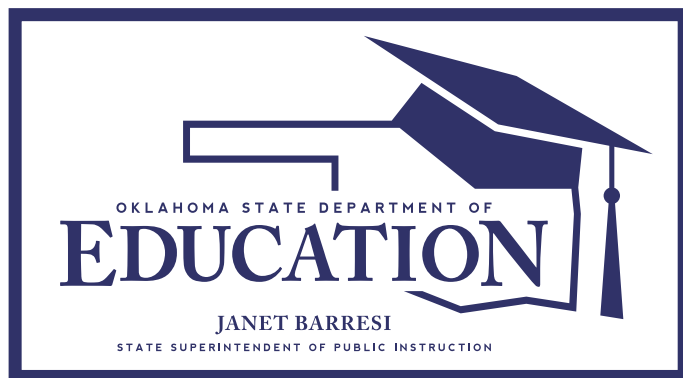


Oklahoma School Testing Program



Oklahoma Core Curriculum Tests

2013–2014
Released Items

End-of-Instruction
Biology I

Oklahoma State Department of Education
Oklahoma City, Oklahoma



CTB

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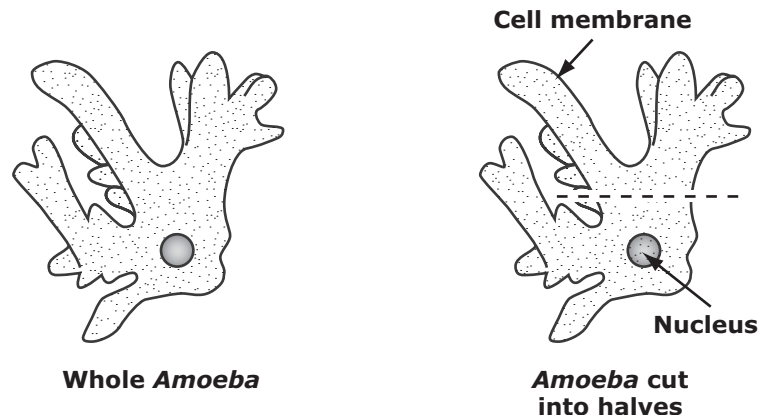
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Section 1

Section 1

- 1 Some students used *Amoebas* to demonstrate that the nucleus is necessary for cell growth and survival. The students cut fifty *Amoebas* into halves as the diagram shows. The students observed the *Amoeba* halves for two days and recorded the results in the data table.

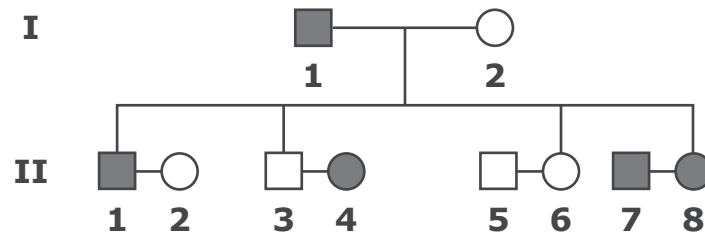


Total Number of Halves	Number of Halves Dead After Two Days	Number of Halves Alive and Growing After Two Days
100	58	42

Was the design of the investigation adequate to demonstrate the importance of the nuclei in the *Amoebas*?

- A yes because the students started with each amoeba half receiving some of the cell membrane
- B yes because the students started with fifty *Amoeba* halves with nuclei and fifty halves without nuclei
- C no because the students should have recorded the numbers of surviving *Amoeba* halves with and without nuclei
- D no because the students should have recorded the size of the cell membrane in each of the *Amoeba* halves after cutting the *Amoebas* into halves

- 2** The pedigree represents a family with an autosomal dominant disease (D).



Key

= Unaffected male	= Affected male
= Unaffected female	= Affected female

From which pair of parents in generation II could the genotype probability of the offspring be 50% DD and 50% Dd?

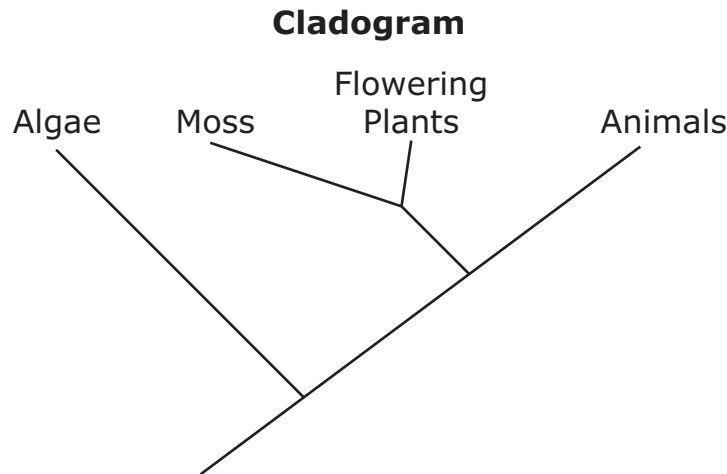
- F** 1, 2
G 3, 4
H 5, 6
J 7, 8

- 3** Which information and which tools would be the most appropriate for determining whether the alleles of a mouse affect its running speed?

- A** the genotype of the mouse, a wall clock, and a microscope
B the phenotype of the mouse, a microscope, and a stopwatch
C the phenotype of the mouse, a metric ruler, and a wall clock
D the genotype of the mouse, a stopwatch, and a metric ruler

Section 1

- 4 To determine how organisms are related, some biologists compared the genetic code for the protein cytochrome-C found in different organisms.



**Amino Acid Differences in
Cytochrome-C (per 100 residues)**

Compared Groups	Number of Differences
Algae vs. Animals	62
Flowering Plants vs. Algae	59
Flowering Plants vs. Animals	52

Based on the cladogram and the data in the table, which is the most accurate prediction about moss?

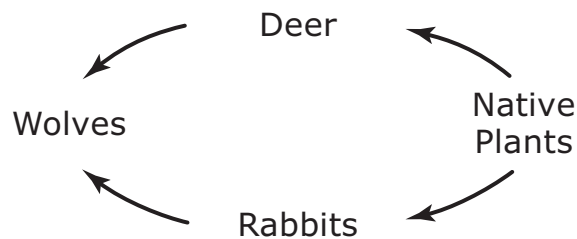
- F** Moss will be more closely related to algae than to flowering plants.
- G** Moss will be more closely related to animals than to flowering plants.
- H** A comparison of moss and flowering plants will result in less than 52 differences.
- J** A comparison of moss and flowering plants will result in more than 52 differences.

- 5** A student studied the cell cycle of an onion root-tip cell. She discovered that the length of the cell cycle was approximately 24 hours.

Starting with one cell, how many cells would exist after 96 hours?

- A** 4
- B** 16
- C** 24
- D** 31

- 6** Biologists are releasing wolves back into the wild in an area where the wolves have not been for many years.

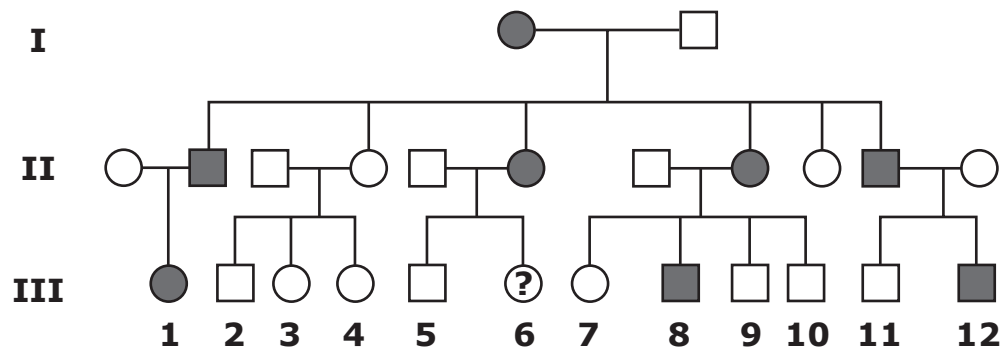


Which statement best predicts how populations of organisms in the food web will change in the years after the wolves are released?

- F** The deer, rabbits, and native plants will increase.
- G** The deer, rabbits, and native plants will decrease.
- H** The deer and rabbits will increase; native plants will decrease.
- J** The deer and rabbits will decrease; native plants will increase.

Section 1

7 A pedigree for an inherited physical trait is shown.

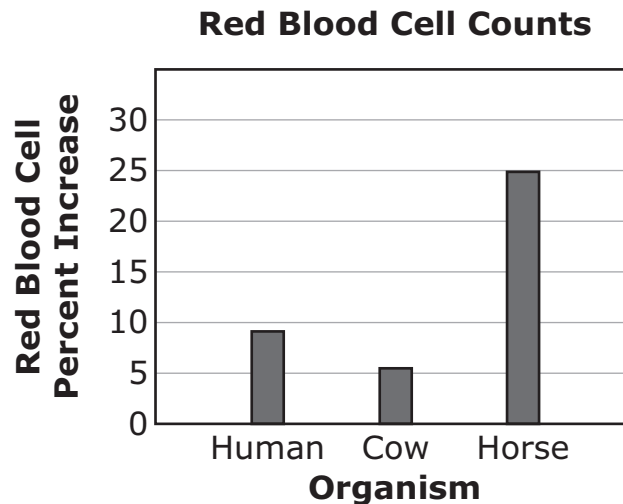


Key			
□	= Affected male	■	= Unaffected male
○	= Affected female	●	= Unaffected female

Based on the pedigree, what is the probability that individual 6 in generation III will display the physical trait?

- A 25%
- B 50%
- C 75%
- D 100%

- 8** Scientists studied the effect of increased altitude on the number of red blood cells in three organisms. Red blood cell counts were done in each organism at low altitude. The organisms were moved to a mountaintop and allowed to adjust to their new surroundings. Red blood cell counts were repeated. The graph shows the change in red blood cell counts for the three organisms.



The chemical process that increases red blood cell counts is the same in each organism because of

- F** common ancestry.
- G** speciation.
- H** differentiation.
- J** geographic isolation.

Section 1

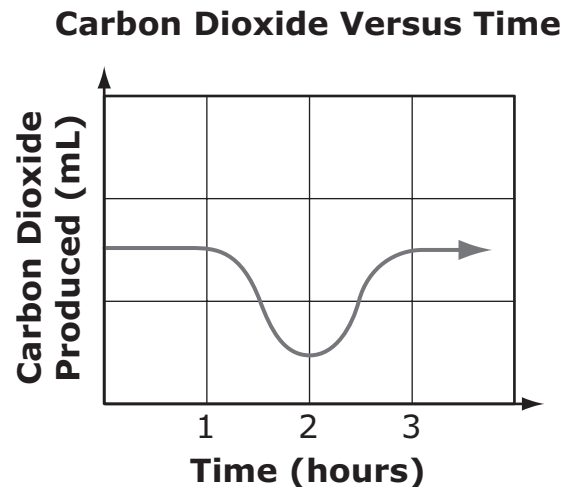
- 9 An ecologist collected biomass data about an ecosystem. Each organism represented a different trophic level.

Organism	Biomass (g/m ²)
1	37
2	2
3	11
4	809

Which conclusion about the organisms in this ecosystem is most logical?

- A Organism 1 cycles the least amount of matter into the ecosystem.
- B Organism 2 cycles nitrogen from living systems into the environment.
- C Organism 3 cycles oxygen from the atmosphere into living systems.
- D Organism 4 cycles carbon from the environment into living systems.

- 10** A scientist recorded carbon dioxide production from an animal over a three-hour period.



Which conclusion is correct based on the data?

- F** Water produced was highest at hour 2 because carbon dioxide production was lowest.
- G** Oxygen intake was lowest at hour 2 because carbon dioxide production was lowest.
- H** Water produced was lowest at hour 2 because glucose breakdown was highest.
- J** Oxygen intake was highest at hour 2 because glucose breakdown was highest.

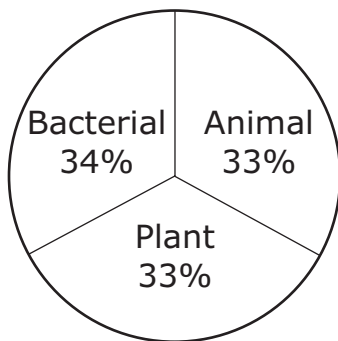
Section 1

- 11** A student observed several organisms and their cells. She recorded her observations in the table.

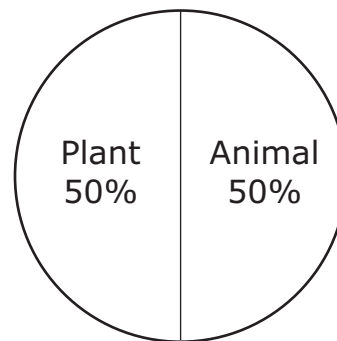
Organism	Single-celled (S) or Multicelled (M)	Cell Wall? (Y/N)	Chloroplasts? (Y/N)
1	M	Y	N
2	M	N	N
3	M	Y	Y
4	M	N	N
5	M	Y	N
6	S	Y	N

Based on the data, which circle graph represents the percentages of cell types the student observed?

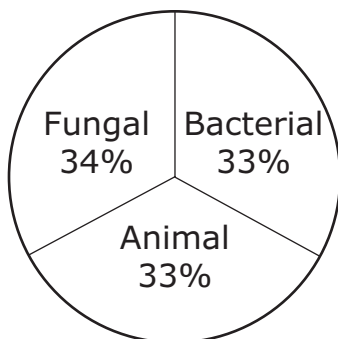
A Cell Types



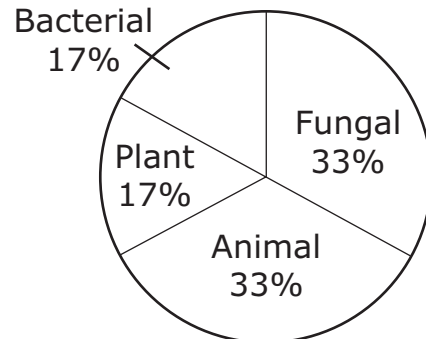
B Cell Types



C Cell Types



D Cell Types



- 12** The larvae of four closely related beetle species consume ants of a particular species. Each beetle species has developed a different strategy for acquiring food. The table shows details of these strategies.

Larvae of Beetle Species	Strategy for Acquiring Food	Response of Ants
Species 1	Live with ants, secrete ant chemicals, and eat ants	None
Species 2	Live in ant nest and eat ants	Do not tolerate beetles
Species 3	Sneak into ant nest, hide in burrow, and eat ant eggs	Do not tolerate beetles
Species 4	Hunt ants outside ant nest	None

Which beetle species has developed an adaptation in which the ants are unaware of the presence of the beetle larvae?

F Species 1

G Species 2

H Species 3

J Species 4

Section 1

- 13** The table shows an observation about each structure that composes the levels of organization of life.

Structure	Observation
1	One cell type with many cells that work together to perform a function
2	Many systems that work together to maintain homeostasis
3	One cell
4	Different tissue types that work together to perform a function
5	Several different organs that perform a function

What sequence of numbers is correct for the levels of organization of life from least complex to most complex?

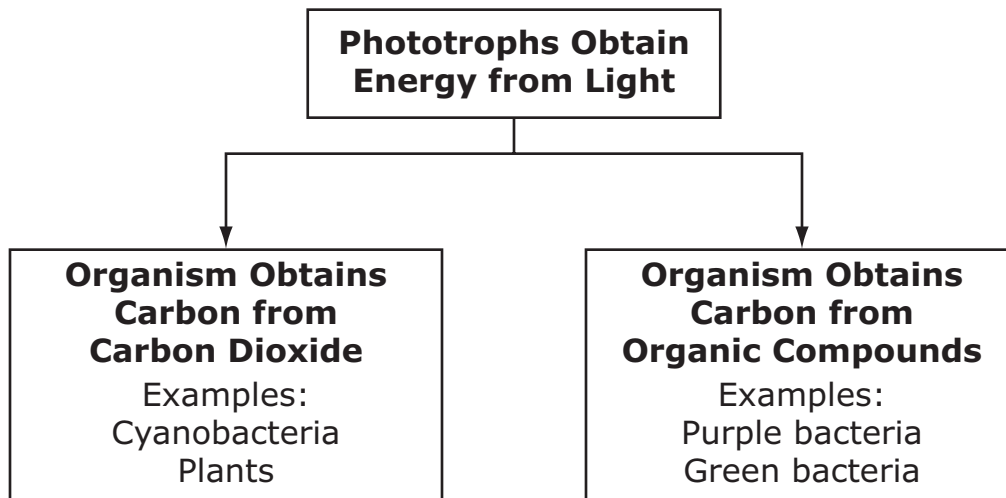
- A** 3-4-2-1-5 **B** 2-1-3-5-4
C 2-5-4-1-3 **D** 3-1-4-5-2

- 14** In humans, long eyelashes are dominant to short eyelashes. Two parents are heterozygous for this trait.

What is the probability that an offspring of these parents will have short eyelashes, and in which unit should the length of the eyelashes be measured?

- F** 25%, grams
G 50%, meters
H 25%, millimeters
J 50%, micrograms

- 15** Some scientists examined various organisms that photosynthesize. The scientists divided the organisms according to how they obtained carbon for synthesizing macromolecules. This is the classification scheme.

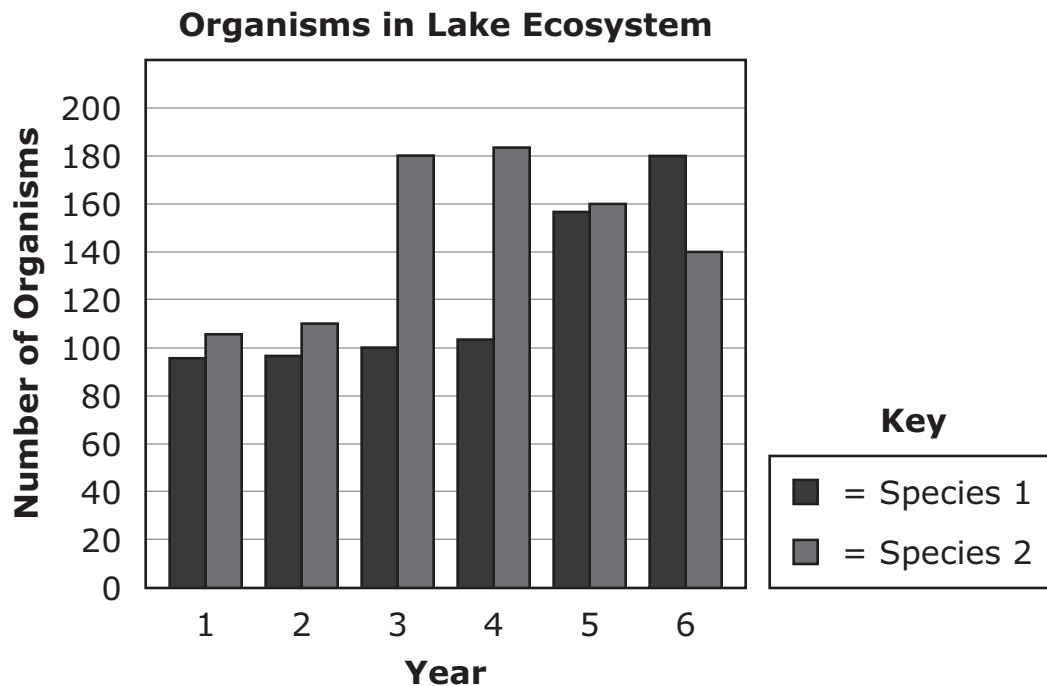


Plants are distinguished from purple bacteria by

- A** the color of the chlorophyll.
- B** the ability to photosynthesize.
- C** the production of organic compounds.
- D** the ability to obtain carbon dioxide from the air.

Section 1

- 16** Two species compete for food in a lake. The bar graph shows the numbers of organisms of each species over six years. Flooding rains affected the lake ecosystem in Year 3.



Which statement explains a probable population change in a future year that has little rainfall?

- F** Species 1 possesses an adaptation in which the population increases when a significant water increase occurs; therefore, the result of little rain would be a decrease in population.
- G** Species 2 possesses an adaptation in which the population increases when a significant water increase occurs; therefore, the result of little rain would be a decrease in population.
- H** Species 1 will become a predator of Species 2.
- J** Species 2 will become a predator of Species 1.

- 17** A scientist compared the chromosome numbers during mitosis and meiosis for several plants. The scientist determined the diploid and haploid chromosome numbers and recorded the information in the table.

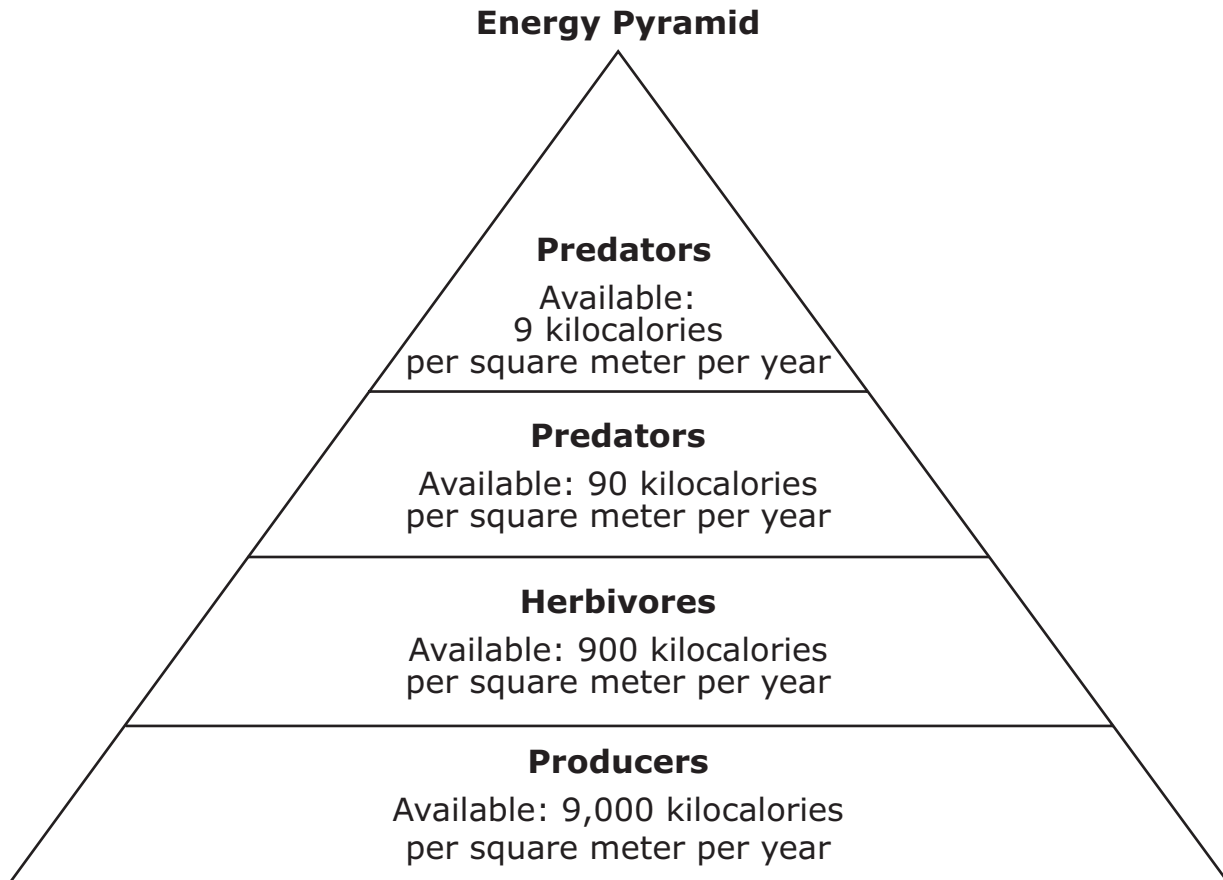
Plant	Diploid Chromosome Number	Haploid Chromosome Number
Alfalfa	16	8
Apple	34	17
Corn	20	10
Potato	48	24
Rice	24	12
Soybean	40	20

Which hypothesis do the data in the table support?

- A** If a sperm cell contains 20 chromosomes, then the species of plant being observed is corn.
- B** If a root cell contains 17 chromosomes, then the species of plant being observed is apple.
- C** If a leaf cell contains 24 chromosomes, then the species of plant being observed is potato.
- D** If a xylem cell contains 40 chromosomes, then the species of plant being observed is soybean.

Section 1

- 18 The diagram shows the relative amounts of energy stored at each level of an ecosystem.



What percentage of the energy created by producers is used by third-level consumers?

- F** 0.1%
- G** 9.0%
- H** 10.0%
- J** 90.0%

- 19** The table shows a small part of the sequence of amino acids within the cytochrome c protein in four animals.

Position of the Amino Acids in Cytochrome c

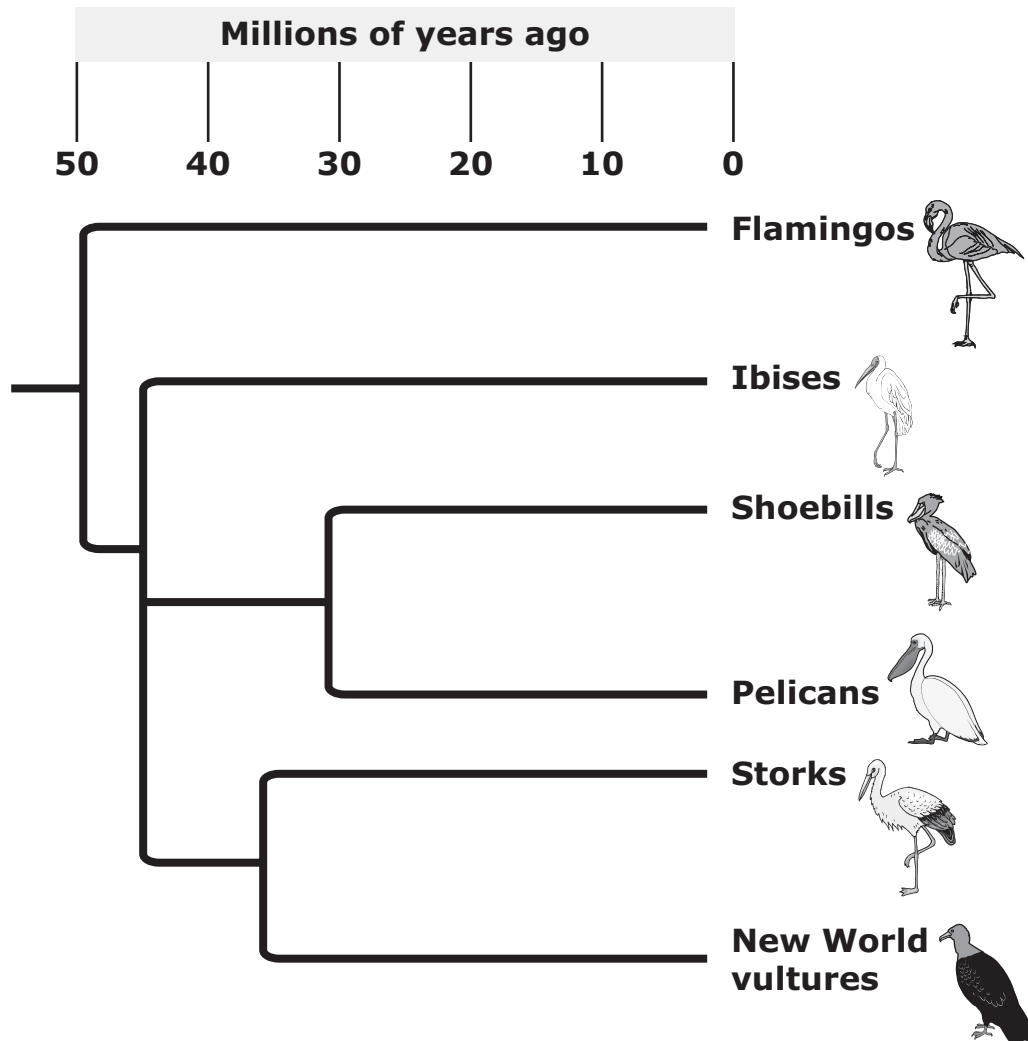
Position of the Amino Acid	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53
Horse	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
Whale	A	B	C	D	E	Y	G	H	Z	J	K	L	M	N	O
Turtle	A	B	C	D	E	V	G	H	Z	J	K	U	M	N	O
Rabbit	A	B	C	D	E	Y	G	H	Z	J	K	L	M	N	O

How many amino acid positions differ between the turtle and the horse, and what does this most likely mean?

- A** The amino acid position differs by one, and the protein is exactly the same in the two organisms.
- B** The amino acid position differs by one, and horses and turtles are completely unrelated.
- C** The amino acid positions differ by three, and the proteins are entirely different in the two organisms.
- D** The amino acid positions differ by three, and horses and turtles share a common ancestor.

Section 1

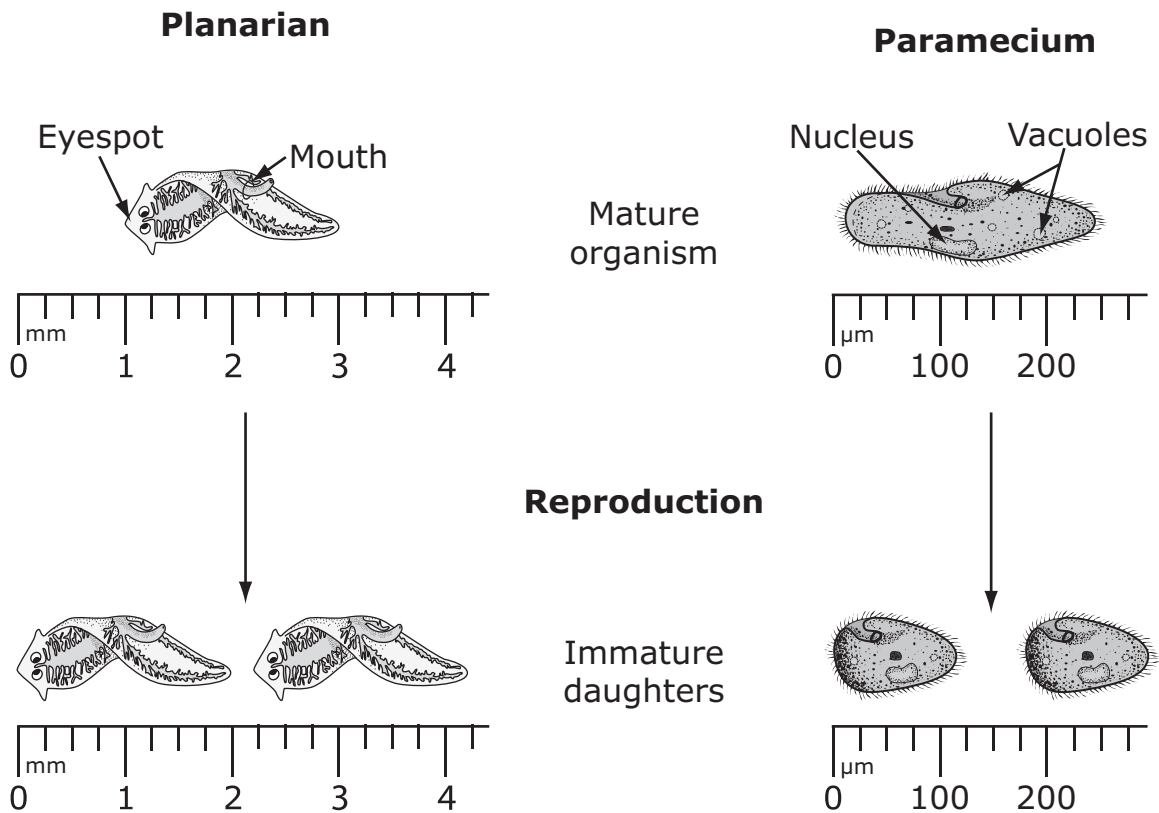
20 The cladogram compares the DNA sequences of six birds.



Which bird's DNA sequence differs from the other birds by the greatest amount?

- F** a flamingo
- G** an ibis
- H** a shoebill
- J** a New World vulture

21 The diagram shows two microscopic organisms undergoing reproduction.



Which statement regarding the reproduction of the multicellular organism is true?

- A** The paramecium produces immature daughters that are the same size as their parent.
- B** The paramecium produces immature daughter cells that are smaller than their parent.
- C** The planarian produces immature daughters that are the same size as their parent.
- D** The planarian produces immature daughter cells that are smaller than their parent.

Section 1

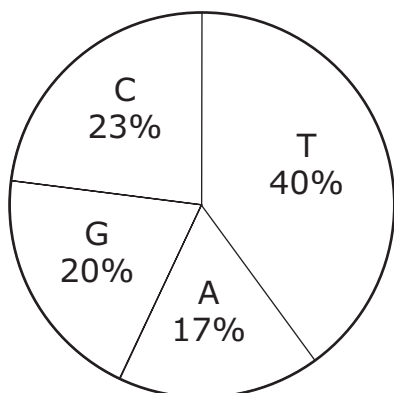
22 The table shows the base composition of a sequence of DNA.

DNA Strand Composition

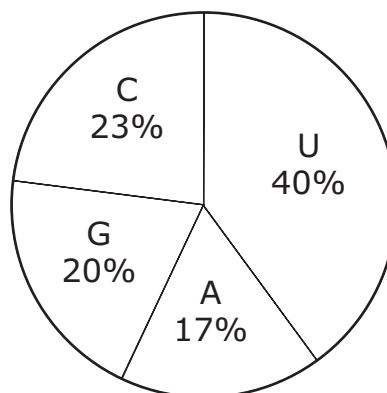
Base	Number of Bases in the Template Strand	% Total in DNA Strand
Adenine	64	40
Thymine	28	17
Cytosine	31	20
Guanine	37	23
Total	160	100

Which of the circle graphs correctly depicts the composition of an mRNA sequence for which the DNA sequence in the table is the template?

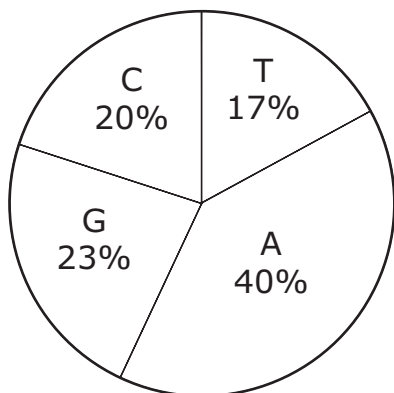
F mRNA Base Composition



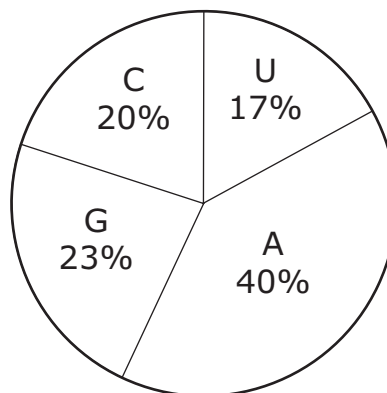
G mRNA Base Composition



H mRNA Base Composition



J mRNA Base Composition



23 A student examining bats and butterflies notices that their wings have the same function. Based on this evidence, he hypothesizes that bats and butterflies share a common ancestry.

Is his hypothesis correct?

- A** Yes. Analogous structures are evidence of common ancestry.
- B** Yes. Homologous structures are evidence of common ancestry.
- C** No. Analogous structures are not evidence of common ancestry.
- D** No. Homologous structures are not evidence of common ancestry.

24 A woman carries only one allele for a recessive sex-linked genetic disease. A man does not have the recessive allele for that genetic disease.

Which of these is true of their children?

- F** All of their sons will have the disease.
- G** All of their children will have the disease.
- H** None of their children will have the disease.
- J** None of their daughters will have the disease.





STOP

END OF SECTION 1

