaker with a larger container
- H Move the light source closer to the beaker
- J Reduce the amount of water

25 When a group of foxes moves to a new environment, a change in which of the following is *least* likely to be a selective pressure on the foxes?

- A Temperatures
- B Food sources
- C Decomposers
- D Predator populations

26 Which of these is required for aerobic cellular respiration?

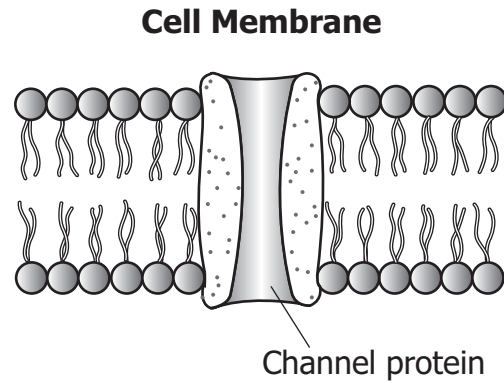
- F** Carbon dioxide
- G** Sunlight
- H** Oxygen
- J** Chlorophyll

27 In a typical animal cell, which component contains the *greatest* amount of water?

- A** Cell membrane
- B** Cytoplasm
- C** Ribosomes
- D** Nucleus

28 Students in a biology class thought that salt water would affect the movements of planaria. They put 25 planaria in salt water and recorded their observations. Which flaw was present in the design of their experiment?

- F** There was no hypothesis.
- G** There was no control.
- H** The sample was too big.
- J** The procedure was too complicated.

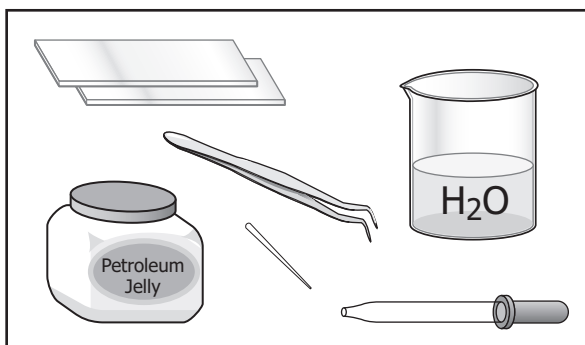


The diagram shows a section of a cell membrane that includes a channel protein. The function of this protein is to —

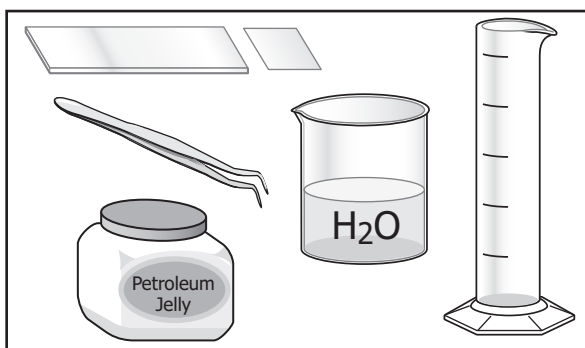
- A** strengthen the outer boundary of the cell
- B** connect reproductive cells during fertilization
- C** allow certain substances to enter or leave the cell
- D** exchange organelles or chromosomes between specialized cells

30 Which set of materials would be *best* to use to prepare a wet mount slide of onion skin cells?

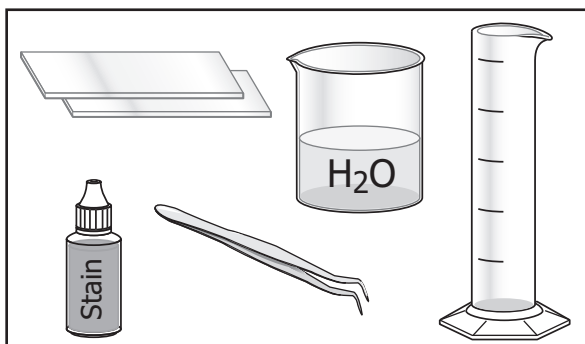
F



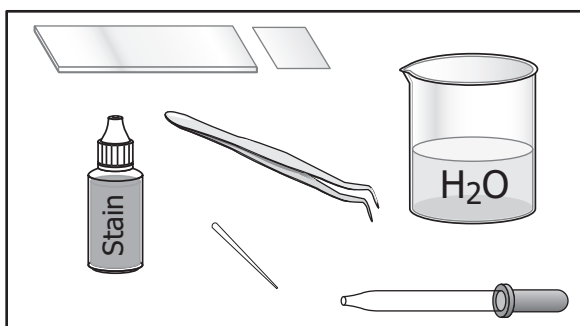
G



H



J



31 Under a microscope, a series of cells are observed that lack membrane-bound internal organelles. Which of these is the *most* likely cell type?

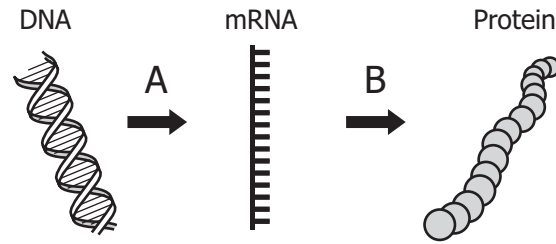
- A** Plant cell
- B** Animal cell
- C** Eukaryotic cell
- D** Prokaryotic cell

32 Which of these supports the cell theory as it is stated today?

- F** New cells are produced by division of existing cells.
- G** All organisms are composed of more than one cell.
- H** Cells must contain a nucleus.
- J** Not all cells are alive.

33 A student observes that a type of eubacteria contains chlorophyll. Which of these does this type of bacteria have in common with plants?

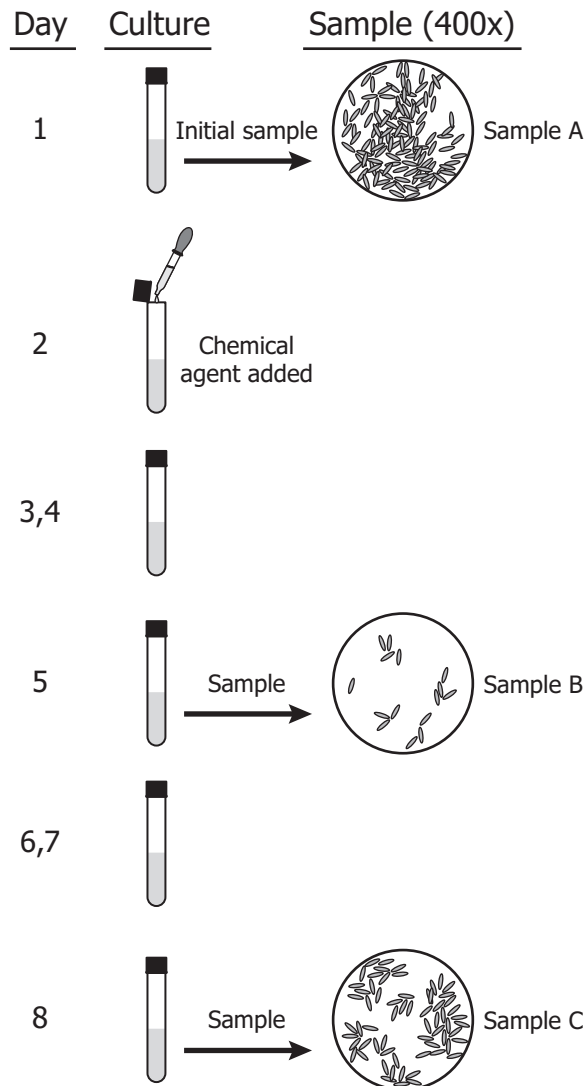
- A** It is photosynthetic.
- B** It contains vascular tissues.
- C** It contains mitochondria.
- D** It is heterotrophic.



In eukaryotic cells, the process indicated by arrow A occurs in the —

- F** cytoplasm
- G** ribosome
- H** nucleus
- J** cell membrane

Bacterial Culture Experiment



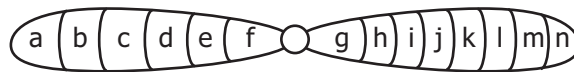
These three samples from the same live culture were all viewed at the same magnification. Which conclusion is *best* supported by the observation of these three samples?

- A** The bacterial culture was unaffected by the chemical agent.
- B** The sampling techniques used did not produce accurate data.
- C** The culture became contaminated by airborne bacteria during the initial sampling.
- D** The culture included some bacteria that were resistant to the chemical agent.

36 Students research unicellular, prokaryotic organisms that live in harsh environments such as volcanic hot springs, brine pools, and anaerobic black organic mud. Which of these groups are the students *most* likely researching?

- F** Protista
- G** Archaeobacteria
- H** Eubacteria
- J** Plantae

37



The diagram shows the normal sequence of genes in a particular chromosome. Which chromosome could have resulted from a deletion that occurred in this chromosome?

- A**







A chromosome with a centromere. The left arm has three segments labeled 'a', 'b', and 'c'. The right arm has eight segments labeled 'g', 'h', 'i', 'j', 'k', 'l', 'm', and 'n'.
- B**

A chromosome with a centromere. The left arm has three segments labeled 'a', 'b', and 'c'. The right arm has eleven segments: 'g', 'h', 'i', 'j', 'k', 'l', 'm', 'n', 'd', 'e', and 'f'.
- C**

A chromosome with a centromere. The left arm has six segments labeled 'a', 'b', 'c', 'f', 'e', and 'd'. The right arm has eight segments labeled 'g', 'h', 'i', 'j', 'k', 'l', 'm', and 'n'.
- D**

A chromosome with a centromere. The left arm has nine segments: 'a', 'b', 'c', 'd', 'e', 'f', 'd', 'e', and 'f'. The right arm has eight segments labeled 'g', 'h', 'i', 'j', 'k', 'l', 'm', and 'n'.










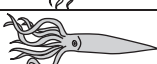

DNA Fingerprinting Experiment

Daughter Horse	Mother Horse	Possible Fathers			
		1	2	3	4
					

The diagram shows DNA fingerprints from a daughter horse, the mother horse, and four possible fathers. Which horse is *most* likely the father?

- F 1
- G 2
- H 3
- J 4

Geologic Time Scale

MILLIONS OF YEARS BEFORE PRESENT	Period	Representative Life	Major Events
CENOZOIC ERA	Quaternary		
11 1/2	Tertiary	 Primitive Horses	Opening of Red Sea
65	Cretaceous	 Last Dinosaurs	Formation of Rocky Mountains
140	Jurassic	 Quarry Dinosaurs	
210	Triassic	 First Dinosaurs	Break up of Pangaea begins
245	Permian	 Primitive Reptiles	Supercontinent Pangaea intact
290	Pennsylvanian	 Giant Insects	
320	Mississippian	 Brachiopods	Little seasonal variations
360	Devonian	 Primitive Fishes	Mountain building in Europe
410	Silurian	 "Sea Scorpions"	
440	Ordovician	 Nautiloids	Beginning of mountain building in North America
500	Cambrian	 Trilobites	Oceans covered most of North America
570	Fossils older than Cambrian age are rare.		Formation of early super continent
MESOZOIC ERA			
PALEOZOIC ERA			

According to this fossil record chart, trilobites probably lived in what ancient environment?

- A** Shallow seas
- B** Mountaintops
- C** Freshwater lakes
- D** Terrestrial forests

40 An early biological theory stated that a change in a population can occur when organisms with favorable variations for a particular environment survive and pass these variations on to the next generation. This theory is better known as the Theory of —

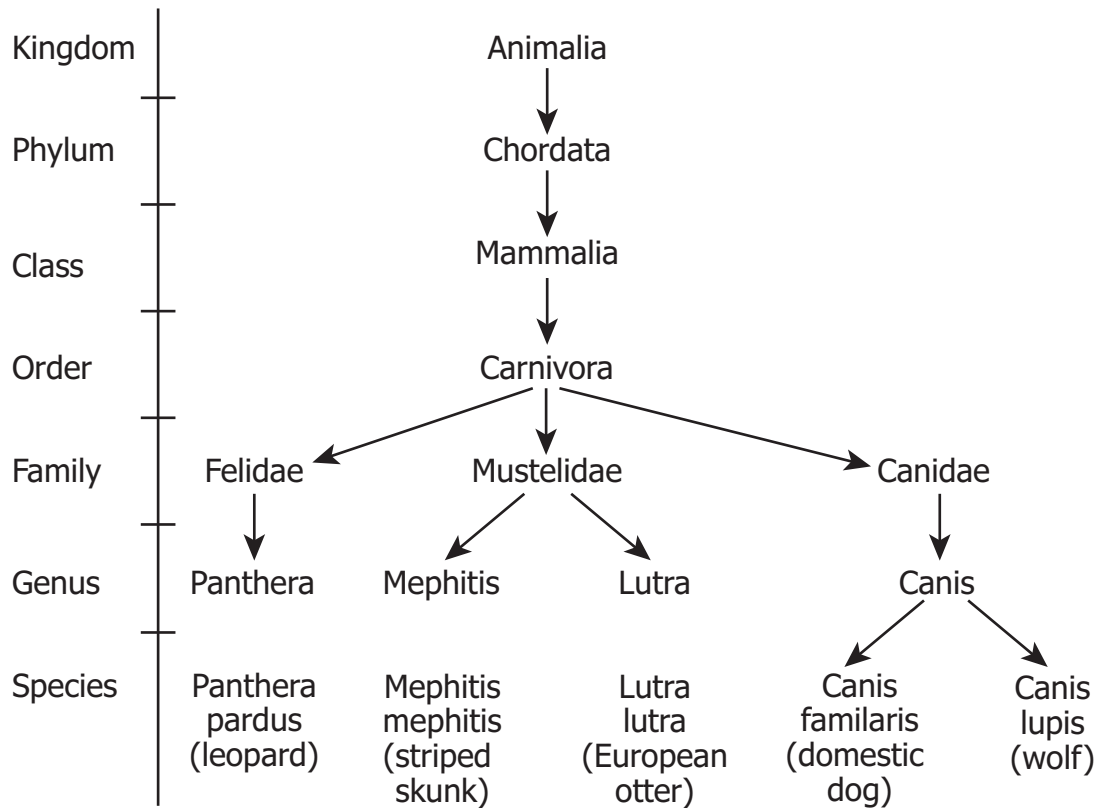
- F** Natural Selection
- G** Punctuated Selection
- H** Variation and Adaptation
- J** Acquired Characteristics

41

	T T x T T	
	T	T
T	T T	T T
T	T T	T T

What ratio of the offspring from the cross shown will be homozygous recessive for the trait of tallness?

- A** 0 in 4
- B** 1 in 4
- C** 2 in 4
- D** 4 in 4



Based on this classification scheme, the European otter and the leopard are in the same —

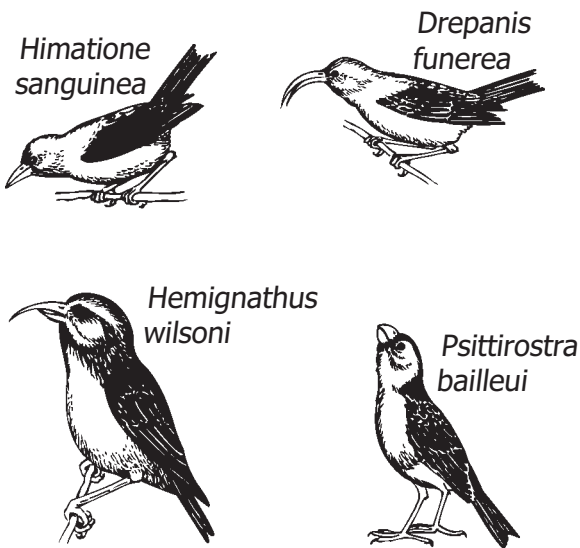
- F** kingdom but in different orders
- G** genus but in different species
- H** order but in different families
- J** family but in different genera

43 A scientist develops a hypothesis, designs an experiment, and obtains data that support her hypothesis. Which of the following *best* describes when a hypothesis becomes a theory?

- A** When one good set of scientific data supports a theory
- B** When the official scientific method is followed
- C** When a website is created to display the theory
- D** When it is supported by consistent data from many experimental trials

44

Hawaiian Honeycreepers



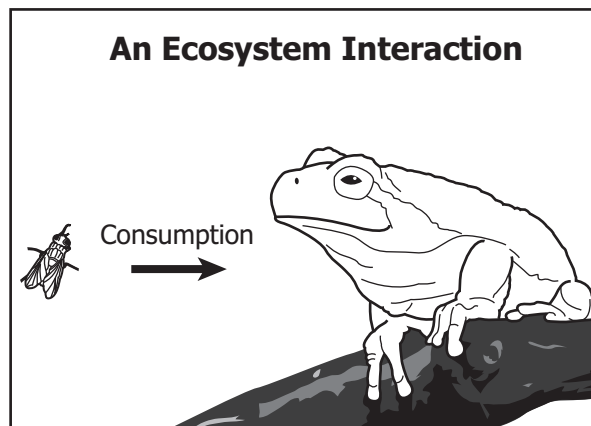
The different species of Hawaiian honeycreepers shown all descended from a single species of North American bird. They now have different beaks, eat different foods, sing different songs, and live in different environments on the islands. Which factor probably contributed *most* to the development of these different species?

- F** Loss of habitat
- G** Geographic isolation
- H** Egg size
- J** Predation

45 What do viruses need to reproduce?

- A** Other viruses
- B** Host organisms
- C** A nutrient medium
- D** An enzyme solution

46



The interaction pictured represents —

- F** growth
- G** respiration
- H** energy and nutrient transfer
- J** herbivory and decomposition

47 All of these are natural events that could alter an ecosystem EXCEPT —

- A** burning of fossil fuels
- B** wildfires
- C** floods
- D** volcanic activity

48 Which of these *best* describes an organism's ability to maintain the constant internal conditions necessary for life?

- F** Homeostasis
- G** Stability
- H** Reproduction
- J** Adaptation

49 Gametes must be haploid because —

- A** gametes are small and can hold only the haploid number of chromosomes
- B** the gametes' chromosomes will be replicated prior to cell division
- C** two gametes will unite during fertilization to create a diploid cell
- D** fertilization results with a haploid zygote

50 Overheating an enzyme results in the enzyme's loss of —

- F** net electrical charge
- G** ability to catalyze a reaction
- H** storage of a large amount of chemical energy
- J** storage of inherited information

