CST Biology Practice Questions

CST Biology Practice Questions (Read first before you take the practice exam)

1. Review the required standards on the first 8 pages of the CST Biology Practice Questions
2. If possible, print out pages 9 – 30 which are practice questions #1-90 and answer key. Print duplo (2 pages per sheet) to save paper if this option is available to you.
3. Write answers to questions #1-90.
4. Check your work with answer key, then review the ones you missed.
5. Check in with me prior to your test to clear up any confusing questions.
6. Look over tips below.

Test Tips for Kids

Hey kids, here are some tips that will be helpful as you prepare for an upcoming test!:

- Stop watching TV and playing video games 1 week before testing. Recently, scientists discovered that a 1 week break from television/video game media will allow the brain to rest and the result is that it is easier to focus on tests! Read a fun book or practice easy math problems for the week. Also get plenty of exercise and rest.
- Organize your desk. Practice using a test and answer document.
- Get a good night's sleep, a good breakfast (low sugar!) before and during the test. *(And every other day as well!)*
- It is okay to be a little nervous. It keeps you alert!

As you take the test:

- Listen carefully to the directions.
- Practice relaxation such as breathing, closing eyes to concentrate.
- Practice time management during the test – but also remember sometimes the test is not timed. Be sure you know if it is a timed or not timed test.
- Scanning the test at the beginning can help.
- Lightly circle the problems you skip. Be sure to erase your marks *(grades 2 and 3)*
- Eliminate answers you know are wrong. Guess only as an absolute last resort. Go with your 1st choice.
- Complete as many questions as you can.
- Let the teacher know if you lost your place.
- Mark bubbles with medium effort and stay in the lines.
- Erase carefully and completely.

Introduction - Biology

The following released test questions are taken from the Biology Standards Test. This test is one of the California Standards Tests administered as part of the Standardized Testing and Reporting (STAR) Program under policies set by the State Board of Education.

All questions on the California Standards Tests are evaluated by committees of content experts, including teachers and administrators, to ensure their appropriateness for measuring the California academic content standards in Biology. In addition to content, all items are reviewed and approved to ensure their adherence to the principles of fairness and to ensure no bias exists with respect to characteristics such as gender, ethnicity, and language.

This document contains released test questions from the California Standards Test forms in 2003, 2004, 2005, 2006, 2007, and 2008. First on the pages that follow are lists of the standards assessed on the Biology Test. Next are released test questions. Following the questions is a table that gives the correct answer for each question, the content standard that each question is measuring, and the year each question last appeared on the test. It should be noted that asterisked (*) standards found in the *Science Content Standards for California Public Schools, Kindergarten through Grade 12*, are not assessed on the California Standards Tests in Science and, therefore, are not represented in these released test questions.

The following table lists each reporting cluster, the number of items that appear on the exam, and the number of released test questions that appear in this document. The released test questions for Biology, Chemistry, Earth Science, and Physics are the same test questions found in different combinations on the Integrated Science 1, 2, 3, and 4 tests.

Biology — Released Test Questions

REPORTING CLUSTER	NUMBER OF QUESTIONS ON EXAM	NUMBER OF RELEASED TEST QUESTIONS
Investigation and Experimentation (Standards: BIIE1. a-n)	6	9
Cell Biology (Standards: BI1. a-h)	9	13
Genetics (Standards: BI2. a-g, BI3. a-b, BI4. a-e, BI5. a-c)	18	27
Ecology and Evolution *Ecology* (Standards: BI6. a-f) *Evolution* (Standards: BI7. a-d, BI8. a-e)	16	25
Physiology (Standards: BI9. a-e, BI10. a-e)	11	16
TOTAL	60	90

In selecting test questions for release, three criteria are used: (1) the questions adequately cover a selection of the academic content standards assessed on the Biology Test; (2) the questions demonstrate a range of difficulty; and (3) the questions present a variety of ways standards can be assessed. These released test questions do not reflect all of the ways the standards may be assessed. Released test questions will not appear on future tests.

For more information about the California Standards Tests, visit the California Department of Education's Web site at http://www.cde.ca.gov/ta/tg/sr/resources.asp.

THE INVESTIGATION AND EXPERIMENTATION REPORTING CLUSTER

The following 14 California content standards are included in the Investigation and Experimentation reporting cluster and are represented in this booklet by nine test questions. These questions represent only some ways in which these standards may be assessed on the California Biology Standards Test.

CALIFORNIA CONTENT STANDARDS IN THIS REPORTING CLUSTER

Investigation and Experimentation	
BIIE1.	**Scientific progress is made by asking meaningful questions and conducting careful investigations. As a basis for understanding this concept and addressing the content in the other four reporting clusters, students should develop their own questions and perform investigations. Students will:**
BIIE1. a.	Select and use appropriate tools and technology (such as computer-linked probes, spreadsheets, and graphing calculators) to perform tests, collect data, analyze relationships, and display data.
BIIE1. b.	Identify and communicate sources of unavoidable experimental error.
BIIE1. c.	Identify possible reasons for inconsistent results, such as sources of error or uncontrolled conditions.
BIIE1. d.	Formulate explanations by using logic and evidence.
BIIE1. e.	Solve scientific problems by using quadratic equations and simple trigonometric, exponential, and logarithmic functions.
BIIE1. f.	Distinguish between hypothesis and theory as scientific terms.
BIIE1. g.	Recognize the usefulness and limitations of models and theories as scientific representations of reality.
BIIE1. h.	Read and interpret topographic and geologic maps.
BIIE1. i.	Analyze the locations, sequences, or time intervals that are characteristic of natural phenomena (e.g., relative ages of rocks, locations of planets over time, and succession of species in an ecosystem).
BIIE1. j.	Recognize the issues of statistical variability and the need for controlled tests.
BIIE1. k.	Recognize the cumulative nature of scientific evidence.
BIIE1. l.	Analyze situations and solve problems that require combining and applying concepts from more than one area of science.
BIIE1. m.	Investigate a science-based societal issue by researching the literature, analyzing data, and communicating the findings. Examples of issues include irradiation of food, cloning of animals by somatic cell nuclear transfer, choice of energy sources, and land and water use decisions in California.
BIIE1. n.	Know that when an observation does not agree with an accepted scientific theory, the observation is sometimes mistaken or fraudulent (e.g., the Piltdown Man fossil or unidentified flying objects) and that the theory is sometimes wrong (e.g., the Ptolemaic model of the movement of the Sun, Moon, and planets).

THE CELL BIOLOGY REPORTING CLUSTER

The following eight California content standards are included in the Cell Biology reporting cluster and are represented in this booklet by 13 test questions. These questions represent only some ways in which these standards may be assessed on the California Biology Standards Test.

CALIFORNIA CONTENT STANDARDS IN THIS REPORTING CLUSTER

Cell Biology	
BI1.	**The fundamental life processes of plants and animals depend on a variety of chemical reactions that occur in specialized areas of the organism's cells. As a basis for understanding this concept:**
BI1. a.	*Students know* cells are enclosed within semipermeable membranes that regulate their interaction with their surroundings.
BI1. b.	*Students know* enzymes are proteins that catalyze biochemical reactions without altering the reaction equilibrium and the activities of enzymes depend on the temperature, ionic conditions, and the pH of the surroundings.
BI1. c.	*Students know* how prokaryotic cells, eukaryotic cells (including those from plants and animals), and viruses differ in complexity and general structure.
BI1. d.	*Students know* the central dogma of molecular biology outlines the flow of information from transcription of ribonucleic acid (RNA) in the nucleus to translation of proteins on ribosomes in the cytoplasm.
BI1. e.	*Students know* the role of the endoplasmic reticulum and Golgi apparatus in the secretion of proteins.
BI1. f.	*Students know* usable energy is captured from sunlight by chloroplasts and is stored through the synthesis of sugar from carbon dioxide.
BI1. g.	*Students know* the role of the mitochondria in making stored chemical-bond energy available to cells by completing the breakdown of glucose to carbon dioxide.
BI1. h.	*Students know* most macromolecules (polysaccharides, nucleic acids, proteins, lipids) in cells and organisms are synthesized from a small collection of simple precursors.

THE GENETICS REPORTING CLUSTER

The following 17 California content standards are included in the Genetics reporting cluster and are represented in this booklet by 27 test questions. These questions represent only some ways in which these standards may be assessed on the California Biology Standards Test.

CALIFORNIA CONTENT STANDARDS IN THIS REPORTING CLUSTER

Genetics	
BI2.	**Mutation and sexual reproduction lead to genetic variation in a population. As a basis for understanding this concept:**
BI2. a.	*Students know* meiosis is an early step in sexual reproduction in which the pairs of chromosomes separate and segregate randomly during cell division to produce gametes containing one chromosome of each type.
BI2. b.	*Students know* only certain cells in a multicellular organism undergo meiosis.
BI2. c.	*Students know* how random chromosome segregation explains the probability that a particular allele will be in a gamete.
BI2. d.	*Students know* new combinations of alleles may be generated in a zygote through the fusion of male and female gametes (fertilization).
BI2. e.	*Students know* why approximately half of an individual's DNA sequence comes from each parent.
BI2. f.	*Students know* the role of chromosomes in determining an individual's sex.
BI2. g.	*Students know* how to predict possible combinations of alleles in a zygote from the genetic makeup of the parents.
BI3.	**A multicellular organism develops from a single zygote, and its phenotype depends on its genotype, which is established at fertilization. As a basis for understanding this concept:**
BI3. a.	*Students know* how to predict the probable outcome of phenotypes in a genetic cross from the genotypes of the parents and mode of inheritance (autosomal or X-linked, dominant or recessive).
BI3. b.	*Students know* the genetic basis for Mendel's laws of segregation and independent assortment.
BI4.	**Genes are a set of instructions encoded in the DNA sequence of each organism that specify the sequence of amino acids in proteins characteristic of that organism. As a basis for understanding this concept:**
BI4. a.	*Students know* the general pathway by which ribosomes synthesize proteins, using tRNAs to translate genetic information in mRNA.
BI4. b.	*Students know* how to apply the genetic coding rules to predict the sequence of amino acids from a sequence of codons in RNA.
BI4. c.	*Students know* how mutations in the DNA sequence of a gene may or may not affect the expression of the gene or the sequence of amino acids in an encoded protein.

BI4. d.	*Students know* specialization of cells in multicellular organisms is usually due to different patterns of gene expression rather than to differences of the genes themselves.
BI4. e.	*Students know* proteins can differ from one another in the number and sequence of amino acids.
BI5.	**The genetic composition of cells can be altered by incorporation of exogenous DNA into the cells. As a basis for understanding this concept:**
BI5. a.	*Students know* the general structures and functions of DNA, RNA, and protein.
BI5. b.	*Students know* how to apply base-pairing rules to explain precise copying of DNA during semiconservative replication and transcription of information from DNA into mRNA.
BI5. c.	*Students know* how genetic engineering (biotechnology) is used to produce novel biomedical and agricultural products.

THE ECOLOGY AND EVOLUTION REPORTING CLUSTER

The following 15 California content standards are included in the Ecology and Evolution reporting cluster and are represented in this booklet by 25 test questions. These questions represent only some ways in which these standards may be assessed on the California Biology Standards Test.

CALIFORNIA CONTENT STANDARDS IN THIS REPORTING CLUSTER

Ecology	
BI6.	**Stability in an ecosystem is a balance between competing effects. As a basis for understanding this concept:**
BI6. a.	*Students know* biodiversity is the sum total of different kinds of organisms and is affected by alterations of habitats.
BI6. b.	*Students know* how to analyze changes in an ecosystem resulting from changes in climate, human activity, introduction of nonnative species, or changes in population size.
BI6. c.	*Students know* how fluctuations in population size in an ecosystem are determined by the relative rates of birth, immigration, emigration, and death.
BI6. d.	*Students know* how water, carbon, and nitrogen cycle between abiotic resources and organic matter in the ecosystem and how oxygen cycles through photosynthesis and respiration.
BI6. e.	*Students know* a vital part of an ecosystem is the stability of its producers and decomposers.
BI6. f.	*Students know* at each link in a food web some energy is stored in newly made structures but much energy is dissipated into the environment as heat. This dissipation may be represented in an energy pyramid.
Evolution	
BI7.	**The frequency of an allele in a gene pool of a population depends on many factors and may be stable or unstable over time. As a basis for understanding this concept:**
BI7. a.	*Students know* why natural selection acts on the phenotype rather than the genotype of an organism.
BI7. b.	*Students know* why alleles that are lethal in a homozygous individual may be carried in a heterozygote and thus maintained in a gene pool.
BI7. c.	*Students know* new mutations are constantly being generated in a gene pool.
BI7. d.	*Students know* variation within a species increases the likelihood that at least some members of a species will survive under changed environmental conditions.
BI8.	**Evolution is the result of genetic changes that occur in constantly changing environments. As a basis for understanding this concept:**
BI8. a.	*Students know* how natural selection determines the differential survival of groups of organisms.
BI8. b.	*Students know* a great diversity of species increases the chance that at least some organisms survive major changes in the environment.
BI8. c.	*Students know* the effects of genetic drift on the diversity of organisms in a population.
BI8. d.	*Students know* reproductive or geographic isolation affects speciation.
BI8. e.	*Students know* how to analyze fossil evidence with regard to biological diversity, episodic speciation, and mass extinction.

THE PHYSIOLOGY REPORTING CLUSTER

The following 10 California content standards are included in the Physiology reporting cluster and are represented in this booklet by 16 test questions. These questions represent only some ways in which these standards may be assessed on the California Biology Standards Test.

CALIFORNIA CONTENT STANDARDS IN THIS REPORTING CLUSTER

Physiology	
BI9.	**As a result of the coordinated structures and functions of organ systems, the internal environment of the human body remains relatively stable (homeostatic) despite changes in the outside environment. As a basis for understanding this concept:**
BI9. a.	*Students know* how the complementary activity of major body systems provides cells with oxygen and nutrients and removes toxic waste products such as carbon dioxide.
BI9. b.	*Students know* how the nervous system mediates communication between different parts of the body and the body's interactions with the environment.
BI9. c.	*Students know* how feedback loops in the nervous and endocrine systems regulate conditions in the body.
BI9. d.	*Students know* the functions of the nervous system and the role of neurons in transmitting electrochemical impulses.
BI9. e.	*Students know* the roles of sensory neurons, interneurons, and motor neurons in sensation, thought, and response.
BI10.	**Organisms have a variety of mechanisms to combat disease. As a basis for understanding the human immune response:**
BI10. a.	*Students know* the role of the skin in providing nonspecific defenses against infection.
BI10. b.	*Students know* the role of antibodies in the body's response to infection.
BI10. c.	*Students know* how vaccination protects an individual from infectious diseases.
BI10. d.	*Students know* there are important differences between bacteria and viruses with respect to their requirements for growth and replication, the body's primary defenses against bacterial and viral infections, and effective treatments of these infections.
BI10. e.	*Students know* why an individual with a compromised immune system (for example, a person with AIDS) may be unable to fight off and survive infections by microorganisms that are usually benign.

1 **Two students were testing the amount of fertilizer that would best promote the growth of strawberries in a garden. Which of the following could be an unavoidable source of experimental error?**

A length of the study

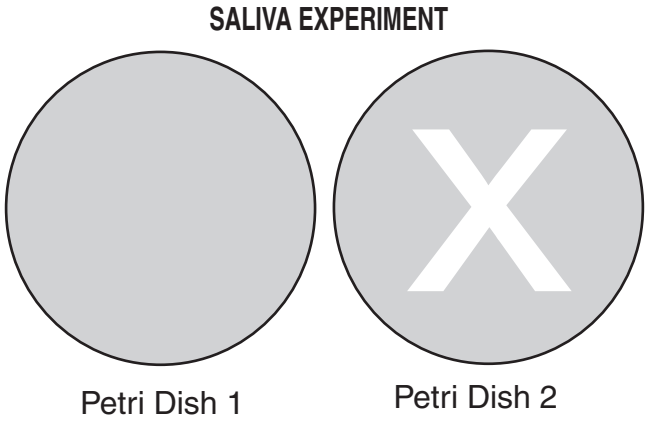
B variation in the strawberry plants

C the cost of watering the plants

D fertilization during the study

CSB00270

2 **A student filled two Petri dishes with a clear cornstarch gel, then marked the letter "X" invisibly onto the gel in Petri dish 1 with a damp cotton swab. He then placed saliva from his mouth onto a second cotton swab and used that swab to mark the letter "X" invisibly onto the gel in Petri dish 2.**



Fifteen minutes later, he rinsed both Petri dishes with a dilute solution of iodine to indicate the presence of starch. The surface of Petri dish 1 turned completely blue, indicating starch. Most of the surface of Petri dish 2 was blue, except the letter "X" was clear, as shown above.

The *most* probable explanation of the clear "X" is that

A the starch in the gel was absorbed by the damp cotton swab.

B the iodine reacted with a chemical in the saliva and broke down.

C a chemical in the saliva broke down the starch in the gel.

D the saliva prevented the iodine from contacting the starch in the gel.

CSB10285

3 **In most stable freshwater environments, populations of *Daphnia* are almost entirely female and reproduce asexually. However, males are observed in low oxygen environments or when food is scarce. Based on these observations, a researcher suggests that male *Daphnia* develop in response to unfavorable environmental conditions. This is an example of a**

A result.

B theory.

C procedure.

D hypothesis.

CSB10041

4 **A computer model of cellular mitosis can simulate the aspects of cellular division quite well. However, microscopic observation of actual cellular mitosis can improve understanding because actual observations**

A may reveal greater unknown complexities.

B are easier than a computer model to view.

C are the same each time.

D may provide division events in sequence.

CSB00035

5 **Which of the following *best* describes the use of population models in biology?**

A They are generally easy to construct.

B They can represent reality precisely.

C They are used when no observations have been made.

D They can help predict outcomes.

CSB10313

6 **After a volcanic eruption has covered an area with lava, which of the following is the *most* likely order of succession in the repopulation of the area?**

A lichens → grasses → shrubs → trees

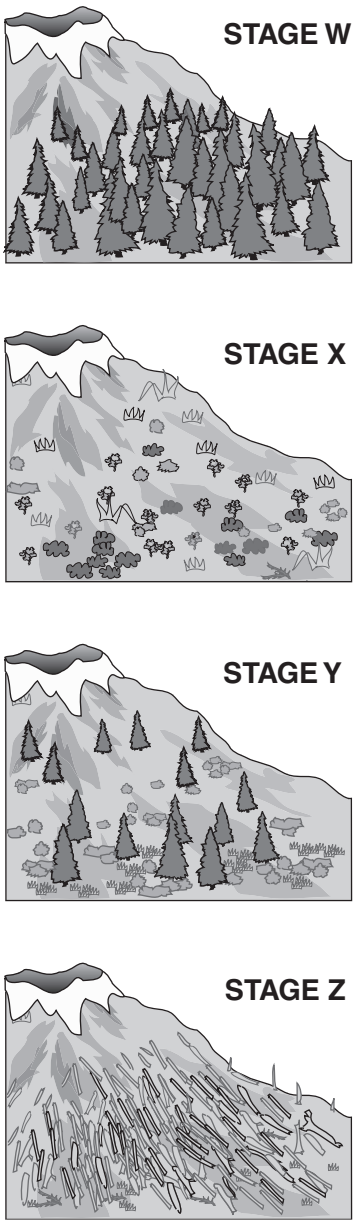
B mosses → grasses → lichens → trees

C grasses → trees → mosses → lichens

D shrubs → grasses → trees → lichens

CSB10049

7



When the Mount St. Helens volcano erupted, the blast covered much of the surrounding area with ash. Based on the diagram above, which list shows the sequence of secondary succession that followed that eruption?

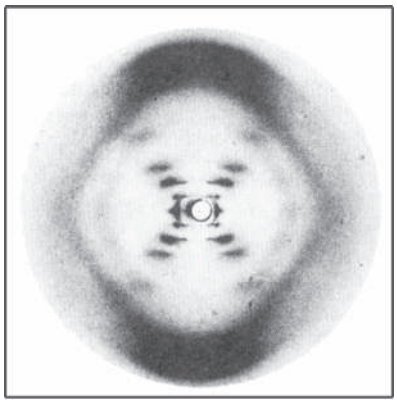
A X, Y, Z, W

B Z, X, Y, W

C W, Y, X, Z

D Z, Y, W, X

8 **The diagram below shows Rosalind Franklin's x-ray diffraction image of DNA.**



How did this evidence affect the work of Watson and Crick?

A It was used to determine the physical structure of DNA.

B It was used to identify the four bases that make up DNA.

C It was used to develop the theory of independent assortment.

D It was used to show that DNA was the molecule of inheritance.

CSB10032

9 **Which information was *most* important to the development of genetic engineering techniques?**

A the observation of nondominant alleles

B the discovery of lethal genes

C the formulation of Punnett squares

D the structure of a DNA molecule

CSB00146

10 **The cell membrane of the red blood cell will allow water, oxygen, carbon dioxide, and glucose to pass through. Because other substances are blocked from entering, this membrane is called**

A perforated.

B semi-permeable.

C non-conductive.

D permeable.

CSB00169

11 **The plasma membrane of a cell consists of**

A protein molecules arranged in two layers with polar areas forming the outside of the membrane.

B two layers of lipids organized with the nonpolar tails forming the interior of the membrane.

C lipid molecules positioned between two carbohydrate layers.

D protein molecules with polar and nonpolar tails.

CSB20259

12 **What causes tomatoes to ripen much more slowly in a refrigerator than they do if left on a table at room temperature?**

A Tomatoes need sunlight to ripen.

B Humidity accelerates the ripening process.

C Low temperatures reduce the action of ripening enzymes.

D Enzymes produced by bacteria inhibit ripening.

CSB10587

13 **There are many different enzymes located in the cytoplasm of a single cell. How is a specific enzyme able to catalyze a specific reaction?**

A Different enzymes are synthesized in specific areas of the cytoplasm.

B Most enzymes can catalyze many different reactions.

C An enzyme binds to a specific substrate (reactant) for the reaction catalyzed.

D Enzymes are transported to specific substrates (reactants) by ribosomes.

CSB10449

14 **Some snake venoms are harmful because they contain enzymes that destroy blood cells or tissues. The damage caused by such a snakebite could *best* be slowed by**

A applying ice to the bite area.

B drinking large amounts of water.

C inducing vomiting.

D increasing blood flow to the area.

CSB00026

15 **Maltose can be broken down into glucose molecules by the enzyme maltase. Which of the following would slow the reaction rate?**

A adding maltase

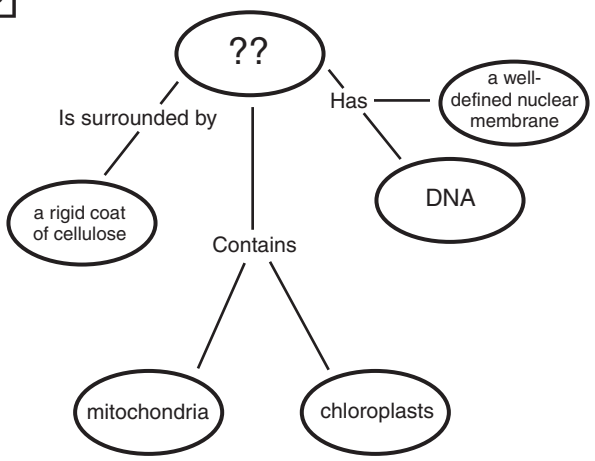
B adding maltose

C removing glucose

D diluting with water

CSB00177

16



Which of these *best* completes this concept map?

A an animal cell

B a prokaryotic cell

C a virus

D a plant cell

CSB00164

17 **Eukaryotic cells are differentiated from prokaryotic cells because eukaryotic cells**

A are much smaller.

B have permeable membranes.

C have a higher rate of reproduction.

D have nuclei.

CSB10170

18 **Which cellular organelle is responsible for packaging the proteins that the cell secretes?**

A cytoskeleton

B cell membrane

C lysosome

D Golgi apparatus

CSB20518

19 **Which molecule in plant cells first captures the radiant energy from sunlight?**

A glucose

B carbon dioxide

C chlorophyll

D adenosine triphosphate

CSB00265

20 **The first stage of photosynthesis in a chloroplast is**

A light-dependent.

B temperature-dependent.

C glucose-driven.

D ATP-driven.

CSB10184

21 **A cell from heart muscle would *probably* have an unusually high proportion of**

A lysosomes.

B mitochondria.

C mRNA.

D Golgi bodies.

CSB00067

22 **In aerobic respiration, the Krebs cycle (citric acid cycle) takes place in**

A chloroplasts.

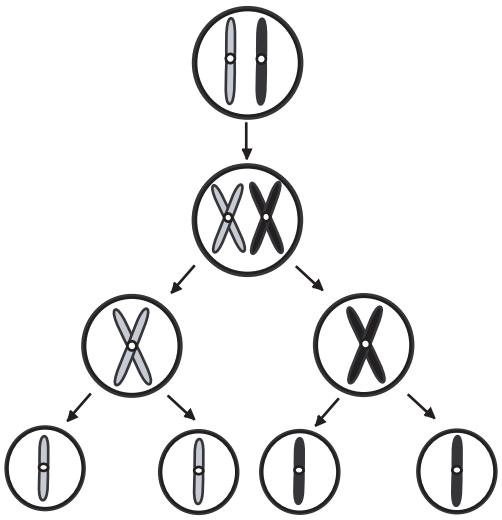
B nuclei.

C lysosomes.

D mitochondria.

CSB10186

23 **The diagram below shows a cellular process that occurs in organisms.**



This process is known as

A meiosis.

B mitosis.

C endocytosis.

D phagocytosis.

CSB10031

24 **Which of the following statements correctly describes meiosis?**

A Cells divide only once during meiosis.

B Meiosis does not occur in reproductive cells.

C The cells produced at the end of meiosis are genetically identical to the parent cell.

D The cells produced at the end of meiosis contain half the number of chromosomes as the parent cell.

CSB10424

25 **Which of the following *best* describes meiosis?**

A It is carried out in all tissues that require cell replacement.

B It occurs only in cells in the reproductive structures of the organism.

C It happens in all tissues except the brain and spinal cord.

D It is the first stage of mitosis.

CSB10203

26 **If a corn plant has a genotype of Ttyy, what are the possible genetic combinations that could be present in a single grain of pollen from this plant?**

A Ty, ty

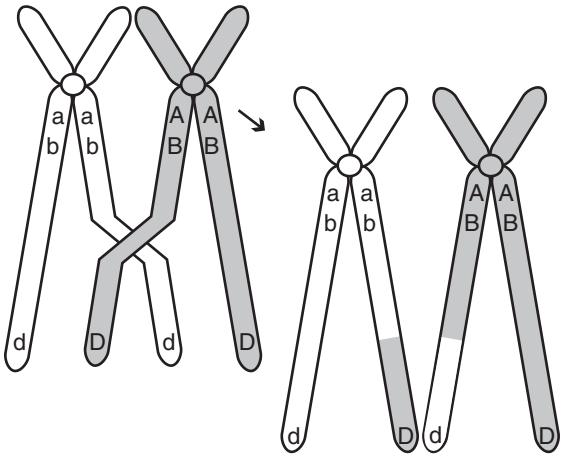
B TY, ty

C TY, Ty, ty

D Ty, ty, tY, TY

CSB00263

27



The diagram above shows homologous chromosomes during prophase I of meiosis. Which of the following correctly describes the process being illustrated?

A mutation in which the DNA content of the gene is altered

B segregation of sister chromatids

C condensation and segregation of alleles

D crossing-over in which alleles are exchanged

CSB10428

28 **Which of the following sequences represents chromosome number during fertilization?**

A $n + n \rightarrow 2n$

B $2n \rightarrow n + n$

C $n \rightarrow n$

D $2n \rightarrow 2n$

CSB20537

29 **The table below lists the typical diploid number of chromosomes of several different organisms.**

Diploid Chromosome Number

Goldfish	94
Potato	48
Human	46
Pea	14
Fruit fly	8

Which of the following is the *best* explanation for why the chromosome number is an even number in each of these organisms?

A It is only a coincidence; many other organisms have an odd number of chromosomes.

B The diploid chromosome number is always even so that when mitosis occurs each new cell gets the same number of chromosomes.

C The diploid chromosome number represents pairs of chromosomes, one from each parent, so it is always an even number.

D Chromosomes double every time the cell divides, so after the first division, the number is always even.

CSB10425

30 **Based only on the sex chromosomes in typical human egg and sperm cells at fertilization, the probability of producing a female is**

A 25%.

B 50%.

C 75%.

D 90%.

CSB10111

31 **In fruit flies, the gene for red eyes (R) is dominant and the gene for sepia eyes (r) is recessive. What are the possible combinations of genes in the offspring of two red-eyed heterozygous flies (Rr)?**

A RR only

B rr only

C Rr and rr only

D RR, Rr, and rr only

CSB00047

32 **In certain breeds of dogs, deafness is due to a recessive allele (d) of a particular gene, and normal hearing is due to its dominant allele (D). What percentage of the offspring of a normal heterozygous (Dd) dog and a deaf dog (dd) would be expected to have normal hearing?**

A 0%

B 25%

C 50%

D 100%

CSB00166

33 **Fur color in cats is controlled by an autosomal gene that can occur in the dominant form, (*B*), or the recessive form, (*b*). The length of the cat's fur is controlled by another autosomal gene that occurs in the dominant form, (*S*), or the recessive form, (*s*). The table below shows the traits for these allele codes.**

Gene	Trait
B	black fur
b	white fur
S	short-haired fur
s	long-haired fur

The following genotypes were found in a male cat and a female cat.

***BbSs* (male)** ***bbSS* (female)**

Which one of the following choices is true of the phenotype of offspring from these parents?

A *All* offspring will have black fur.

B *All* offspring will have white fur.

C *All* offspring will have long-haired fur.

D *All* offspring will have short-haired fur.

CSB00193

34 **If a human baby boy inherits a recessive allele from his mother, in which circumstance would he *most* likely show the trait coded for by the recessive allele?**

A The baby inherits the dominant allele from his father.

B The allele is on an autosomal chromosome and the baby is a twin.

C The allele is on the X chromosome.

D The allele is on the Y chromosome.

CSB10118

35 **Mendel hypothesized that reproductive cells have only one factor for each inherited trait. This hypothesis is supported by the observation that**

A haploid cells are produced by mitosis.

B diploid cells are produced by mitosis.

C haploid cells are produced by meiosis.

D diploid cells are produced by meiosis.

CSB10437

36

Codons Found in Messenger RNA

Second Base

First Base	U	C	A	G	*Third Base*
U	Phe	Ser	Tyr	Cys	U
	Phe	Ser	Tyr	Cys	C
	Leu	Ser	Stop	Stop	A
	Leu	Ser	Stop	Trp	G
C	Leu	Pro	His	Arg	U
	Leu	Pro	His	Arg	C
	Leu	Pro	Gln	Arg	A
	Leu	Pro	Gln	Arg	G
A	Ile	Thr	Asn	Ser	U
	Ile	Thr	Asn	Ser	C
	Ile	Thr	Lys	Arg	A
	Met	Thr	Lys	Arg	G
G	Val	Ala	Asp	Gly	U
	Val	Ala	Asp	Gly	C
	Val	Ala	Glu	Gly	A
	Val	Ala	Glu	Gly	G

A strand of mRNA containing the repeating sequence AAGAAGAAGAAG could code for which of the following amino acid sequences?

A lys–arg–glu–lys

B ser–ser–glu–glu

C lys–arg–lys–arg

D lys–lys–lys–lys

CSB00174

37

5' ATCAGCGCTGGC 3'

The above sequence of DNA is part of a gene. How many amino acids are coded for by this segment?

A 4

B 8

C 12

D 20

CSB10128

38 **A scientist puts nucleotide chains of UUUUUU in a test tube under conditions allowing protein synthesis. Soon the test tube is full of polypeptide chains composed of only the amino acid phenylalanine. What does this experiment indicate?**

A The amino acid phenylalanine is composed of uracil.

B UUU codes for the amino acid phenylalanine.

C Protein synthesis malfunctions in test tubes.

D Most proteins contain only one type of amino acid.

CSB10132

39 **Which of these would *most* likely cause a mutation?**

A the placement of ribosomes on the endoplasmic reticulum

B the insertion of a nucleotide into DNA

C the movement of transfer RNA out of the nucleus

D the release of messenger RNA from DNA

CSB00097

40 **One human disease is caused by a change in one codon in a gene from GAA to GUA. This disease is the result of**

A a mutation.

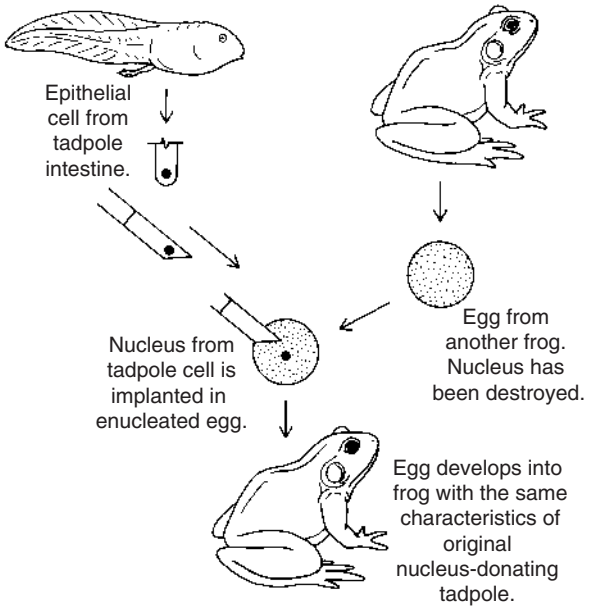
B a meiosis error.

C crossing-over.

D polyploidy.

CSB00182

41



Which of these is *best* demonstrated by the experiment above?

A Differentiated cells contain a complete set of genes.

B All frogs are genetically identical.

C Embryonic development is controlled by the cytoplasm.

D The nucleus of a tadpole cell is unspecialized.

CSB00077

42 **Although there are a limited number of amino acids, many different types of proteins exist because the**

A size of a given amino acid can vary.

B chemical composition of a given amino acid can vary.

C sequence and number of amino acids is different.

D same amino acid can have many different properties.

CSB00157

43 **The clear protein of an egg white becomes opaque and firm when cooked because the heat**

A mutates the DNA.

B turns the protein into carbohydrates.

C stops protein formation.

D changes the protein structure.

CSB00153

44 **Which of the following base pair sequences could be produced in DNA replication?**

A 5' AGTCUT 3'
3' TCUGTA 5'

B 5' AGTCAT 3'
3' TCAGTA 5'

C 5' AGTCAT 3'
3' CTGACG 5'

D 5' AGTCAT 3'
3' UCAGUA 5'

CSB10141

45 **5' G T A _ _ _ A A 3'**
3' C A T G C A T T 5'

This segment of DNA has undergone a mutation in which three nucleotides have been deleted. A repair enzyme would replace them with

A CGT.

B GCA.

C CTG.

D GTA.

CSB00162

46 **A base sequence is shown below.**

ACAGTGC

How would the base sequence be coded on mRNA?

A TGTCACG

B GUGACAU

C UGUCACG

D CACUGUA

CSB10489

47 **Semi-conservative replication of DNA refers to the idea that**

A DNA molecules need to unwind before duplication begins.

B each new DNA molecule contains two new single RNA strands.

C the two strands of DNA molecules run in opposite directions.

D each half of the original DNA molecule is joined with a new complementary DNA strand.

CSB20229

48 **The bacterium *Agrobacterium tumefaciens* infects plants, and a portion of its DNA is inserted into the plant's chromosomes. This causes the plant to produce gall cells, which manufacture amino acids that the bacterium uses as food. This process is a natural example of**

A polyploidy.

B genetic manipulation.

C grafting.

D hybridization.

CSB00187

49 **Genetic engineering has produced goats whose milk contains proteins that can be used as medicines. This effect was produced by**

A mixing foreign genes into the milk.

B injecting foreign genes into the goats' udders.

C inserting foreign genes into fertilized goat eggs.

D genetically modifying the nutritional needs of the goats' offspring.

CSB10146

50 **Scientists found that, over a period of 200 years, a mountain pond was transformed into a meadow. During that time, several communities of organisms were replaced by different communities. Which of these *best* explains why new communities were able to replace older communities?**

A The original species became extinct.

B Species in the older community died from old age.

C The abiotic characteristics of the habitat changed.

D Diseases that killed the older organisms disappeared.

CSB00008

51 **In a pond, the primary producer is a green alga, *Spirogyra*; the primary consumer is the crustacean, *Daphnia*; the secondary consumer is a small fish, the bluegill; and the tertiary consumer is a larger fish, the smallmouth bass. What changes can be expected in the pond if the *Daphnia* are killed with pesticides?**

A The *Spirogyra* population will probably die.

B The bluegill population will probably increase.

C The *Daphnia* population will eat something else.

D The smallmouth bass population will die.

CSB10339

52 **A food chain is shown below.**

Grasses → Crickets → Field Mice → Hawks

For the food chain shown, which of the following changes would have the *most* severe consequences?

A a drastic decrease in rainfall, causing drought

B the poaching of predatory hawks by game hunters

C the introduction of a second predator that eats field mice

D a parasitic infestation that reduces the cricket population

CSB20074

53 **Rabbits introduced into Australia over 100 years ago have become a serious pest to farmers. Rabbit populations increased so much that they displaced many native species of plant eaters. What is the *most* logical explanation for their increased numbers?**

A Rabbits have a high death rate.

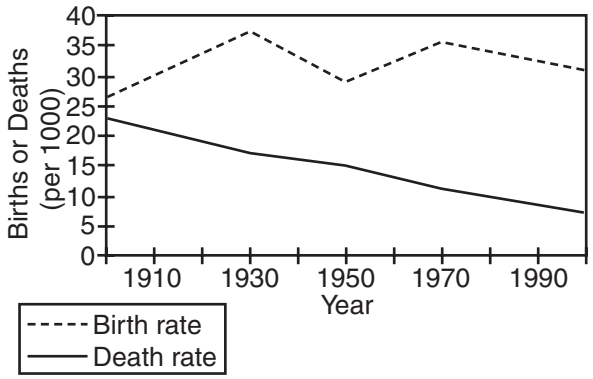
B There are few effective predators.

C Additional rabbit species have been introduced.

D There is an increase in rabbit competitors.

CSB00300

54 **The graph below shows the birth rate and death rate for a population during the 1900s.**



From 1900 to 2000, the population has

A increased.

B decreased.

C stayed the same.

D increased until 1930, then decreased.

CSB10456

55 **Complete burning of plant material returns carbon primarily to the**

A herbivores.

B water.

C vegetation.

D atmosphere.

CSB00204

56 **Which of these organisms are *most* helpful in preventing Earth from being covered with the bodies of dead organisms?**

A herbivores

B producers

C parasites and viruses

D fungi and bacteria

CSB00176

57 **Which of these organisms would *most* likely be found at the top of an energy pyramid?**

A clams

B sardines

C sharks

D kelp

CSB00268

58 **Which of these organisms would *most* likely be found at the bottom of a biomass pyramid?**

A giant squids

B sand sharks

C sea cucumbers

D green algae

CSB00160

59

Rabbit coat color

Allele	Phenotype
C	Rabbit with fully colored coat
c^{ch}	Rabbit with light gray coat
c^{h}	Himalayan rabbit: white with dark ear tips, nose, paws, and tail
c	Albino rabbit

Order of dominance C → c^{ch} → c^{h} → c

The chart shows four alleles at the same locus that affect rabbits' coat color. Each allele is dominant to the ones below it. Rabbits with an albino or Himalayan coat are more susceptible to predators. Which of the following genotypes will produce a rabbit that is *least* likely to survive?

A $c^{ch}c$

B Cc

C $c^{h}c$

D Cc^{h}

CSB00161

60 **Which of these would have the *least* effect on natural selection in a subspecies of giraffes that is geographically isolated from other subspecies of giraffes?**

A available niches

B existing predators

C chromosome number

D available food resources

CSB00051

61 **In carrier pigeons there is a rare inherited condition that causes the death of the chicks before hatching. In order for this disease to be passed from generation to generation there must be parent birds that**

A are heterozygous for the disease.

B have the disease themselves.

C produce new mutations for this disease.

D are closely interbred.

CSB00167

62 **A healthy individual is a carrier of a lethal allele but is unaffected by it. What is the probable genotype of this individual?**

A two dominant normal alleles

B one recessive lethal allele and one dominant lethal allele

C one recessive lethal allele and one dominant normal allele

D one dominant lethal allele and one recessive normal allele

CSB10492

63 **A genetic disorder due to a recessive allele (a) is lethal in homozygous individuals (aa), whereas heterozygous individuals (Aa) have no symptoms. Based on this information, which of the following is likely to result?**

A The disorder will quickly be eliminated since no recessive homozygotes will survive to reproduce.

B The disorder will be maintained in the population through the reproduction of heterozygotes.

C Only homozygous dominant (AA) individuals will survive.

D The prevalence of the disorder will increase over time.

CSB10466

64 **Mutations within a DNA sequence are**

A natural processes that produce genetic diversity.

B natural processes that always affect the phenotype.

C unnatural processes that always affect the phenotype.

D unnatural processes that are harmful to genetic diversity.

CSB20139

65 **Which of these *best* illustrates natural selection?**

A An organism with favorable genetic variations will tend to survive and breed successfully.

B A population monopolizes all of the resources in its habitat, forcing other species to migrate.

C A community whose members work together utilizes all existing resources and migratory routes.

D The largest organisms in a species receive the only breeding opportunities.

CSB00018

66 **A species of finch has been studied on one of the geographically isolated Galapagos Islands for many years. Since the island is small, the lineage of every bird for several generations is known. This allows a family tree of each bird to be developed. Some family groups have survived and others have died out. The groups that survive *probably* have**

A interbred with other species.

B inherited some advantageous variations.

C found new places on the island to live.

D been attacked by more predators.

CSB00038

67 **A population of termites initially consists of darkly colored and brightly colored members. After several generations, the termite population consists almost entirely of darkly colored members because the brightly colored termites are easier for a predatory species of insectivores to locate. This situation is an example of**

A the evolution of a new species.

B natural selection.

C artificial selection.

D adaptive radiation.

CSB20081

68 **Earth has undergone some catastrophic changes from time to time. Which of these *most* likely explains why life on Earth continued following these catastrophes?**

A Dominant species had a slow mutation rate.

B Many species filled the same niche.

C A strong species had many different characteristics.

D A wide diversity of species existed.

CSB00083

69 **A small population of chimpanzees lives in a habitat that undergoes no changes for a long period. How will genetic drift probably affect this population?**

A It will accelerate the appearance of new traits.

B It will promote the survival of chimpanzees with beneficial traits.

C It will increase the number of alleles for specific traits.

D It will reduce genetic diversity.

CSB00322

70 **A small portion of a population that is geographically isolated from the rest of the population runs the risk of decreased**

A genetic drift.

B mutation rate.

C natural selection.

D genetic variation.

CSB20765

71 **A single species of squirrel evolved over time into two species, each on opposite sides of the Grand Canyon. This change was *most* likely due to**

A higher mutation rates on one side.

B low genetic diversity in the initial population.

C the isolation of the two groups.

D differences in reproductive rates.

CSB00031

72 **Fossil evidence suggests that a number of members of one fish species from an ancient lake in Death Valley, California, became several isolated species. Each of these new species lived in a different pond. Which of the following *best* explains the cause of this speciation?**

A episodic isolation

B temporal isolation

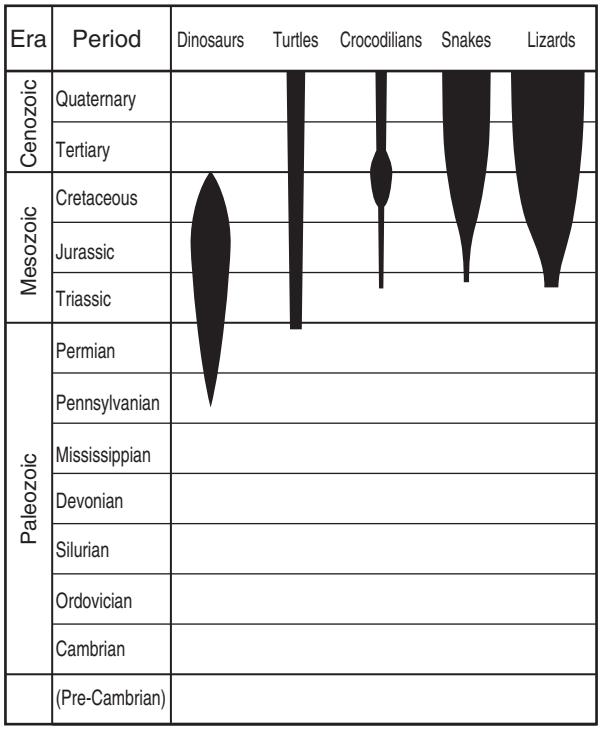
C geographic isolation

D behavioral isolation

CSB20512

73

Numbers of Representative Species



According to this information, which group demonstrated the greatest biodiversity during the Cretaceous period?

A dinosaurs

B crocodilians

C snakes

D lizards

CSB00168

74 **If a paleontologist finds fossils of many different species existing in the same area at approximately the same time, the paleontologist can conclude that the ecosystem in this area had a high degree of**

A climatic variation.

B episodic speciation.

C biological diversity.

D geographic isolation.

CSB20752

75 **In order for the body to maintain homeostasis, the chemical decomposition of food to produce energy must be followed by**

A water intake.

B muscle contractions.

C waste removal.

D nervous impulses.

CSB00188

76 **Carbon dioxide is produced as cells break down nutrients for energy. Which of the following pairs of systems would participate in removing the carbon dioxide from the body?**

A endocrine and circulatory

B circulatory and respiratory

C respiratory and endocrine

D reproductive and excretory

CSB10350

77 **The respiratory system depends on the nervous system for signals to**

A enhance the amount of available oxygen in the lungs.

B coordinate muscles controlling breathing.

C release enzymes to increase the exchange of gases.

D exchange gases with the circulatory system.

CSB00124

78 **Striking the tendon just below the kneecap causes the lower leg to jerk. Moving an object quickly toward the face can cause the eyes to blink shut. These are examples of**

A learned responses.

B short-term memory.

C reflex reactions.

D sensory overload.

CSB10353

79 **The fight-or-flight response includes greater heart output and a rise in blood pressure. This response is due to**

A insulin secreted by the pancreas.

B thyroxine secreted by the thyroid gland.

C oxytocin secreted by the pituitary gland.

D adrenaline secreted by the adrenal glands.

CSB20068

80 **Which of these secretes a hormone that regulates the rate of metabolism of the body?**

A spleen

B cerebrum

C thyroid

D kidney

CSB00233

81 **The homeostatic mechanism in humans that regulates blood pH depends on the feedback of information from**

A stretch receptors.

B chemical receptors.

C hormone receptors.

D thermal receptors.

CSB20315

82 **Which of the following is a function of the nervous system?**

A releasing ATP into contracting muscle tissues

B signaling muscle tissues to contract

C producing lactic acid in fatigued muscle tissues

D increasing cellular respiration in muscle tissues

CSB10097

83 **A signal that the bladder is full is sent to the central nervous system by**

A feedback loops.

B sensory neurons.

C nephron tubules.

D receptor proteins.

CSB10568

84 **What is the *greatest* danger to a patient who has had damage to the skin?**

A loss of oils produced by the skin

B excessive muscle contractions in the damaged area

C infections in uncovered tissues

D damaged tissue entering the blood stream

CSB00068

85 **Sweat and skin secretions contain a mixture of molecules that kills or limits the growth of many types of microbes. This control of microbes is an example of**

A a nonspecific defense against infection.

B an enzyme-catalyzed biochemical reaction.

C a feedback loop to maintain homeostasis.

D a specific immune response to infection by microbes.

CSB10560

86 **The Sabin vaccine is a liquid containing weakened polio viruses. Vaccinated individuals become protected against polio because the weakened viruses**

A prevent further viral invasion.

B induce an inflammatory response.

C promote production of antibodies.

D are too weak to cause illness.

CSB00220

87 **Injecting a person with a killed-bacteria vaccine can protect that individual from a disease because the proteins of the killed bacteria**

A remain in the body, and live bacteria later prey on them instead of live tissues.

B bind with receptors in the body, so that live bacteria cannot bind with them later.

C stimulate the production of antibodies which can be manufactured later in response to infection.

D give the person a mild form of the disease, which conditions the body not to respond to later infection.

CSB10083

88 **Which of the following require a host cell because they are *not* able to make proteins on their own?**

A blue-green algae

B bacteria

C protozoans

D viruses

CSB00227

89 **How do human diseases caused by bacteria and diseases caused by viruses react to antibiotics?**

A Neither responds to antibiotics.

B Both respond to antibiotics.

C Viral diseases respond to antibiotics; bacterial diseases do not.

D Bacterial diseases respond to antibiotics; viral diseases do not.

CSB10365

90 **Individuals with HIV sometimes contract a pneumonia infection that is rare in the rest of the population because people with HIV**

A are unable to fight off these pneumonia-causing organisms.

B are more often exposed to these pneumonia-causing organisms.

C release pheromones that attract the pneumonia-causing organisms.

D release substances that increase the strength of the pneumonia-causing organisms.

CSB00243

Question Number	Correct Answer	Standard	Year of Release
1	*B*	BIIE1.B	2003
2	*C*	BIIE1.D	2008
3	*D*	BIIE1.F	2006
4	*A*	BIIE1.G	2004
5	*D*	BIIE1.G	2008
6	*A*	BIIE1.I	2004
7	*B*	BIIE1.I	2006
8	*A*	BIIE1.K	2005
9	*D*	BIIE1.K	2007
10	*B*	BI1.A	2004
11	*B*	BI1.A	2008
12	*C*	BI1.B	2005
13	*C*	BI1.B	2006
14	*A*	BI1.B	2007
15	*D*	BI1.B	2008
16	*D*	BI1.C	2003
17	*D*	BI1.C	2006
18	*D*	BI1.E	2007
19	*C*	BI1.F	2003
20	*A*	BI1.F	2005
21	*B*	BI1.G	2004
22	*D*	BI1.G	2006
23	*A*	BI2.A	2007
24	*D*	BI2.A	2008
25	*B*	BI2.B	2005
26	*A*	BI2.C	2004
27	*D*	BI2.C	2006
28	*A*	BI2.D	2007
29	*C*	BI2.E	2007
30	*B*	BI2.F	2008
31	*D*	BI2.G	2003
32	*C*	BI3.A	2003
33	*D*	BI3.A	2004
34	*C*	BI3.A	2006
35	*C*	BI3.B	2005

Question Number	Correct Answer	Standard	Year of Release
36	*D*	BI4.A	2003
37	*A*	BI4.A	2006
38	*B*	BI4.B	2005
39	*B*	BI4.C	2003
40	*A*	BI4.C	2007
41	*A*	BI4.D	2008
42	*C*	BI4.E	2004
43	*D*	BI5.A	2005
44	*B*	BI5.A	2007
45	*A*	BI5.B	2004
46	*C*	BI5.B	2006
47	*D*	BI5.B	2008
48	*B*	BI5.C	2003
49	*C*	BI5.C	2005
50	*C*	BI6.B	2003
51	*D*	BI6.B	2007
52	*A*	BI6.B	2008
53	*B*	BI6.C	2004
54	*A*	BI6.C	2007
55	*D*	BI6.D	2003
56	*D*	BI6.E	2008
57	*C*	BI6.F	2005
58	*D*	BI6.F	2008
59	*C*	BI7.A	2003
60	*C*	BI7.A	2007
61	*A*	BI7.B	2004
62	*C*	BI7.B	2006
63	*B*	BI7.B	2008
64	*A*	BI7.C	2005
65	*A*	BI7.D	2004
66	*B*	BI8.A	2004
67	*B*	BI8.A	2008
68	*D*	BI8.B	2005
69	*D*	BI8.C	2004
70	*D*	BI8.C	2007

Question Number	Correct Answer	Standard	Year of Release
71	*C*	BI8.D	2003
72	*C*	BI8.D	2006
73	*D*	BI8.E	2005
74	*C*	BI8.E	2006
75	*C*	BI9.A	2003
76	*B*	BI9.A	2007
77	*B*	BI9.B	2003
78	*C*	BI9.B	2004
79	*D*	BI9.B	2006
80	*C*	BI9.C	2006
81	*B*	BI9.C	2008
82	*B*	BI9.D	2005
83	*B*	BI9.E	2007
84	*C*	BI10.A	2005
85	*A*	BI10.A	2008
86	*C*	BI10.C	2004
87	*C*	BI10.C	2007
88	*D*	BI10.D	2003
89	*D*	BI10.D	2006
90	*A*	BI10.E	2005