

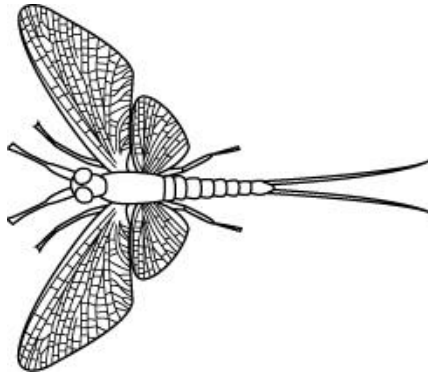
BIOLOGY MOCK FINAL EXAM

1. The dichotomous key is for arthropods.

Dichotomous Key for Arthropod Orders

1a	Six legs	Go to 2
1b	Eight legs	Go to 6
2a	Has wings	Go to 3
2b	Wingless	Go to 5
3a	One pair of wings	Diptera
3b	Two pairs of wings	Go to 4
4a	Wing pairs nearly the same size	Odonata
4b	Front wing pair much larger than hind wing pair	Ephemeroptera
5a	Two tail appendages	Diplura
5b	Three tail appendages	Thysanura
6a	Separation between head/thorax and abdomen	Araneae
6b	No separation between head/thorax and abdomen	Acarina

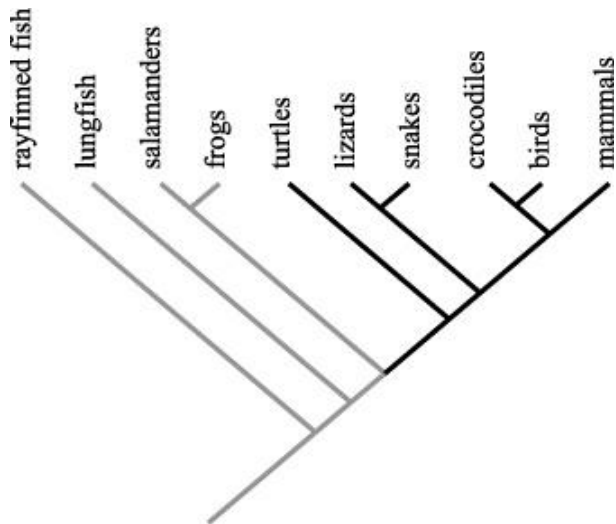
The diagram represents a mayfly.



To which order does the mayfly belong?

- A. Diptera
- B. Ephemeroptera
- C. Odonata
- D. Thysanura

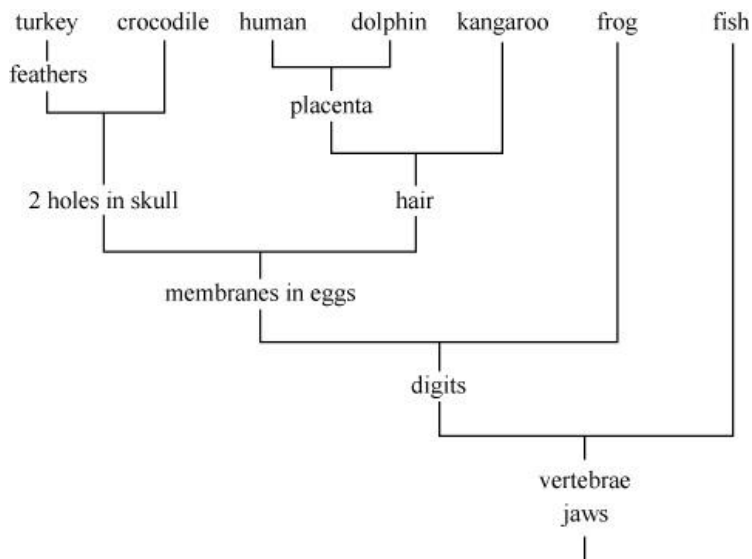
2. The diagram below represents a type of phylogenetic tree called a cladogram.



Which organisms are most closely related?

- A. turtles and lizards
- B. birds and mammals
- C. crocodiles and birds
- D. lungfish and salamanders

3. The diagram below shows the evolutionary relationships among animals with common ancestors.



According to this diagram, at least how many homologous structures do turkeys and crocodiles have?

- A. one
- B. two
- C. five
- D. six

4. Which information would be least useful in determining the classification of an organism?
- A. structural analysis
 - B. where the organism lives
 - C. how the organism develops
 - D. DNA and biochemical analysis
5. A cat associates the sound of a can opener to the act of being fed. Which behavior is occurring?
- A. imprinting
 - B. habituation
 - C. classical conditioning
 - D. trial-and-error learning
6. Which bodily process of an earthworm will only function properly if the worm's skin is moist?
- A. circulation
 - B. excretion
 - C. reproduction
 - D. respiration
7. Over a period of a few months, a student learns to ignore the ringing of his alarm clock. Which type of learning behavior has occurred?
- A. imprinting
 - B. habituation
 - C. trial and error
 - D. classical conditioning
8. What adaptation is most responsible for allowing plants to grow in areas where there is limited water?
- A. roots
 - B. flowers
 - C. chlorophyll
 - D. vascular tissues

9. Which type of sexual reproduction most favors organisms living on land?

- A. internal fertilization with eggs incubated externally
- B. external fertilization with eggs incubated externally
- C. internal fertilization with eggs incubated internally
- D. external fertilization with eggs incubated internally

10. What is the purpose of a large ball of lightweight fibers that surrounds some plant seeds?

- A. to attract hungry birds
- B. to hold in heat for germination
- C. to aid in seed dispersal by the wind
- D. to help anchor it to the ground when falling from the plant

11. Which organ's evolutionary adaptation allows organisms that live in salt water to retain more water?

- A. the liver
- B. the heart
- C. the kidneys
- D. the stomach

12. Which adaptation is more essential for a heterotrophic multi-cellular organism than for a multi-cellular autotrophic organism?

- A. water evaporation
- B. cellular respiration
- C. means of locomotion
- D. asexual reproduction

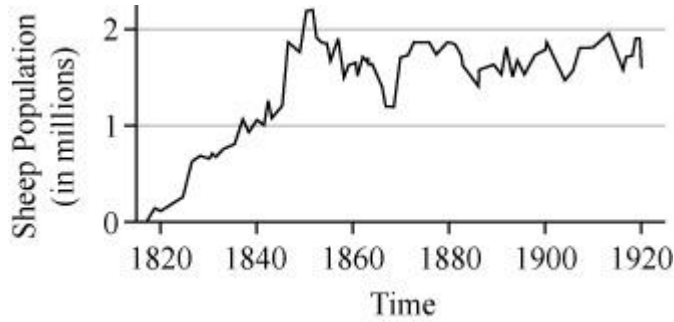
13. Which best describes an example of mutualism?

- A. Mistletoe lives in the branches of tall trees, absorbing nutrients from the tree branch.
- B. A leech attaches to the side of a fish, where it sucks blood and cell fluids from the fish.
- C. A clown fish hides in the tentacles of a sea anemone, drawing larger fish to the anemone.
- D. A barnacle attaches to the sides of a whale, filtering nourishment as the whale swims along.

14. In which way does mistletoe growing on a tree branch demonstrate parasitism?

- A. The mistletoe absorbs water from the tree, but the tree is unaffected.
- B. The tree is harmed or even killed, as the mistletoe takes nutrients from the tree.
- C. The mistletoe grows around the tree, preventing it from being exposed to sunlight.
- D. The tree supplies the mistletoe with nutrients, while the mistletoe provides the tree with water.

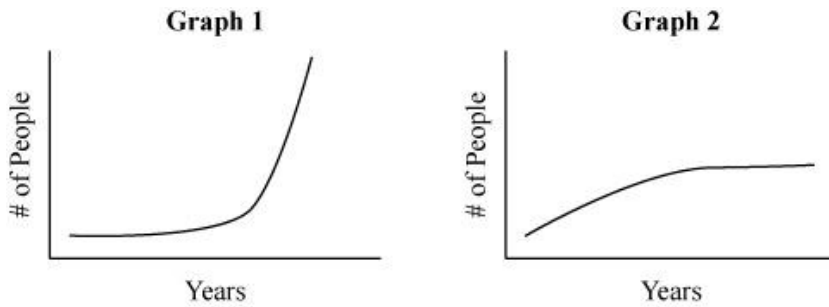
15. The graph shown tracks the sheep population in an area over 100 years.



Which value is closest to the carrying capacity for this population?

- A. 1.0 million sheep
- B. 1.5 million sheep
- C. 2.0 million sheep
- D. 2.5 million sheep

16. The graphs below represent possible changes in human population.



Which conclusion is most accurate?

- A. Graph 1's birth rate is greater than its death rate.
- B. Graph 2's birth rate is greater than its death rate.
- C. Graphs 1 and 2 both have greater birth rates than death rates.
- D. Graphs 1 and 2 both have roughly equal birth and death rates.

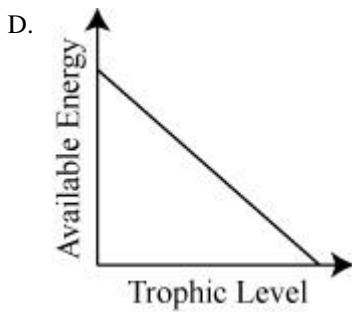
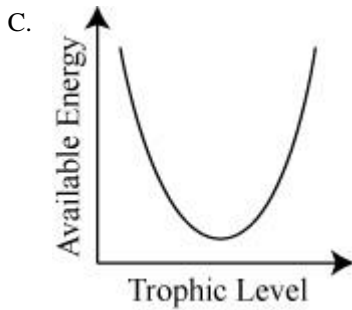
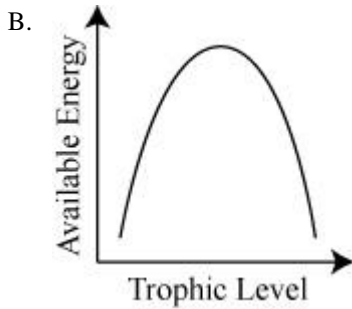
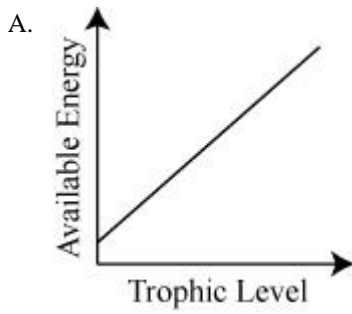
17. Which impact may a quickly rising population have on a developing country?

- A. decreased land pollution
- B. increased land availability
- C. higher potential for disease
- D. decreased food consumption

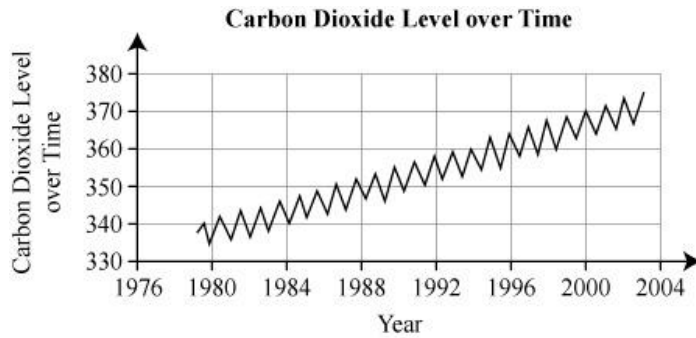
18. Which would raise the carrying capacity of the environment for a given species?

- A. decreasing the size of the environment
- B. introducing contaminants in to the environment
- C. increasing water and food supplies in the environment
- D. populating the environment with a predator of the species

19. Which graph best describes the relationship between trophic levels and available energy?



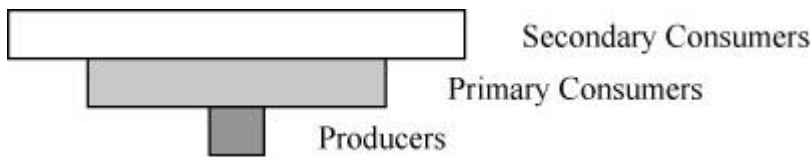
20. The diagram below shows the carbon dioxide levels in Hawaii from 1979 thru 2003.



What is the most likely explanation for the annual fluctuations in carbon dioxide levels?

- A. seasonal variation in people's use of automobiles
- B. seasonal variation in photosynthetic activity of plants
- C. changes in the rate of deforestation in tropical regions
- D. changes in wind currents that circulate the atmosphere

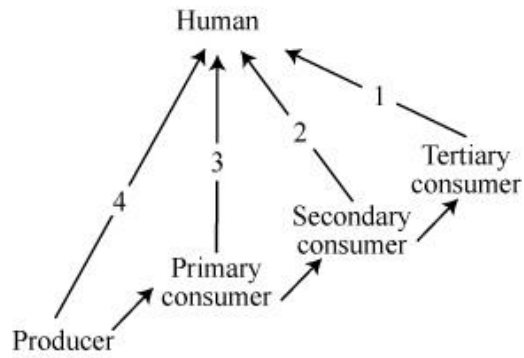
21. The diagram shows an inverted energy pyramid.



Why do energy pyramids NOT appear like the diagram?

- A. Producers outnumber consumers in ecosystems.
- B. Heat escapes from lower trophic levels and does not increase.
- C. Individual producers contain greater energy than individual consumers.
- D. Consumers gain more energy than they lose when consuming other animals.

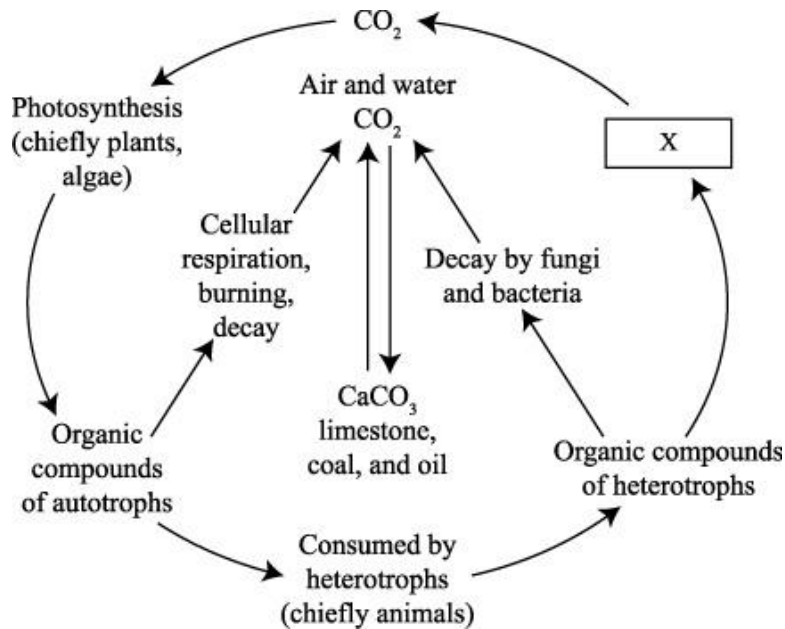
22. The diagram shows one part of a food web.



Along which arrow will a human most likely receive the highest proportion of usable energy per biomass consumed?

- A. 1
- B. 2
- C. 3
- D. 4

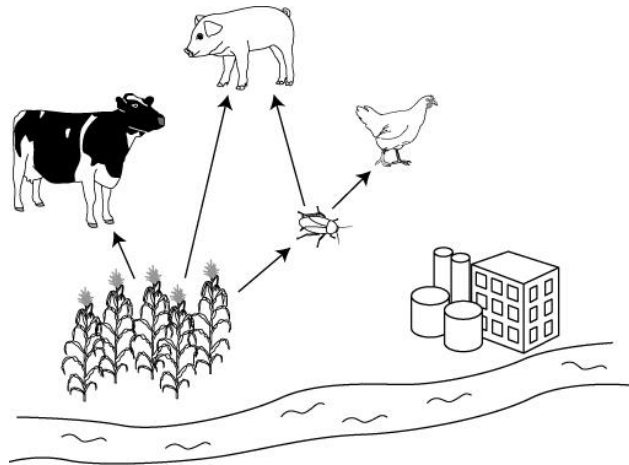
23. Which process, marked with an X in the diagram below, is one way that animals put CO₂ into the atmosphere?



- A. combustion
- B. photosynthesis
- C. respiration
- D. transpiration

24. Which is a correct statement about the flow of energy through an ecosystem?
- A. Carnivores are present to feed on producers.
 - B. Herbivores are autotrophic through photosynthesis.
 - C. Producers convert radiant energy into chemical energy.
 - D. Consumers convert radiant energy into chemical energy.
25. If a population of nitrogen-fixing bacteria in an ecosystem was severely decreased, which is the most likely result?
- A. Plants would be unable to perform photosynthesis.
 - B. Plants and animals would be unable to produce proteins.
 - C. Plants and animals would be unable to perform cellular respiration.
 - D. Plant and animal cells would no longer be able to make phospholipids for the cell membrane.
26. Which human activities have the greatest impact on the carbon cycle?
- A. crop rotation and deforestation
 - B. cellular respiration and crop rotation
 - C. deforestation and burning fossil fuels
 - D. burning fossil fuels and cellular respiration
27. Which provides the best argument against the introduction of a non-native animal species to a sensitive ecosystem?
- A. The species might be outcompeted by native species.
 - B. The species may have no natural predators in the new ecosystem.
 - C. The species may be susceptible to pathogens in the new ecosystem.
 - D. The species might be unable to produce viable offspring with native species.
28. Increasing carbon dioxide levels have contributed to the warming of Earth's atmosphere. Which best explains how deforestation has most contributed to the increase in atmospheric carbon dioxide?
- A. by eliminating trees, which absorb and store carbon dioxide
 - B. by increasing soil erosion, which releases stored carbon dioxide
 - C. by decreasing the number of animals which release carbon dioxide
 - D. by replacing native trees with crops that do not absorb or store carbon dioxide

29. Beach vitex is a salt-tolerant plant that is native to Asia. It thrives in coastal dune systems and is a prolific seed producer. In 2010, the state of North Carolina banned the import, sale, and possession of this plant, which has been termed “the kudzu of the coast.” The plant was most likely banned because of which effect?
- toxicity to seagulls
 - erosion of the coastline
 - nuisance to beachgoers
 - crowding of native sea grasses
30. Population growth in the United States has led to increased demand for nonrenewable resources. Which nonrenewable resources are most threatened in the United States?
- forests, topsoil, and petroleum
 - groundwater, topsoil, and petroleum
 - forests, groundwater, and hydroelectricity
 - groundwater, topsoil, and hydroelectricity
31. Which is NOT a consequence of pesticide use?
- birth defects
 - deforestation
 - biomagnification through food chains
 - resistance to pesticides from overexposure
32. The diagram below shows a farm that is located downstream from a chemical plant. The food web existing on the farm is also shown.



If a human wanted the lowest risk of chemical bioaccumulation, which organism should she choose to eat?

- chicken
- cow
- pig
- plant

33. An increase in Earth's average temperature from the buildup of carbon dioxide and other gases in the atmosphere is called

- A. acid rain
- B. ozone depletion.
- C. greenhouse effect
- D. particulate dispersal.

34. Which subunits make up a nucleotide of DNA?

- A. ribose, phosphate, and thymine
- B. cytosine, ribose, and phosphate
- C. deoxyribose, phosphate, and uracil
- D. phosphate, deoxyribose, and adenine

35. The diagram below is an mRNA codon chart.

Codon Chart

Second Base

		Second Base							
		U	C	A	G				
U	U	UUU Phe	UCU Ser	UAU Tyr	UGU Cys	U			
	C	UUC Phe	UCC Ser	UAC Tyr	UGC Cys	C			
	A	UUA Leu	UCA Ser	UAA Stop	UGA Stop	A			
	G	UUG Leu	UCG Ser	UAG Stop	UGG Trp	G			
C	U	CUU Leu	CCU Pro	CAU His	CGU Arg	U			
	C	CUC Leu	CCC Pro	CAC His	CGC Arg	C			
	A	CUA Leu	CCA Pro	CAA Gln	CGA Arg	A			
	G	CUG Leu	CCG Pro	CAG Gln	CGG Arg	G			
A	U	AUU Ile	ACU Thr	AAU Asn	AGU Ser	U			
	C	AUC Ile	ACC Thr	AAC Asn	AGC Ser	C			
	A	AUA Ile	ACA Thr	AAA Lys	AGA Arg	A			
	G	AUG Met	ACG Thr	AAG Lys	AGG Arg	G			
G	U	GUU Val	GCU Ala	GAU Asp	GGU Gly	U			
	C	GUC Val	GCC Ala	GAC Asp	GGC Gly	C			
	A	GUA Val	GCA Ala	GAA Glu	GGA Gly	A			
	G	GUG Val	GCG Ala	GAG Glu	GGG Gly	G			

A segment of a DNA strand has the base sequence of TAC GCA TGA CTA. Which amino acids would be produced from this DNA segment?

- A. Serine – Histidine – Asparagine – Glycine
- B. Asparagine – Proline – Isoleucine – Valine
- C. Methionine – Arginine – Threonine – Aspartic Acid
- D. Arginine – Glutamine – Methionine

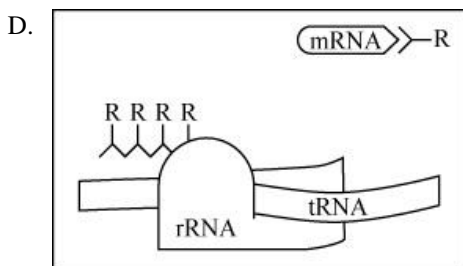
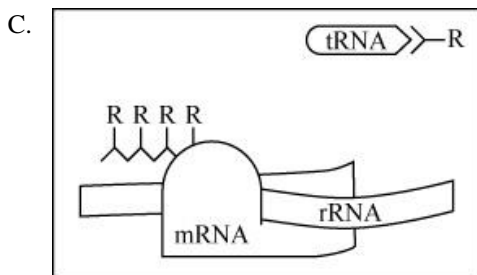
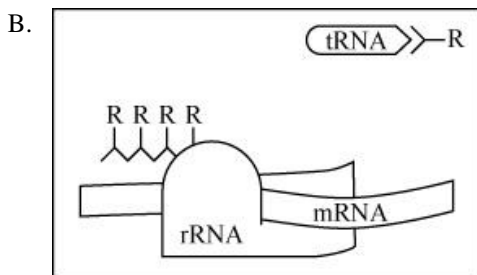
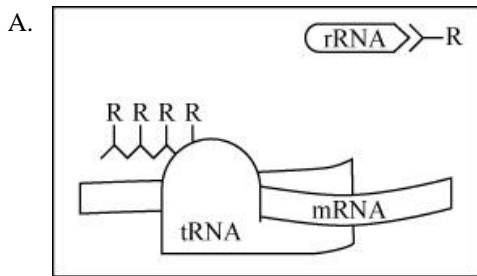
36. Which best explains the relationship between DNA, proteins, and amino acids?

- A. DNA produces amino acids, which join together in long chains to form proteins.
- B. Proteins are composed of amino acids and determine which DNA is found in a cell.
- C. DNA directs the production of proteins by determining the order in which amino acids align in the ribosomes.
- D. Proteins found in the cytoplasm direct the production of DNA, which contains the template for amino acids.

37. Which process ends with the release of a newly synthesized protein into cellular cytoplasm?

- A. translation
- B. transcription
- C. DNA synthesis
- D. DNA replication

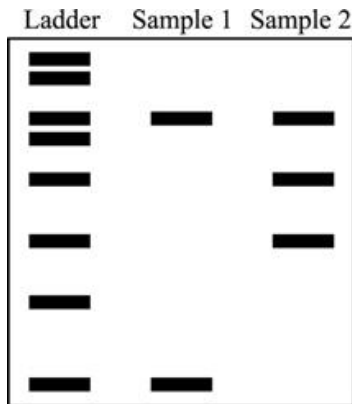
38. Which diagram shows the correct labeling of RNA molecules during the synthesis of polypeptides from amino acids and RNA?



39. A woman is diagnosed with skin cancer but is treated and survives. If she has a baby many years later, which is an accurate statement?

- A. The baby will also have skin cancer because it is a heritable disease.
- B. The baby will not have skin cancer because the baby's DNA is too immature to have mutations.
- C. The baby will also have skin cancer because the Sun's radiation can cause mutations to every cell in the body.
- D. The baby will not have skin cancer because the Sun's radiation cannot cause mutations to the woman's sex cells.

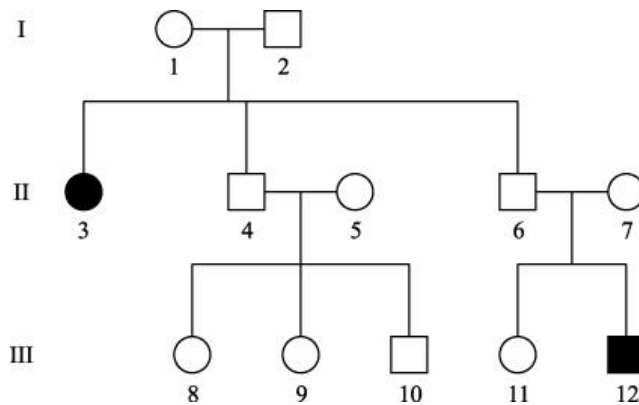
40. Two different samples of DNA are cut into fragments by the same restriction enzyme. The DNA is then run on a gel using electrophoresis.



What is one reason why the two lanes of sample DNA are so different?

- A. Sample 1 contained more base pairs than sample 2.
 - B. Sample 2 contained heavier base pairs than sample 2.
 - C. Sample 1 was cut too small by the restriction enzyme.
 - D. Sample 2 had more sites match the restriction enzyme.
41. How do scientists make transgenic plants resistant to a specific chemical pesticide?
- A. by inserting genes into the plant's DNA that code for pesticide-resistant proteins
 - B. by exposing the plants in the field to radiation to mutate their genes for resistance
 - C. by selectively cross-breeding different plants until a plant is produced that is resistant
 - D. by creating a symbiotic relationship between the plant and pesticide-resistant bacteria
42. The Human Genome Project began in 1988 as a way for scientists to identify and understand the DNA sequence in humans. What is one potential benefit of the Human Genome Project?
- A. It explains relationships among people.
 - B. It helps identify genes responsible for disease.
 - C. It assists with classifying animals related to humans.
 - D. It determines which genes are recessive and dominant.

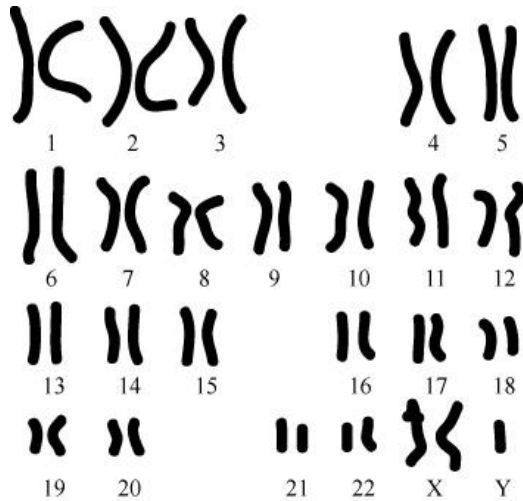
43. Enzymatic activity can be affected by many factors. Which factor would have the least effect on the rate of enzymatic activity?
- the pH of the substrate
 - the temperature of the substrate
 - the concentration of oxygen present
 - the concentration of the enzyme present
44. A man who is red-green colorblind marries a woman with normal vision whose father is colorblind. Which represents the probability that they will have a colorblind son?
- 0%
 - 25%
 - 50%
 - 100%
45. A man is heterozygous for blood type A, and his wife is heterozygous for blood type B. Which blood types are possible in their offspring?
- A and B
 - A and AB
 - B, AB, and O
 - A, B, AB, and O
46. The pedigree represents the occurrence of cystic fibrosis in four generations of a family.



Which pattern of inheritance is shown?

- autosomal recessive
- sex-linked recessive
- autosomal dominant
- sex-linked dominant

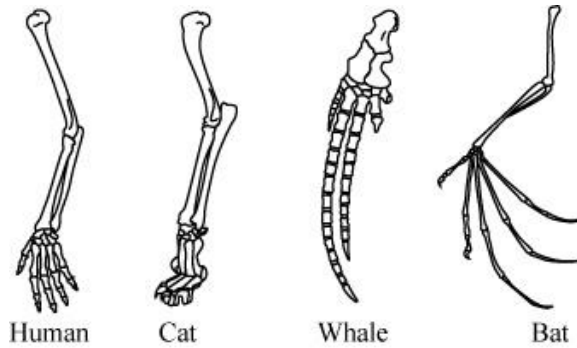
47. The diagram below represents the karyotype for Klinefelter's syndrome.



Which is the likely cause of this condition?

- A. nondisjunction during mitosis
 - B. nondisjunction during meiosis
 - C. chromosomal deletion during mitosis
 - D. chromosomal deletion during meiosis
48. Which demonstrates an example of natural selection?
- A. A bear ravages a campsite in search of food.
 - B. A bird builds a nest in preparation for egg laying.
 - C. A mouse scampers under a shed to escape from a circling owl.
 - D. A lion attacks a herd of antelope, catching the weakest member.
49. When the antibiotic penicillin was first discovered, it was considered to be a wonder drug against bacterial infections; however, today penicillin is not as effective as it once was. Which best explains this?
- A. Many bacteria have developed resistance to the antibiotic.
 - B. Bacteria reproduce faster than the antibiotic can kill them.
 - C. The strength of the antibiotic has been reduced over the years.
 - D. Many individuals have developed allergic reactions to the antibiotic.
50. The human smallpox virus has been eradicated. Which describes how the smallpox vaccine worked?
- A. Smallpox viruses invaded the vaccines rather than immune system cells.
 - B. Smallpox viruses were attacked by both the vaccine and the immune system.
 - C. Smallpox vaccines helped the immune system to create antibodies to the virus.
 - D. Smallpox vaccines synthesized a protective layer around immune system cells.

51. The diagram below represents the forelimb bone structure in four different animals.



Which conclusion can best be drawn from the diagram?

- A. The four animals have similar dietary needs.
 - B. The four animals have the same number of chromosomes.
 - C. The four animals may have evolved from a common ancestor.
 - D. The four animals may have evolved during a different period of time.
52. Which do scientists believe were the first type of cells to appear?
- A. aerobic and eukaryotic
 - B. aerobic and prokaryotic
 - C. anaerobic and eukaryotic
 - D. anaerobic and prokaryotic
53. The ability to roll one's tongue is inherited as a dominant trait. Which best explains how two tongue-rolling parents produce a child who can NOT roll his tongue?
- A. A dominant mutation must occur in the child's DNA.
 - B. One parent must carry a dominant and a recessive allele.
 - C. Both parents must carry a dominant and a recessive allele.
 - D. The child inherited at least one dominant allele from a parent.
54. Which human trait is inherited through polygenic inheritance?
- A. dimples
 - B. eye color
 - C. blood type
 - D. red-green color vision

55. In humans, free-hanging earlobes are dominant to attached earlobes. If two parents with attached earlobes have a child, what is the probability of their producing a child with free-hanging earlobes?
- A. 0%
 - B. 25%
 - C. 50%
 - D. 100%
56. Which would be a genetic transmission of a disease?
- A. A wound becomes infected with bacteria.
 - B. A virus is transmitted when a father drinks after his sick son.
 - C. A child develops a heart condition that was present in his father.
 - D. A woman catches a cold after several of her coworkers have been sick.
57. Which pair is a correct match of an organic molecule with its subunits?
- A. proteins-amino acids
 - B. nucleic acids-glycerol
 - C. lipids-monosaccharides
 - D. carbohydrates-nucleotides
58. Which describes the structure of enzymes?
- A. carbohydrates with lipid tails
 - B. nucleic acids with an attached ribose compound
 - C. proteins composed of long chains of amino acids
 - D. a complex carbohydrate composed of two simple carbohydrates and a starch
59. Which is the best explanation of the way enzymes speed up chemical reactions?
- A. They raise activation energy.
 - B. They lower activation energy.
 - C. They maintain activation energy.
 - D. They have no effect on activation energy.

60. Which is a function of the cell wall?

- A. storage
- B. transcription
- C. structural support
- D. energy production

61. In which type of organism is a scientist likely to find the most cells containing a vacuole?

- A. bacterium
- B. bird
- C. fish
- D. plant

62. Which is a correct statement about prokaryotic and eukaryotic cells?

- A. DNA is only found in eukaryotic cells.
- B. RNA is only found in prokaryotic cells.
- C. Circular RNA strands called plasmids are only found in eukaryotic cells.
- D. Circular DNA strands called plasmids are only found in prokaryotic cells.

63. A student observes pictures of cells from a fern leaf, a bacterium, and a human cheek cell. What will distinguish the bacterium from the other two cells?

- A. lack of cilia
- B. lack of a nucleus
- C. lack of cytoplasm
- D. lack of chloroplasts

64. Euglena are photosynthetic. Which organelles would be most important to the survival of euglena?

- A. eyespots and flagella
- B. pseudopodia and eyespots
- C. flagella and contractile vacuoles
- D. contractile vacuoles and eyespots

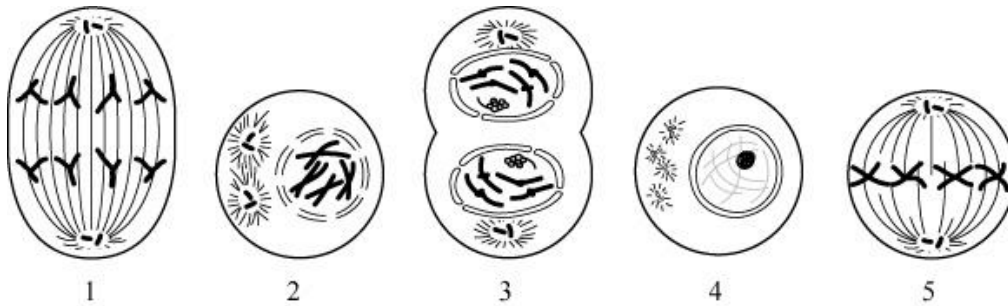
65. Which substance is used by cells to send signals over greater distances to other target cells?
- A. enzyme
 - B. hormone
 - C. cholesterol
 - D. receptor protein
66. Which would identify an unknown cell as a liver cell as opposed to a pancreas cell?
- A. A liver cell has different DNA from a pancreas cell.
 - B. Different segments of DNA are active in the two cells.
 - C. The location of the cell in the organism determines its function.
 - D. Hormones which are present determine whether it is a liver cell or a pancreas cell.
67. Which action would be most helpful in maintaining homeostasis?
- A. running a race
 - B. eating an apple
 - C. walking up steps
 - D. sweating on a hot day
68. How are diffusion and osmosis similar?
- A. They both involve enzymes.
 - B. They are both processes that require ATP.
 - C. They are both involved in passive transport.
 - D. They both involve the movement of a variety of molecules.
69. To enter and leave the cell, sodium requires an energy-intensive pump. Which describes the process of sodium moving into and out of the cell?
- A. osmosis
 - B. diffusion
 - C. active transport
 - D. passive transport
70. Which factor least affects the rate of photosynthesis?
- A. intensity of light
 - B. availability of water
 - C. amount of oxygen present

D. environmental temperature

71. Some cells convert glucose to carbon dioxide and water. What is the purpose of this process in cells?

- A. to aid in reproduction
- B. to dispose of waste glucose
- C. to make food by photosynthesis
- D. to change energy to a form that the cell can use

72. The diagrams below show the various stages of the cell cycle.



Which correctly lists the stages of the cell cycle in order?

- A. 2, 1, 5, 3, 4
- B. 4, 2, 5, 1, 3
- C. 2, 4, 5, 1, 3
- D. 4, 2, 1, 5, 3

73. A potential cancer treatment targets cells during mitosis. It works most effectively when the chromosomes are aligned at the center of the cell. During which phase of mitosis does this occur?

- A. anaphase
- B. metaphase
- C. prophase
- D. telophase

74. What is a difference between cells produced through mitosis and those produced through meiosis?

- A. Mitosis produces cells with larger genes than those produced through meiosis.
- B. Mitosis produces cells that lack genes, and those produced through meiosis have genes.
- C. Mitosis produces cells with genes that are more vulnerable to disease than those produced through meiosis.
- D. Mitosis produces genetically identical cells, and those produced through meiosis have random combinations of parents' genes.

75. Which process occurs during meiosis, but does NOT occur during mitosis?

- A. crossing over
- B. gene mutation
- C. nuclear division
- D. replication of DNA

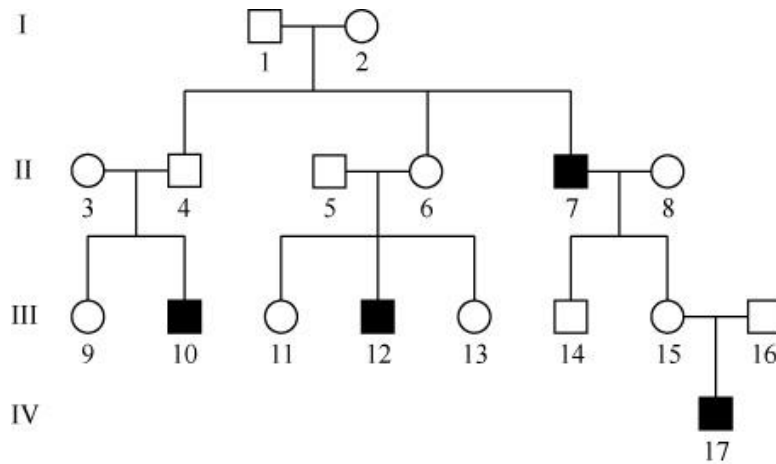
76. How many chromosomes are in a human sperm cell?

- A. 12
- B. 23
- C. 46
- D. 92

77. What is demonstrated when a red flower is crossed with a white flower to produce pink flowers?

- A. complete dominance
- B. incomplete dominance
- C. complete recessiveness
- D. incomplete recessiveness

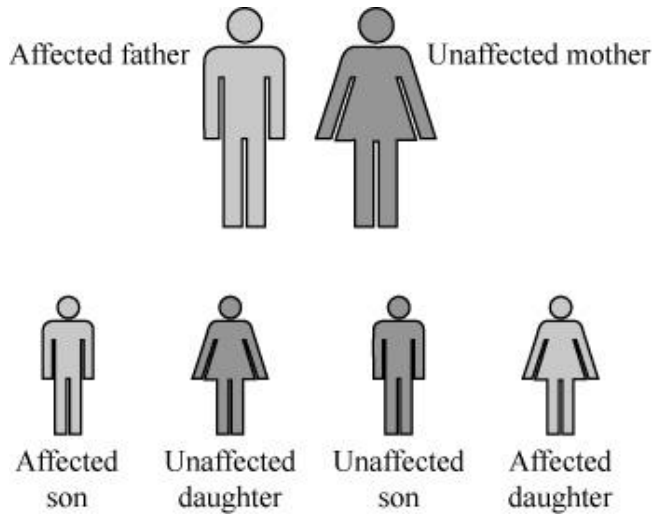
78. The pedigree below represents a sex-linked trait in four generations of a family.



Which best represents the phenotype of Individual II-6?

- A. an affected male
- B. an affected female
- C. a normal male, carrier
- D. a normal female, carrier

79. The diagram below represents the inheritance pattern for Huntington's disease.



Which best describes the inheritance pattern?

- A. autosomal recessive
- B. sex-linked recessive
- C. autosomal dominant
- D. sex-linked dominant

80. Red-green colorblindness is more common in men than in women. Which best explains this fact?

- A. The allele for colorblindness is dominant in men and recessive in women.
- B. Men only need one allele for colorblindness, while women need two alleles.
- C. The allele for colorblindness is carried on the Y-chromosome so only men get it.
- D. Women have other allele pairs which cover the colorblind allele, while men do not.