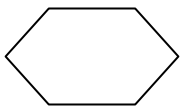
Mid Year Test

1. Which chemical elements would you expect to find in abundance in a living cell?
A. hydrogen, neon, argon
B. carbon, oxygen, hydrogen
C. iron, magnesium, calcium
D. sodium, potassium, sulfur

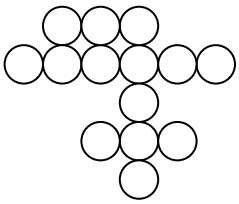
2. What is the most common form hydrogen and oxygen are found in living things?
A. fats
B. water
C. protein
D. DNA

3. What are the functions of lipid molecules?
A. provide molecules for body structures and enzymes
B. contain genetic information that guides cell functions.
C. provide “quick energy” when the body needs it.
D. store energy and release it when it is needed.

4. Which of the following is a main component of enzymes and is responsible for the structure of cells and tissues?
A. lipid
B. nucleic acid
C. protein
D. carbohydrate



A



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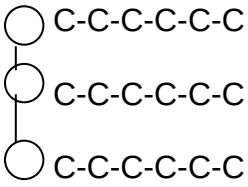


D

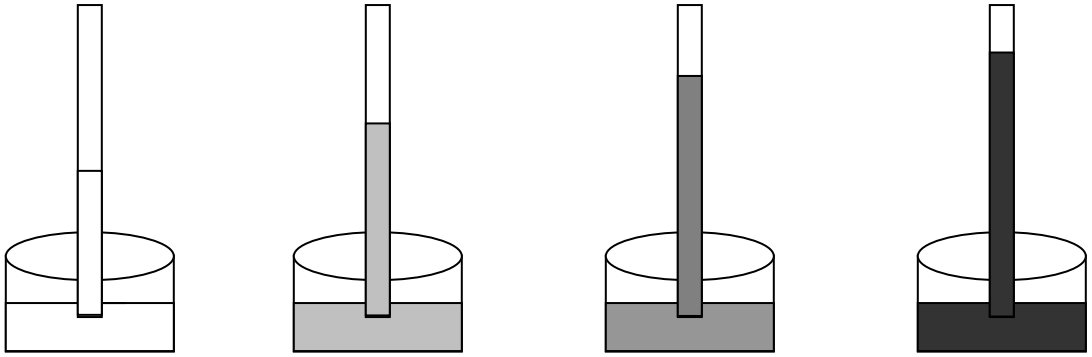
5. Which structure represents a lipid molecule?
A. A
B. B
C. C
D. D

6. Water is polar in nature. To be polar means to:
A. be very cold and difficult to warm up.
B. freeze easily and boil rapidly
C. have positive and negative charged ends
D. have a low heat capacity

An experiment is performed to see how plants respond to acid rain. Water plants are placed in water of varying pH measurements. The pH levels are 2.5, 6.0, 7.0, and 9.0. Each day, the health of the plants is measured by counting the leaves and recording the color.

7. Which pH is the best control for this experiment?
A. 2.5
B. 6.0
C. 7.0
D. 9.0

Each beaker is filled with the same amount of different liquids. The liquids have been drawn up into the tubes to the line shown. Answer the following questions based on the diagram of the tubes and your knowledge of the properties of water.



A. **B.** **C.** **D.**

8. Which substance has the most capillary action?
A. substance A
B. substance B
C. substance C
D. substance D

9. Which substance demonstrates the least adhesion to the tube?
A. substance A
B. substance B
C. substance C
D. substance D

10. Water helps living organisms maintain internal balance. The best example of this is when water
A. forms layers inside the cell.
B. prevents large fluctuations in body temperature
C. uses capillary action to move water to great heights
D. helps small bugs stay afloat on the waters surface

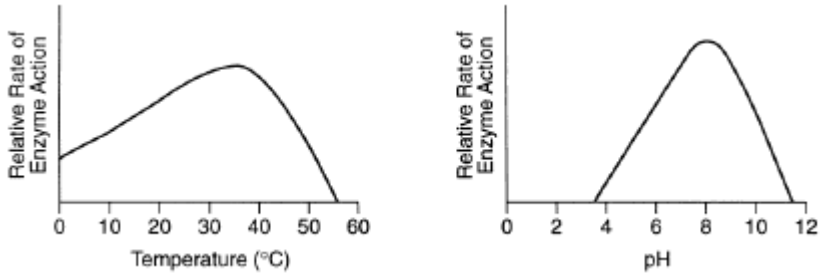
11. Enzymes influence chemical reactions in living systems by
A. providing the substrate required for the reaction to occur
B. affecting the rate at which reactions occur
C. absorbing water released when polymers are formed
D. combining with excess hydrogen to form gaseous wastes

12. Which group of organic compounds includes the enzymes?

A. proteins
B. starches
C. carbohydrates
D. lipids

13. Which environmental condition would most likely have the LEAST effect on the rate of enzyme reactions in humans?
A. the pH of the solution
B. the temperature of the solution
C. the amount of enzyme present
D. the amount of light present

14. Which statement best describes the enzyme represented in the graphs below?



A. This enzyme works best at a temperature of 35 °C and a pH of 8.
B. This enzyme works best at a temperature of 50 °C and a pH of 12.
C. Temperature and pH have no influence on the activity of this enzyme.
D. This enzyme works best at a temperature above 50 °C and a pH above 12

15. Use the chart below and your knowledge of enzymes to answer the question.

Enzyme	Effective Temperature Range (°C)	Optimum pH
A	60–80	3
B	30–40	3.5
C	20–38	9
D	20–27	7

At what temperature would enzyme D most likely be broken down?
A. 19 °C
B. 20 °C
C. 25 °C
D. 39 °C

16. Which of the following is composed of autotrophic cells?
A. frog
B. grass
C. mushroom
D. insect

17. Which cells cannot create their own energy from sunlight and depend on other organisms for a food supply?
A. trophic
B. metatrophic
C. autotrophic
D. heterotrophic

18. Which process releases energy for use by plant cells?
A. cellular respiration
B. photosynthesis
C. radiation
D. metabolism

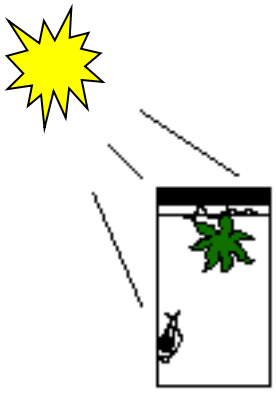
19. Which macromolecule is produced during photosynthesis?
A. nucleic acids in the form of DNA
B. proteins in the form of cellulose
C. carbohydrates in the form of glucose
D. lipids in the form of steroids

20. Which of the following is a reactant in the photosynthetic reaction?
A. sugar
B. carbon dioxide
C. oxygen
D. heat and motion

21. Which process allows energy to enter a food chain?
A. photosynthesis
B. respiration
C. water cycle
D. combustion

Answer the following questions based on the this information:

A snail and elodea (a waterplant) are placed in a sealed aquarium and placed an area that receives regular sunlight.

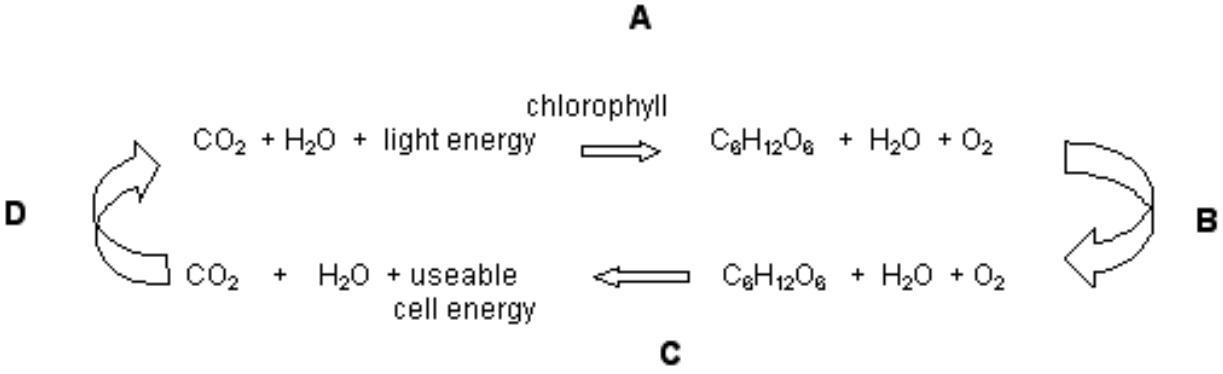


22. What is entering this system?
A. O_2
B. CO_2
C. water
D. light

23. At which point in a 24 hour period would there be the greatest production of oxygen (O_2)?
A. at night
B. in the morning
C. noon
D. evening

Use the diagram to answer the following questions.

24. At which point does photosynthesis occur?



A. A
B. B
C. C
D. D

25. What happens to the **stored** energy as the cycle moves from B to C to D?
A. increases
B. decreases
C. stays the same
D. changes to potential energy

Two test tubes contain a water plant and water. Several drops of bromothymol blue are added to each test tube. The bromothymol blue has carbon dioxide added to it and is a greenish color. Tube A is placed in a sunny window and tube B is placed in a cupboard.

26. Carbon dioxide creates a weak acid in bromothymol blue which makes it green. The test tube A turned from green to blue. Where did the carbon dioxide go?
A. It turned into oxygen.
B. It was absorbed by the water
C. It was combined with the bromothymol blue.
D. It was used by the plant

27. This type of bond is strongest among atoms
A. Polar
B. Ionic
C. Covalent
D. Hydrogen

28. What is the original source of energy for ecosystems?
A. plants
B. the soil
C. the sun
D. water

29. Which food chain correctly lists the steps according to energy flow?

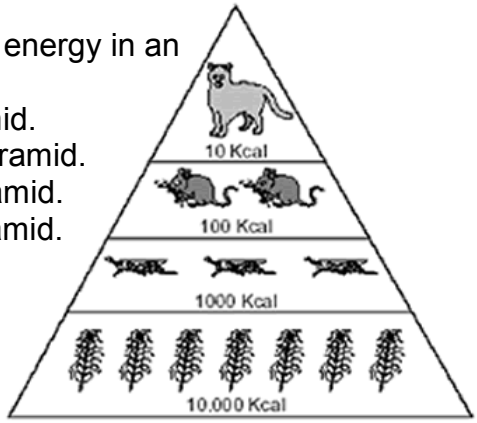
A. sun → grass → deer → mountain lion

B. mountain lion → deer → grass → sun

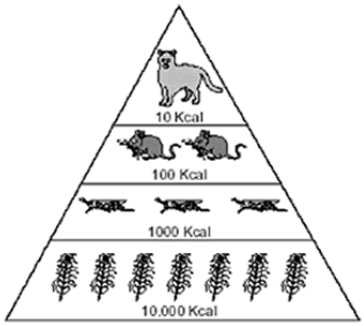
C. grass → sun → mountain lion → deer

D. deer → mountain lion → grass → sun

30. What does the shape of an energy pyramid indicate about energy in an ecosystem?
A. most of the energy is stored in plants at the top of the pyramid.
B. most of the energy is stored in animals at the base of the pyramid.
C. most of the energy is stored in animals at the top of the pyramid.
D. most of the energy is stored in plants at the base of the pyramid.



31. How much energy is lost between a level and the one above it?
A. ten percent
B. fifty percent
C. ninety percent
D. one hundred percent



32. How does winter hibernation benefit a bear?
A. The energy needed to stay alive in winter is reduced.
B. The energy needed to store fat is increased.
C. The amount of food gathered in summer is reduced.
D. The bear is safe from hunters.

33. Many types of birds expend large amounts of energy to fly long distances in the spring. How can a trip like this be worthwhile to the birds?
A. They find an abundant supply of food and safer nesting areas.
B. Birds expend little energy when they fly and they stop often.
C. Migration is an instinct that birds retain, it has little value in today's world.
D. Birds must change food sources during the year to be able to balance their diets.

34. What must the energy provided by food caught by a predator be balanced by?
A. the energy needed to catch the food
B. the energy stored in the predators body
C. the energy stored in the prey animals body
D. the amount of energy stored in ecosystem

35. Which of the following is a difference between the nitrogen and carbon cycles?
A. Nitrogen can exist as a solid but carbon cannot.
B. Carbon is released through decomposition but nitrogen is not.
C. Carbon is released through respiration but nitrogen is not.
D. Carbon is cycled through animals but nitrogen is not.

36. Which of the following correctly traces the path of a raindrop through the water cycle?
A. precipitation, run-off, evaporation, condensation
B. precipitation, condensation, run-off, evaporation
C. precipitation, evaporation, run-off, condensation
D. precipitation, evaporation, condensation, run-off

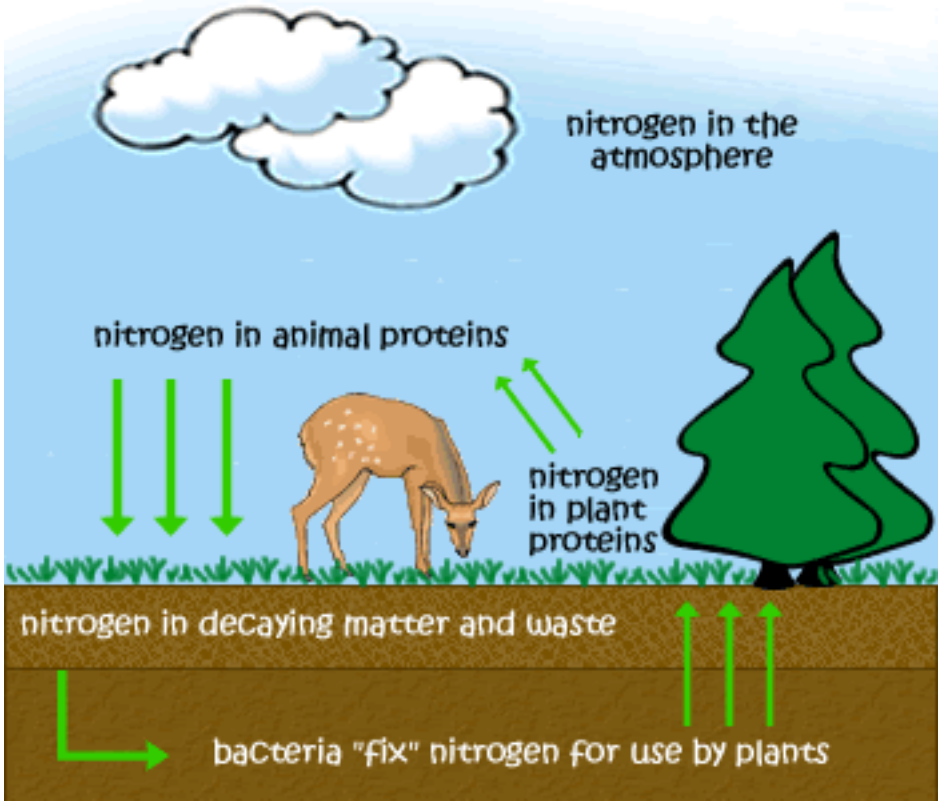
37. Which of the following is a way carbon is added to the atmosphere?
A. Evaporation of water
B. Forest fires
C. Photosynthesis
D. Formation of fossil fuels

38. Why are legumes such as peas and alfalfa considered good for soil?
A. They add valuable humus to the soil when they die and decay.
B. They absorb water and help control runoff.
C. Their leaves are able to photosynthesis at a very high rate.
D. They have nitrogen fixing bacteria in their roots.

39. Where is the oxygen we breathe produced?

A. in the rocks
B. by decaying organisms
C. during photosynthesis
D. as water evaporates

Use this diagram to answer the next two questions:



40. According to the diagram, how do plants get nitrogen?
A. from the air
B. from changes in weather
C. from bacteria
D. from clouds

Energy from the sun drives Earth's weather and climate, and heats Earth's surface; in turn, Earth radiates energy back into space. Atmospheric greenhouse gases trap some of the outgoing energy, retaining heat somewhat like the glass panels of a greenhouse. Without this natural "greenhouse effect," temperatures would be much lower than they are now, and life as known today would not be possible. Instead, thanks to greenhouse gases, Earth's average temperature averages a more hospitable 60°F. However, problems may arise when the atmospheric concentration of greenhouse gases increases. Many scientists have stated that the rising levels of carbon dioxide present a threat to our planet.

41. Which of the following is an inference from this reading?
A. Energy from the sun drives Earth's weather and climate.
B. What are the levels of greenhouse gases that are safe?
C. Thanks to greenhouse gases, Earth's average temperature is 60°F.
D. Scientists are worried about greenhouse gases.

42. The amount of carbon dioxide in the atmosphere has been increasing rapidly since the industrial revolution. How is this a disruption of the natural carbon cycle?
A. Carbon from the ocean is dissolving more of the salt.
B. Carbon from fossil fuels is no longer being stored underground.
C. It represents the natural fluctuation in the cycle caused by humans.
D. The rising levels cause forest fires.

43. Which of the following is a way carbon dioxide can be removed from the air?
A. building dams
B. fertilizing crops
C. mining coal
D. planting trees

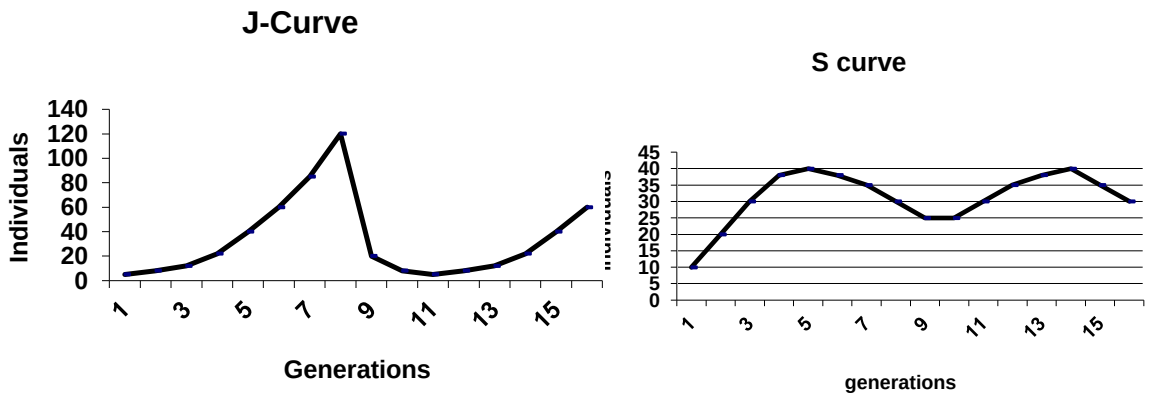
This chart contains data students collected when they observed microorganisms in a covered jar containing pond water and hay.

Day	Number of microorganisms	Kinds of microorganisms	Other observations
1	A few	two	the microorganisms were swimming and feeding on the hay
4	many	Three or four	Some microorganisms were feeding on each other
7	hundreds	Five or six	Moldy scum was developing on the surface and a smell was developing
10	Very few	one	The water was a dark color and smelled very bad

44. Which conclusion best matches this data?
A. Microorganisms are small and can swim around freely.
B. Ecosystems change over time.
C. Hay with water smells bad if left for 10 days.
D. Ecosystems are unchanging and balanced.

45. Which of the following are examples of **biotic** factors in an ecosystem?
A. water and soil pH
B. snails and soil bacteria
C. water and air temperature
D. elevation and precipitation

46. Which of the following best represents examples of **abiotic** factors in an ecosystem?
A. water temperatures at different depths in a pond
B. population of red-winged blackbirds in a cattail marsh
C. the number of mallard ducks living in a wetlands pond
D. the diversity of species of grasses found in a farmer's hayfield

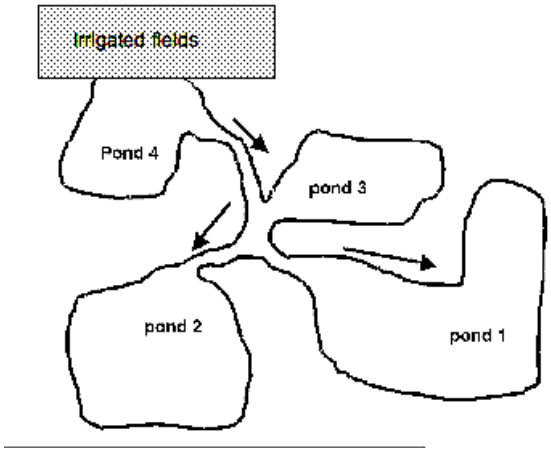


J curve is based on a population of population of field mice with no predators.

S curve is based on field mice with snakes present.

47. Which type of relationship between snakes and mice can be inferred from these graphs?
A. naturalism
B. commensalism
C. parasitism
D. predation

Arrows show the direction of water flow through these wetlands.



Pond	pH	Water Temp.	#flathead minnows
1	7.2	15 C	97
2	7.1	10 C	90
3	6.4	11 C	62
4	5.2	9 C	45

48. What abiotic factor appears to be the main cause of the declining fathead minnow population as water moves through the four ponds?
A. water temperature
B. acidic pH levels
C. the number of ponds in the area
D. declining invertebrate population

49. Which of the following is **qualitative** data that might be gathered during a study of mountain goats?
A. the number of young goats born each year.
B. the type of care each mother goat gave her offspring
C. the temperature of the mountain air at night.
D. the distance the goats could climb in a day.

50. Fire control in the western United States has reduced the danger of fire in most forests. Why do some foresters argue that the forests would be healthier if fires burned more often?
A. These foresters are not concerned with human life and property.
B. Fires create open spaces that allow more people to build homes on.
C. Fires allow trees to grow more rapidly and grow different species of plants.
D. Fires are a part of healthy forest ecosystems and restore balance of nutrients.

51. Leaf cutter ants keep fungal gardens. The ants provide food for the fungus but also feed on the fungus. This is an example of
A. Competition
B. Predator/prey
C. Producer/Consumer
D. Mutualism

52. If you observe several cells without a nucleus under the microscope, you are probably observing:
A. Eukaryotic cells
B. Animal cells
C. Prokaryotic cells
D. Plant cells

53. Which cell organelle is responsible for processing energy in the cell?
A. golgi body
B. mitochondria
C. nucleus
D. ribosome

54. Cell membranes are constructed mainly of:
A. lipid bilayers
B. protein pumps
C. carbohydrate gates
D. free-moving proteins

55. The movement of water across a selectively permeable membrane is known as:
A. exocytosis
B. diffusion
C. phagocytosis
D. osmosis

56. A substance that moves across a cell membrane without using the cell's energy tends to move:
A. away from the area of equilibrium
B. away from the area that is less concentrated
C. away from the area that is more concentrated
D. toward the area that is more concentrated

57. If a cell is placed in a hypotonic solution (and the molecules cannot pass through the membrane), what will happen to the cell?
A. The cell will swell
B. The cell will stay the same
C. The cell will shrink
D. The cell will float

58. How does a body cell maintain homeostasis when placed in a fresh water environment?
A. It must pump out lipids as the fresh water comes in.
B. It must pump in fresh water using active transport.
C. It must pump out the incoming fresh water.
D. Homeostasis will be maintained if the cell does nothing.

59. Which of the following are all passive processes (doesn't require energy)?
A. Diffusion, osmosis, active transport
B. Diffusion, osmosis, facilitated diffusion
C. Diffusion, active transport, ventilation
D. Active transport, movement, osmosis

60. Which process provides new cells for growth and replacement of body cells?
A. metabolism
B. respiration
C. digestion
D. mitosis

61. What part of a cell must be duplicated exactly during mitosis?
A. cell membrane
B. nucleus
C. chromosomes
D. mitochondria

62. DNA replication will take place at:
A. Interphase
B. Prophase
C. Metaphase
D. Anaphase

63. To maintain the chromosome number of a species, gametes must be
A. diploid
B. haploid
C. dominant
D. recessive

64. When will crossover in meiosis take place?
A. Prophase I
B. Anaphase I
C. Anaphase II
D. Prophase II

65. The main difference between mitosis and meiosis is:
A. mitosis occurs in humans, meiosis occurs in plants
B. mitosis produces diploid cells, meiosis produces haploid cells
C. mitosis occurs randomly, meiosis occurs purposefully
D. mitosis involves homologous chromosomes, meiosis does not

66. What is the result of a single cell going through the process of meiosis?
A. one identical new cell
B. two identical new cells
C. three identical haploid bodies
D. four gamete cells

Matching:
67. Please match the following term to its definition: Cell Wall
a. Outer covering of a plant cell made of cellulose
b. An organelle used for making proteins
c. The organelle that controls the cell
d. The organelle that releases energy in the cell
e. Used for storage of water and supports the cell

68. Please match the following term to its definition: Ribosome
a. Outer covering of a plant cell made of cellulose
b. An organelle used for making proteins
c. The organelle that controls the cell
d. The organelle that releases energy in the cell
e. Used for storage of water and supports the cell

69. Please match the following term to its definition: Vacuole
a. Outer covering of a plant cell made of cellulose
b. An organelle used for making proteins
c. The organelle that controls the cell
d. The organelle that releases energy in the cell
e. Used for storage of water and supports the cell

70. Please match the following term to its definition: Cytokinesis
a. First phase of mitosis
b. Sister chromatids are attached to each other with this structure
c. The process by which the cytoplasm of a cell divides
d. The chromosomes line up at the center of the cell

71. Please match the following term to its definition: Prophase
a. First phase of mitosis
b. Sister chromatids are attached to each other with this structure
c. The process by which the cytoplasm of a cell divides
d. The chromosomes line up at the center of the cell

72. Please match the following term to its definition: Metaphase
a. First phase of mitosis
b. Sister chromatids are attached to each other with this structure
c. The process by which the cytoplasm of a cell divides
d. The chromosomes line up at the center of the cell

73. What creates variation in the offspring of sexually reproducing organisms?
A. genetic recombination during fertilization
B. mitotic division in body cells
C. crossing over in mitosis
D. homologous chromosomes lining up

74. A branch cut off of a geranium plant grows into a new plant. Will the new plant be different from its parent plant?
A. yes, because mitosis will take place in the new plant.
B. yes, because meiosis will take place in the old plant.
C. no, because meiosis and fertilization did not take place.
D. no, because the new plant was formed from gametes.

75. What is an advantage of asexual reproduction? Offspring that
A. are identical to their parents.
B. resemble their parents.
C. are quite different than their parents.
D. are random and can have different results each time.

76. Mendel theorized that genetic traits are “independently assorted” and one trait does not depend on another for transmission to offspring. What do we know today that makes this theory invalid?
A. Genes on the same chromosome are usually transmitted together.
B. Chromosomes stick together and are often transmitted with each other.
C. The same gene may be responsible for several different traits.
D. Transmission of genes is random and depends on laws of probability

77. Where are genes for sex-linked traits located?
A. They can be on any chromosome
B. On the “Y” chromosome
C. On the “X” chromosome
D. On chromosome pair # 21

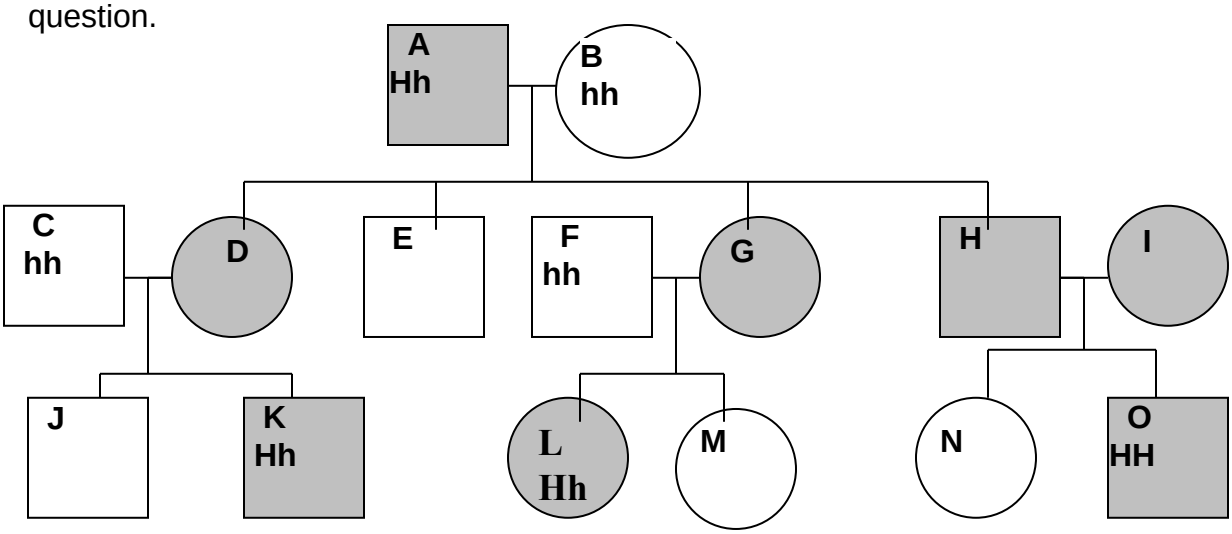
78. A white flower crossed with a red flower produces pink offspring. This is an example of incomplete dominance. If two of the pink-flowered plants are crossed, what ratio will the genotypes of the offspring have?
A. 1 RR: 3 RW
B. 1 RR: 2 RW: 1 WW
C. 2 RW: 2 WW
D. 1 RW: 2 RR: 1 WW

79. Why are blood types considered an example of codominance?
A. there are four types of blood, not two
B. blood type O can be donated to anyone, AB cannot
C. blood types A and B will both be expressed when present
D. there are three alleles for blood type and four types of blood

80. A tall pea plant (DD) and a tall pea plant (Dd) have what in common?
A. phenotype
B. genotype
C. alleles
D. seed color

81. In crossing homozygous dominant and homozygous recessive pea plants, Mendel noted that some genes were not seen in the F1 (first) generation and were seen in only 25% of the F2 (second) generation. What did he call these genes?
A. dominant
B. recessive
C. lethal
D. incompletely dominant

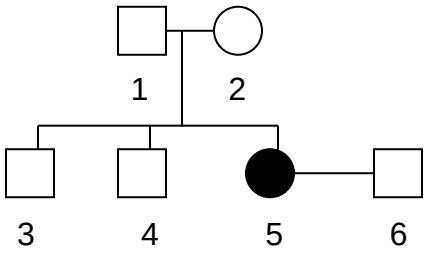
Use the pedigree chart below of Huntington's disease (H) to answer the next question.



82. What is the genotype of individual H?

A. HH
B. Hh
C. hh
D. unable to determine

Answer the next question from the data in the following pedigree.



83. What mode of inheritance of the trait shown in the pedigree is most likely?

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

Use the following information to answer the next question.

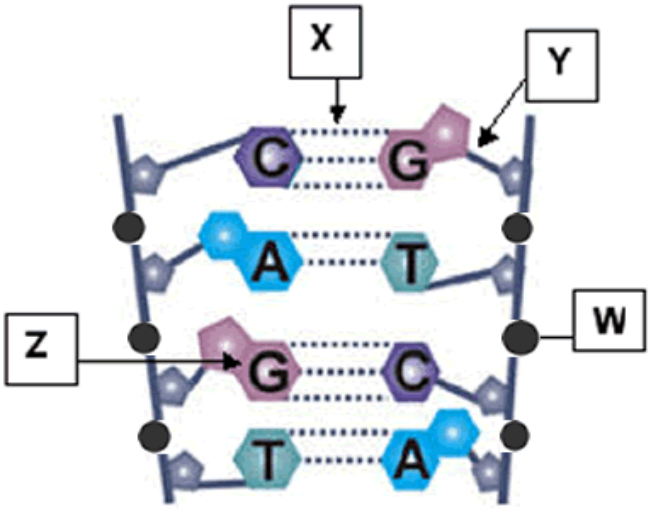
A = normal pigmentation
a = albino

An albino man who married a normally pigmented woman. They have three children: an albino son, a normally pigmented daughter, and a normally pigmented son.

84. What chance does the daughter have of having an albino offspring if she marries a AA man?
A. 0
B. 1/2
C. 1/3
D. 1/4

Use this segment of DNA to answer the next two questions:

85. Which bonds break when DNA replicates? The bonds marked by
A. W
B. X
C. Y
D. Z



86. Why is the order of the molecules labeled C, G, A, and T important?
A. it gives DNA its internal strength to hold together
B. it defines the ability of the organism to reproduce
C. it determines the proteins produced by this DNA
D. it provides a site for DNA polymerase to unwind the DNA.

87. What would be the result if DNA did not replicate during cell division?
A. two new normal cells
B. two new cells with twice as much DNA as normal
C. two new cells with half as much DNA as normal
D. a genetic mutation that would create a small individual.

88. When messenger RNA is translated, what new product forms?
A. DNA
B. tRNA
C. lipid
D. protein

89. If one strand of DNA has the nitrogen bases sequence ATCTG, what is the complementary RNA strands' sequence?
A. UAGAC.
B. AACTG.
C. TACAU.
D. ATCUG.

90. What is the role of t-RNA?
A. to provide a template for protein formation
B. to provide instructions for constructing m-RNA
C. to help line up amino acids in the new protein
D. to allow for the replication of DNA

91. Ultraviolet light from the sun has enough energy to remove a thymine base from a DNA molecule and it is sometimes replaced by a different nucleotide. Where is this change most likely to occur and what might it cause?
A. in the skin, causing skin cancer
B. in the ovaries, causing birth defects in the offspring
C. in the hair, causing a change in hair color
D. in the liver, causing jaundice and hepatitis

In the 1940's a scientist named Chargaff wanted to know how DNA worked. He analyzed DNA and produced results similar to the chart below. Use this chart for the next question.

Source	Number of Nucleotides in a comparable DNA sequence			
	Thymine	Adenine	Cytosine	Guanine
Cow	112	109	82	87
mouse	117	113	87	83
butterfly	94	92	132	133
worm	113	112	96	93
Human	125	109	89	83

92. How did this research aid Watson and Crick to build the first model of DNA?
A. They knew that A nucleotides matched with T
B. They knew that nucleotides were the center of the helix.
C. They built their model without help from other researchers.
D. They knew DNA was different in every different type of organism.

93. What term describes the phosphate, carbon and nitrogenous base groups that make up DNA?
A. RNA
B. thymine
C. nucleotide
D. pyrimidine

94. In DNA transcription a copy of _____ is made
A. Another DNA molecule
B. mRNA
C. Pyruvic acid
D. tRNA

95. One of the products of protein synthesis:
A. Enzymes
B. Carbohydrates
C. Starch
D. Lipids

96. The function of ribosomes is:
A. synthesis of codons
B. produce amino acids
C. synthesis of proteins
D. serve as a messenger to the nucleus

97. RNA has all of the following EXCEPT:
A. adenine
B. ribose sugar
C. thymine
D. cytosine

98. Extracting the nucleus and putting it in a new egg cell is considered what type of genetic technology?
A. genetic engineering
B. genetic cloning
C. gene splicing
D. gene therapy

99. If a female who is a carrier for colorblindness marries a male who is normal, what are the possible phenotypes of their children?
A. ¼ normal, ¾ colorblind
B. ½ normal, ½ colorblind
C. 0 colorblind, 4/4 normal
D. ¼ colorblind, ¾ normal

100. What are the possible genotypes of the offspring if a male with AB blood marries a female with AO blood?
A. AO, AA, AB, BO
B. BO, AB, OO
C. OO, AB, AO, BO
D. AA, AB, BB, BO