

Name \_\_\_\_\_

1) What is the term coined by Robert Hooke that is given to a single unit of life:

2) In what organelle of a typical human cell are the chromosomes found?

3) Which of the following organelles is found in plant cells and NOT in animal cells:

- W) mitochondria
- X) ribosomes
- Y) chloroplasts
- Z) golgi

4) What are the names of the 2 human sex chromosomes?

5) How many single or simple sugars make up a disaccharide?

6) In the process of photosynthesis, plants use sunlight to make carbohydrates. What are the 2 molecules from which carbohydrates are made in plants?

7) What is olfaction the scientific term for?

8) Which of the following is NOT an insect:

- W) spider
- X) flea
- Y) moth
- Z) grasshopper

9) Which of the following is considered a primary function of underarm hair in humans:

- W) insulation from heat and cold
- X) dry lubricant
- Y) to frighten undesirable mates
- Z) it has no known function

10) Which one of the following 5 animals is LEAST related to the others: shark, tuna, bass, swordfish, porpoise

11) What is the most common name for the boundary of all cells without cell walls that separates the inside of the cell from the outside of the cell?

12) Which of the following is the primary function of cotyledons:

- W) storage and production of food
- X) protection of ungerminated seed
- Y) release of a hormone that induces germination
- Z) stimulation of root growth

13) How many X chromosomes does the typical non-reproductive cell of a human female have?

14) What is the most common single sugar or monosaccharide in most animals?

15) What is the name of the joint where the tibia and femur meet?

16) Which of the following would most likely indicate an animal is a carnivore:

- W) long intestine
- X) multiple stomachs
- Y) large canine teeth
- Z) large body size

17) Which one of the following 5 animals is NOT a mammal:

bat; elephant; beaver; penguin; monkey

18) Which of the following cellular structures is NOT found in animal cells:

- W) ribosomes
- X) mitochondria
- Y) cell wall
- Z) golgi

19) What is the most common scientific name for the higher plant organelle that carries on most of the cell's photosynthesis?

20) What does the term DNA stand for?

21) Which of the following is a reptile:

- W) salamander
- X) frog
- Y) lizard
- Z) toad

22) Osmosis is primarily a consequence of the movement of what substance in response to changes in salt, protein and sugar concentrations?

23) In what stage of mitosis do duplicated chromosomes line-up at the equator of cells?

24) Which of the following is a dicot:

- W) dandelion
- X) tulip
- Y) daffodil
- Z) iris

25) Choroid, ciliary muscle, and vitreous humor are all part of what anatomical structure?

26) Which of the following has radial symmetry:

- W) star fish
- X) shark
- Y) human
- Z) bird

27) Which of the following is NOT an organelle:

- W) chloroplast
- X) endoplasmic reticulum
- Y) mitochondria
- Z) chromosome

28) In addition to DNA, human chromosomes are mostly made of what general class of biological molecule?

29) Watson, Crick and Wilkins received a Nobel prize for their roles in discovering which of the following:

- W) DNA
- X) chromosomes
- Y) that chromosomes are made of DNA
- Z) the structure of DNA

30) What is the most common term for the general form of cell that has no nucleus?

31) Unlike at nighttime, a person will achieve sharpest day vision by looking directly straight at an object because:

- W) the center of the visual field has the highest sensitivity to photons
- X) the center of the visual field is where the optic nerve is
- Y) the fovea contains the highest density of cones
- Z) rods are most dense in the center of the visual field

32) What branch of science is dedicated to the naming and organizing of life forms into various categories?

33) LIFE SCIENCE *Multiple Choice* Which of the following human cells contains 23 chromosomes:

- W) zygote
- X) normal liver cell
- Y) skin cell of a female
- Z) an ovum

34) What part of a cell was given a name meaning colored body and contains the genetic material for hereditary?

35) Which of the following is the best term that describes a random change in the base sequence of DNA:

- W) genetic pressure
- X) mutation
- Y) genetic pool
- Z) genetic coding

36) What heart chamber is the most muscular?

37) Which of the following is the vector for the bubonic plague:

- W) tse tse fly
- X) mosquito
- Y) flea
- Z) human

38) Most of the enzymes in a human cell are:

- W) phospholipids
- X) DNA
- Y) proteins
- Z) polysaccharides

38) A red blood cell, when placed in a 25% glucose solution, will do which of the following:

- W) burst
- X) shrink
- Y) stay the same
- Z) cannot be predicted with the information given

39) What is the common name for the human body region where the scapula and humerus meet?

40) When we say a person has blue or brown eyes, to what structure of the eye are we referring?

41) Which of the following does NOT have bilateral symmetry:

- W) human
- X) butterfly
- Y) sea urchin
- Z) spider

42) Which one of the following 5 animals is NOT a rodent:  
chipmunk; beaver; mouse; rabbit; porcupine

43) Which of the following is an enzyme that converts starch to glucose:

- W) insulin
- X) amylase
- Y) trypsin
- Z) hexokinase

44) If a typical human nucleated cell underwent one mitosis and no cytokinesis, how many chromosomes would it contain?

45) All proteins are made of what general class of building blocks that are repeating units in protein structure?

46) Which of the following is NOT a characteristic of birds:

- W) presence of feathers
- X) presence of a beak
- Y) presence of teeth
- Z) presence of well developed lungs

47) Lazzaro Spallanzani and Francesco Redi are best known for which of the following:

- W) disproving the theory of spontaneous generation
- X) making great pepperoni pizza
- Y) proving that malaria is transmitted by mosquitoes
- Z) showing the plague was an infectious disease

48) What organelle inside of the nucleus of a eukaryotic cell is involved with making ribosomes?

49) Which of the following is derived from embryonic ectoderm:

- W) bones
- X) hair and epidermis
- Y) blood
- Z) muscle

50) Which of the following is the most likely reason that Charles Darwin is credited as inventing the theory of evolution:

- W) he was the first person to think of animals evolving from other animals
- X) he was the first person to discover any evidence for evolution
- Y) he was the first person to document his theory in great detail with a lot of observational evidence
- Z) he was a well respected scientist

51) What sense is the most acute in a typical owl of North America?

52) What sense is most acute in raptor birds like hawks and eagles?

53) What term is most commonly used by biologists to describe the process in which chromosomes are divided and properly allocated into sex cells?

54) Which of the following is NOT true about cells:

- W) all cells have a plasma membrane
- X) all living things are composed of cells
- Y) animal cells are on average smaller than plant cells
- Z) plant cells usually have a cell wall just inside the plasma membrane

55) When Gregor Mendel crossed purple flowered pea plants with white flowered pea plants, he usually got mostly seeds that grew into plants with purple flowers. Which of the following best describes the inheritance of the purple flower trait:

- W) hybrid
- X) genotype
- Y) dominant
- Z) allelic

56) What is the general name for the bones in the palm of the human hand?

57) Chlorophyll absorbs what color of light the least?

58) Using a microscope he built himself, Robert Hooke coined the term "cell" after he observed a slice of:

- W) cork from the bark of an oak tree
- X) skin from an onion
- Y) sperm from a frog
- Z) an egg cell of a chicken

59) Which of the following animal classes typically has the simplest heart:

- W) fish
- X) amphibians
- Y) reptiles
- Z) birds

60) Which of the following is NOT true:

- W) all life on Earth is made of a cell or more than one cell
- X) the DNA of all cells on Earth has the same 4 bases
- Y) almost all nucleated cells in a human have the same set of genes
- Z) liver cells are different from brain cells because they have different genes

61) Which of the following is a prokaryote:

- W) malarial parasite
- X) AIDS virus
- Y) E. coli
- Z) human liver cell

62) Which of the following is NOT a characteristic of ferns:

- W) production of spores
- X) fronds for leaves
- Y) typically prefer shady environments
- Z) production of flowers

63) Where, inside of a eukaryotic cell, are proteins typically manufactured:

- W) nucleus

- X) nucleolus
- Y) cytoplasm
- Z) plasma membrane

64) Which of the following is a hormone:

- W) actin
- X) hemoglobin
- Y) cytochrome C
- Z) insulin

65) Which 2 of the following 5 organisms are amphibians:

lizard; toad; alligator; salamander; snake

66) Which of the following is NOT a characteristic of mammals:

- W) mammary glands
- X) hair on most of its body
- Y) presence of gill slits in embryo
- Z) poorly regulated internal temperature

67) Which of the following hormones is involved most directly in human reproduction:

- W) follicle stimulating hormone
- X) melatonin
- Y) thymosin
- Z) antidiuretic hormone

68) What physical structure is most characteristic of the vertebrate class Aves, especially in fossil specimens?

69) Which of the following structures of the human body is NOT properly matched with its function:

- W) pituitary gland and hormone regulation
- X) synapse and connection between two nerves
- Y) myelin and rapid nerve conduction
- Z) spleen and production of insulin

70) What organ of the human body is responsible for the production of bile?

71) The cell's plasma membrane is best described as:

- W) a lipid bilayer with imbedded proteins
- X) a protein bilayer with imbedded proteins
- Y) a carbohydrate bilayer with imbedded lipids
- Z) a protein monolayer with an imbedded lipid bilayer

72) Which one of the following 5 molecules would NOT be considered a lipid: olive oil; cholesterol; wax; saturated fat; maltose

73) What organelle of the typical human body cell produces the majority of the cell's energy?

74) Order the following 4 stages of mitosis from the earliest to occur to the latest: metaphase; prophase; anaphase; telophase

75) What specific pair of glands in humans is primarily responsible for producing epinephrine?

76) Which of the following does NOT function directly in helping cells move:

- W) flagella
- X) cilia
- Y) pseudopodia
- Z) hypha

77) What is the name of the organ found in boney fish that allows them to regulate their buoyancy and float?

78) Which of the following is NOT a typical characteristic of endocrine hormones:

- W) they are produced in one place and act in another
- X) they are usually carried through the blood stream
- Y) they are each produced in large quantities
- Z) they are very powerful

79) LIFE SCIENCE *Multiple Choice* Which of the following functions as a packaging center and modifies proteins for transport out of the cell:

- W) lysosome
- X) nucleolus
- Y) endoplasmic reticulum
- Z) golgi

80) Which of the following is typically the largest organelle in plant cells:

- W) mitochondria
- X) ribosome
- Y) nucleolus
- Z) vacuole

81) Which of the following is NOT true of proteins:

W) they can act as hormones

X) their activity is altered by temperature changes

Y) their activity is altered by pH changes

Z) they store genetic information and pass it from generation to generation

82) The adenine base in one strand of DNA binds with what base on the opposite strand of DNA?

83) Which of the following is NOT true of meiosis:

- W) it prevents mutations from occurring
- X) it functions to reduce the number of chromosomes by one-half
- Y) it increases diversity in off-spring
- Z) it allows for exchange of genes between chromosomes

84) Order the following 4 parts of the digestive system from the one that is involved earliest in digestion to the latest: duodenum; esophagus; jejunum; colon

85) Which of the following vertebrate groups is the most ancient, arriving first in evolution:

- W) amphibians
- X) fish
- Y) reptiles
- Z) birds

86) Which of the following would a botanist most accurately call a salad made of peppers, tomatoes, and olives:

- W) a vegetable salad
- X) a fruit salad
- Y) a fruit and vegetable salad
- Z) a berry salad

87) What 5 carbon sugar is found in DNA?

88) Which of the following elements is found in the least amount by mass in the human body:

- W) oxygen
- X) carbon
- Y) hydrogen
- Z) sodium

89) Give the scientific name for the human bones commonly called the shoulder blade and knee cap?

90) Of the following cell structures, which one is the smallest:

- W) ribosome
- X) nucleolus
- Y) golgi
- Z) chloroplast

91) Ribosomes directly function in which of the following ways:

- W) the storage of genetic information
- X) the digestion of proteins and carbohydrates
- Y) the manufacture of proteins
- Z) the liberation of stored energy

92) Which of the following is the most direct product of meiosis in a flowering plant:

- W) spore
- X) sporophyte
- Y) zygote
- Z) gamete

93) What gland is very effective in removing iodine from the blood to make its primary hormone?

94) Order the following 4 taxonomical groups from the largest to the smallest: genus, order, family, class

95) What symbiotic relationship is characterized by one organism benefiting while the other is harmed?

96) Which of the following environments is NOT properly matched with its biome:

- W) moderately wet summers with long cold winters are characteristic of a taiga
- X) hot wet summers and moderate dry winters are characteristic of a chaparral
- Y) presence of permafrost and cold winters are characteristic of a tundra
- Z) warm and sometimes dry summers and cool to cold winters are characteristic of a temperate grassland

97) Which one of the following 5 molecules is NOT considered a carbohydrate: fructose; glycogen; cellulose; collagen; maltose

98) Which of the following is a structural protein:

- W) keratin
- X) insulin
- Y) ferritin
- Z) RNA polymerase

99) Charles Darwin's evolutionary theory was based mostly on the idea that an organism's environment will allow certain organisms to survive over others. This is most often called:

- W) genetic pressure
- X) genetic insulation
- Y) natural selection
- Z) a genetic bottleneck

100) If blue eye color is recessive and brown eye color is dominant, what is the chance that a blue-eyed woman, who is married to a man who is brown-eyed and who also carries the blue-eyed gene, will have a blue-eyed child?

101) What human arm bone meets the carpals closest to the thumb?

102) Proteins are most directly made from a temporary copy of DNA called:

- W) messenger RNA
- X) c-DNA
- Y) anti-DNA
- Z) amino acid chain

103) What is the name for the most sensitive photoreceptor of the retina?

104) Based on its classification, which one of the following 5 organisms is LEAST related to the others: spider; scorpion; mite; tick; flea

105) Which of the following is NOT generally true concerning heredity:

- W) alternative versions of certain genes cause differences in inherited appearances of offspring
- X) each gamete contributes one-half of the chromosomes to the zygote
- Y) gametes get only one version of each gene
- Z) each human organism has only one copy of a gene for each trait

106) Which one of the following 5 molecules is considered a polysaccharide: cholesterol; glycogen; DNA; insulin; fructose

107) Which of the following is NOT characteristic of gymnosperms like pine and spruce trees:

- W) they have reproductive structures called cones
- X) their leaves are resistant to water loss
- Y) they are dicots and are flowering plants
- Z) they are common across the United States

108) Name any and all of the following 3 plant structures which typically possess stomata: stems, leaves, roots

109) Consider a tomato plant that is limp because it needs to be watered. What cellular organelle is most directly responsible for the limpness in the plant:

- W) vacuole
- X) nucleus
- Y) chloroplast
- Z) mitochondrion

110) Sometimes called the master gland, what endocrine gland releases growth hormone, follicle stimulating hormone, prolactin, and thyroid stimulating hormone?

111) The wing of a hawk and the arm of a primate are considered examples of:

- W) parallel structures
- X) congruent structures
- Y) generate structures
- Z) homologous structures

112) Which of the following is an excretory organ commonly found in insects:

- W) kidney
- X) spirial bladder
- Y) malpighian tubule
- Z) spiracles

ANSWER:

113) What organ of the human body primarily eliminates abnormal and old red blood cells and recycles the iron for new red blood cells?

114) What tissue of the human body is responsible for producing most of the body's red blood cells?

115) LIFE SCIENCE *Multiple Choice* Chitin is a major component of which of the following:

- W) fingernails of primates

- X) shells of crabs
- Y) cartilage of vertebrates
- Z) compact bone of vertebrates

116) What structure of the human ear, named after the Latin word for snail, plays a key role in hearing?

117) Of the 4 chambers of the human heart, which one pumps blood directly to the lungs?

118) What is the common name for the only fish with a prehensile tail that can be used to hold onto seaweed. The female of this species of fish also has the peculiar habit of laying her eggs in the pouch of the male.

119) Which of the following is the most reliable and direct way for a biologist to tell whether the skeleton of an adult human is male or female:

- W) the density of the bones
- X) the number of ribs
- Y) the shape of the pelvis
- Z) the size of the vertebrae

ANSWER:

120) Which one of the following 5 organisms is LEAST related to the others: moth; beetle; flea; ant; scorpion

16) LIFE SCIENCE *Multiple Choice* Which of the following is the most likely reason that many conifers have male cones that grow only on the lower branches and female cones on the upper branches:

- W) to prevent frost damage to the pollen
- X) to allow more sun to ripen the female cones
- Y) to encourage cross-fertilization
- Z) to make it more difficult for squirrels and other animals to eat the cones

ANSWER:

16) LIFE SCIENCE *Short Answer* Place the following 4 stages of development of an insect from the earliest to the latest: pupa, egg, larva, adult

ANSWER:

1) LIFE SCIENCE *Short Answer* Identify any and all of the following 4 organisms that would

be considered motile: E. coli; paramecium; amoeba; Streptococcus

ANSWER:

2) LIFE SCIENCE *Multiple Choice* Which of the following is the primary function of suberin (read as: SOO-burr-in) in plant epidermal cells:

- W) waterproofing
- X) as a toxin to insect invaders
- Y) as a glue to keep cells attached to one another
- Z) coloration

ANSWER:

2) LIFE SCIENCE *Multiple Choice* Which of the following molecules is considered a lipid:

- W) cellulose
  - X) keratin
  - Y) chitin
  - Z) cholesterol
- ANSWER

5) LIFE SCIENCE *Short Answer* What is the name of the most common group of fungi that are unicellular and are commonly used to make bread rise?

ANSWER:

3) LIFE SCIENCE *Short Answer* Which one of the following 5 organisms is NOT a reptile: Iguana; chameleon; anaconda; mud puppy; crocodile

ANSWER:

2) LIFE SCIENCE *Multiple Choice* Which of the following garden plants have root nodules that contain nitrogen-fixing bacteria:

- W) garlic
- X) peas
- Y) tomatoes
- Z) peppers

ANSWER:

4) LIFE SCIENCE *Short Answer* What is the name of the largest leg bone below the knee?

ANSWER:

1) LIFE SCIENCE *Short Answer* How many chromosomes are contained in a typical mature human sperm cell?

ANSWER:

3) LIFE SCIENCE *Short Answer* Birds belong to what class of the animal kingdom?

ANSWER:

3) LIFE SCIENCE *Multiple Choice* The primary use of sunscreen is to protect skin against what form of radiation:

- W) ultraviolet
- X) X-rays
- Y) infrared
- Z) visible

ANSWER:

1) LIFE SCIENCE *Short Answer* What is the name for the opening in the center of the iris of the human eye that lets light into the eye?

ANSWER:

1) LIFE SCIENCE *Multiple Choice* Which of the following is the embryonic root of a plant seed:

- W) radicle
- X) cotyledon
- Y) hypocotyl
- Z) suspensor

ANSWER:

6) LIFE SCIENCE *Short Answer* What is the common name for the tympanic membrane found in humans?

ANSWER:

6) LIFE SCIENCE *Short Answer* What is the term first used by Charles Darwin that is the principle mechanism for evolutionary change



where individuals having certain characteristics contribute more offspring to succeeding generations?

ANSWER:

11) LIFE SCIENCE *Short Answer* What is the most common scientific term for the general type of cell that has a nucleus?

ANSWER:

11) LIFE SCIENCE *Short Answer* In the leaf cell of a maple tree, what organelle is responsible for photosynthesis?

ANSWER:

16) LIFE SCIENCE *Multiple Choice* Which of the following is NOT true of carotenoids or beta carotenes:

- W) they protect chlorophyll from excess sunlight
- X) they produce orange color in fruit and leaves
- Y) they are vitamin precursors in human diets
- Z) in maple trees, they are produced mostly in the autumn

ANSWER:

16) LIFE SCIENCE *Short Answer* The end of the femur, the end of the tibia, and the patella make up what joint in the human body?

ANSWER:

21) LIFE SCIENCE *Short Answer* Which one of the following 4 plant products are NOT considered fruits by a botanist: tomatoes; potatoes; eggplants; pumpkins

ANSWER:

21) LIFE SCIENCE *Short Answer* Which one of the following 5 choices would usually have a cell wall: liver cell; chloroplast; bacterium; plant cell; red blood cell

ANSWER:

1) LIFE SCIENCE *Short Answer* What is another name for the voice box in humans that connects the throat and trachea?

ANSWER:

1) LIFE SCIENCE *Multiple Choice* Where is the smallest bone in the human body located:

- W) in the middle ear
- X) in the little toe
- Y) inside the nasal cavity
- Z) on the last lumbar vertebra

ANSWER:

6) LIFE SCIENCE *Multiple Choice* Which of the following is LEAST accurate concerning energy on Earth:

- W) sunlight energy is captured and stored as chemical energy
- X) fossil fuels have chemical energy derived from the sun
- Y) all forms of energy on earth are derived from the sun
- Z) photosynthesis converts water and carbon dioxide into starch and molecular oxygen

ANSWER:

6) LIFE SCIENCE *Multiple Choice* Which of the following food sources do baleen whales primarily feed upon:

- W) plankton and krill
- X) small fish
- Y) fish and free floating sea weed
- Z) mollusks and diatoms

ANSWER:

11) LIFE SCIENCE *Multiple Choice* Which of the following is NOT a typical characteristic of birds:

- W) feathers
- X) hollow bones
- Y) well-developed lungs
- Z) teeth

ANSWER:

11) LIFE SCIENCE *Short Answer* Order the following taxonomical groups from the largest to the smallest: order; class; species; phylum

ANSWER:

16) LIFE SCIENCE *Multiple Choice* Which of the following is the LEAST accurate statement:

- W) the most common source of energy for human brain cells is glucose
- X) cellulose is a polymer of glucose
- Y) starch is a polymer of glucose
- Z) humans can digest cellulose into glucose

ANSWER:

16) LIFE SCIENCE *Multiple Choice* All cells have a :

- W) cell wall
- X) cell membrane
- Y) chloroplast
- Z) nucleus

ANSWER:

21) LIFE SCIENCE *Short Answer* Sleeping sickness is to the tsetse (read as: set-see) fly as malaria is to what organism?

ANSWER:

21) LIFE SCIENCE *Short Answer* Name any and all of the following vegetables that a botanist would consider to be primarily a stem: kale; broccoli; sweet potato; celery; asparagus

ANSWER:

1) LIFE SCIENCE *Multiple Choice* The carbon in glucose that is made by plants from photosynthesis comes from:

- W) carbon stored in soil nutrients
- X) carbon absorbed from roots
- Y) carbon gas absorbed mostly through roots
- Z) carbon dioxide taken in through leaves

ANSWER:

1) LIFE SCIENCE *Short Answer* Name all of the following vegetables that a botanist would consider to be a seed: kernel of corn; potato; onion; beet; pea

ANSWER:

6) LIFE SCIENCE *Multiple Choice* Which of the following organisms would most likely be considered a saprophyte:

- W) anthrax bacteria
- X) Euglena (read as: you-GLEE-nah)
- Y) mushroom

- Z) tapeworm

ANSWER:

6) LIFE SCIENCE *Short Answer* What is the most common term for the symbiotic relationship between two organisms where one benefits and the other is harmed?

ANSWER:

11) LIFE SCIENCE *Multiple Choice* Which of the following tissues or cell types is most directly responsible for preventing water loss in plants:

- W) phloem
- X) xylem
- Y) epidermis
- Z) parenchyma

ANSWER:

11) LIFE SCIENCE *Short Answer* What are the two most important gases that diffuse into and out of the human body through the lungs?

ANSWER:

16) LIFE SCIENCE *Multiple Choice* Which of the following is NOT part of the central nervous system:

- W) cerebral cortex
- X) cerebellum
- Y) spinal cord
- Z) peripheral nerves

ANSWER

16) LIFE SCIENCE *Multiple Choice* Which of the following is a scientific instrument most commonly used in the sterilization of equipment:

- W) autoclave
- X) gonculator
- Y) incubator
- Z) spectronic 20

ANSWER:

21) LIFE SCIENCE *Short Answer* What is the name for the hardest substance in the human body?

ANSWER:

21) LIFE SCIENCE *Multiple Choice* Which of the following organisms has the least number of teeth:

- W) shark
- X) narwhal
- Y) pig
- Z) horse

ANSWER:

1) LIFE SCIENCE *Multiple Choice* At the end of all stages of meiosis in a human oocyte or egg cell, which of the following is true:

- W) 2 egg cells of equal size are produced
- X) 4 egg cells of equal size are produced
- Y) 1 large cell and 1 small cell are produced
- Z) 1 large cell and 3 small cells are produced

ANSWER:

1) LIFE SCIENCE *Short Answer* Name any and all of the following 3 plants that germinate from a seed with one cotyledon: maple tree; dandelion; lily

ANSWER:

1) LIFE SCIENCE *Short Answer* Name all of the following 3 plants that are ephemerals: maple tree; trillium, lady's slipper

6) LIFE SCIENCE *Multiple Choice* Which of the following is the longest section of the digestive tract:

- W) small intestine
- X) large intestine
- Y) esophagus
- Z) stomach

ANSWER:

6) LIFE SCIENCE *Multiple Choice* The Achilles tendon is located where in the human body:

- W) the wrist

- X) the ankle
- Y) the shoulder
- Z) the lower back

ANSWER:

11) LIFE SCIENCE *Multiple Choice* The anopheles mosquito will transmit malaria from an infected person to a non-infected person. In this case, the mosquito is serving as which of the following:

- W) a communal organism
- X) a vector
- Y) a keystone species
- Z) a saprophyte

ANSWER:

11) LIFE SCIENCE *Multiple Choice* Which of the following statements concerning proteins is LEAST accurate:

- W) all proteins contain amino acids
- X) proteins typically contain some sulfur
- Y) proteins often function as catalysts
- Z) all hormones are proteins

ANSWER:

16) LIFE SCIENCE *Multiple Choice* Which of the following organisms has cilia covering its body, an oral groove, a contractile vacuole, and can be seen easily with a light microscope:

- W) *E. coli*
- X) planaria
- Y) *Paramecium*
- Z) hydra

ANSWER:

16) LIFE SCIENCE *Multiple Choice* Which of the following is the location of the deltoid muscles:

- W) shoulder

- X) ankle
- Y) hip
- Z) thigh

ANSWER:

21) LIFE SCIENCE *Short Answer* Meat-eater is to carnivore as plant-eater is to what?

ANSWER:

21) LIFE SCIENCE *Short Answer* Scientists call the process of converting DNA to RNA transcription. What is the most common term for converting RNA into protein?

ANSWER:

1) LIFE SCIENCE *Multiple Choice* What color of visible light is absorbed LEAST by chlorophyll:  
W) blue  
X) violet  
Y) red  
Z) green

ANSWER:

1) LIFE SCIENCE *Short Answer* Order the following 4 stages of development in an insect from the youngest stage to the oldest: larva; egg; pupa; adult

ANSWER:

6) LIFE SCIENCE *Multiple Choice* Cochlear (read as: KO-klee-are) hair cells are present in which of the following parts of the human body:

- W) ears
- X) eyelashes
- Y) eyebrows
- Z) toes

ANSWER:

6) LIFE SCIENCE *Short Answer* Name any and all of the following 5 vegetables that a botanist would consider to be a flower: brussels sprout; broccoli; asparagus; cauliflower; mushroom

ANSWER:

11) LIFE SCIENCE *Multiple Choice* Which of the following statements is typically NOT true:

- W) plant cells have cell walls

- X) animal cells do not have cell walls
- Y) plant cells do not have a cell membrane
- Z) animal cells have a cell membrane

ANSWER:

11) LIFE SCIENCE *Short Answer* Which 2 of the following 4 whales are considered toothed whales: blue whale, sperm whale, humpback whale, killer whale

ANSWER:

16) LIFE SCIENCE *Multiple Choice* Which of the following is NOT a characteristic of mammals:

- W) hair covering most of the body
- X) mammary glands
- Y) open circulatory system
- Z) 4 chambered heart

ANSWER:

16) LIFE SCIENCE *Short Answer* What term, meaning fungus root, is an association of fungi with roots of higher plants and is found in forest soils throughout the world?

ANSWER:

21) LIFE SCIENCE *Short Answer* The filament and anther make up what specific structure of a flower?

ANSWER:

21) LIFE SCIENCE *Multiple Choice* Which of the following statements about human chromosomal DNA is NOT correct:

- W) DNA is a large double stranded polymer
- X) each strand of DNA is oriented in a direction opposite to the opposing strand
- Y) cytosine binds to adenine
- Z) DNA is composed of nucleotides which are made of a sugar, a phosphate, and a base

ANSWER:

1) LIFE SCIENCE *Multiple Choice* Which of the following NOT a rodent:

- W) rat
- X) rabbit
- Y) mouse
- Z) squirrel

ANSWER

1) LIFE SCIENCE *Multiple Choice* Which of the following is NOT correct concerning human reproduction:

- W) ovulation typically occurs about 15 days after the start of menstruation
- X) the male gametes determine the sex of the baby
- Y) fertilization of the egg usually occurs in the uterus
- Z) the mature egg cell has a large amount of cytoplasm

ANSWER:

6) LIFE SCIENCE *Multiple Choice* Bioterrorists have recently used the agent ricin. From what source is ricin derived:

- W) animal
- X) plant
- Y) bacteria
- Z) inorganic chemical

ANSWER:

6) LIFE SCIENCE *Multiple Choice* Which of the following is NOT true about the human body:

- W) finger nails appear pink because of blood flowing below them
- X) the Adam's apple is the common name for a piece of cartilage in the throat that lines part of the esophagus
- Y) hair is composed of dead cells
- Z) when sweat evaporates, it draws heat from the body to cool it down

ANSWER:

11) LIFE SCIENCE *Multiple Choice* Which of the following is an intracellular parasite:

- W) leech
- X) tapeworm
- Y) malaria
- Z) *Ascaris*

ANSWER:

11) LIFE SCIENCE *Multiple Choice* Which of the following is NOT true of cartilaginous fish like sharks and skates:

- W) they do not possess true bones in their skeletons
- X) they are common in both marine and fresh water environments
- Y) they lack a swim bladder
- Z) they have a well-developed lateral line

ANSWER:

16) LIFE SCIENCE *Multiple Choice* Which of the following organelles is NOT properly matched with its function in the cell:

- W) mitochondrion and energy production
- X) golgi and digestion of unwanted cellular products
- Y) ribosomes and protein synthesis
- Z) chloroplasts and conversion of energy into starch

ANSWER:

16) LIFE SCIENCE *Multiple Choice* Which of the following is a function of plasma membranes that requires the cell to expend stored energy to move molecules into and out of a cell:

- W) Brownian motion
- X) active transport
- Y) passive diffusion
- Z) simple diffusion

ANSWER:

21) LIFE SCIENCE *Short Answer* Consider a plant with a tap root and net venation in its leaves. How many cotyledons would this plant most likely have as a seedling?

ANSWER:

21) LIFE SCIENCE *Multiple Choice* Which of the following objective lenses is recommended to be used when first focusing on a specimen in a typical student compound light microscope:

- W) low power
- X) medium power
- Y) high power
- Z) oil immersion lens

ANSWER

1) LIFE SCIENCE *Multiple Choice* Which of the following four fabrics is NOT properly matched with its biological source:

- W) angora - rabbit
- X) camel hair - camel
- Y) cashmere - llama
- Z) mohair - goat

ANSWER:

1) LIFE SCIENCE *Short Answer* What is the common term for the nervous impulse that travels from a sensory nerve cell up to the spinal cord, then out through a motor nerve to move a muscle, all without involvement of the brain?

ANSWER:

6) LIFE SCIENCE *Multiple Choice* Intercostal arteries are found in which of the following locations in the human body:

- W) eyes
- X) ears
- Y) knees
- Z) ribs

ANSWER:

6) LIFE SCIENCE *Multiple Choice* When biologists assign a binomial or genus and species name to an organism, which of the following is the most typical and proper form they will use for the name:

- W) the genus and species are both capitalized and in plain text
- X) the genus and species are both lower case and in plain text
- Y) the genus is capitalized and species is lower case, while both are in plain text
- Z) the genus is capitalized and species is lower case, while both are in italics or underlined

ANSWER:

11) LIFE SCIENCE *Multiple Choice* Which of the following is NOT correct concerning the human reproductive system:

- W) each uterus typically is joined to 2 fallopian tubes
- X) implantation of the fertilized egg occurs in the uterus

Y) ovulation often is associated with a small, temporary rise in body temperature  
Z) only females typically produce estrogen

ANSWER:

11) LIFE SCIENCE *Short Answer* What are the 3 main types of muscle present in the human body?

ANSWER:

16) LIFE SCIENCE *Multiple Choice* Which of the following human cells is NOT properly matched with its function:

- W) erythrocyte and oxygen transport
- X) hepatocyte and production of bile
- Y) axon and nerve conduction
- Z) oocyte (read as: oh-oh-site) and production of bone

ANSWER:

16) LIFE SCIENCE *Short Answer* What is the name of the nitrogen base molecule that transmits most of the short term energy needed by cells of all living things?

ANSWER:

21) LIFE SCIENCE *Short Answer* What is the most common name of the substance that young worker bee larvae feed on to become queen bees?

ANSWER:

21) LIFE SCIENCE *Multiple Choice* Which of the following is the most plentiful protein found in the fluid portion of human blood and NOT contained inside of cells:

- W) hemoglobin
- X) albumin
- Y) antibodies
- Z) vitamins

ANSWER:

1) LIFE SCIENCE *Multiple Choice* Which of the following makes up the innermost layer of the human tooth:

- W) dentin
- X) enamel

- Y) cartilage
- Z) pulp

ANSWER:

1) LIFE SCIENCE *Short Answer* Which 2 of the following 4 organisms have no nucleus:  
*E. coli; paramecium; staphylococcus; amoebae*

ANSWER:

6) LIFE SCIENCE *Multiple Choice* Which of the following is typically the most serious current cause of species endangerment and potential extinction of animals such as the tiger and gorilla:

- W) water pollution
- X) infectious disease
- Y) habitat loss
- Z) starvation

ANSWER:

6) LIFE SCIENCE *Short Answer* What main subdivision of the brain is located near the brain stem and is primarily responsible for coordinated movements of the body?

ANSWER:

11) LIFE SCIENCE *Multiple Choice* Which of the following is NOT a characteristic of the taxonomical class Reptilia:

- W) an amniotic or shelled egg
- X) poor body temperature regulation
- Y) scales containing keratin
- Z) external fertilization

ANSWER:

11) LIFE SCIENCE *Short Answer* The oxygen released by plants during photosynthesis is derived from what molecule?

ANSWER:

16) LIFE SCIENCE *Multiple Choice* Which of the following was Rosalind Franklin's critical contribution to deciphering the structure of DNA:

- W) she showed adenine was found in the same amount as thymine
- X) she showed that DNA was the genetic material

- Y) she proved that adenine bonded to thymine and cytosine to guanine
- Z) she produced an X-ray diffraction picture that showed DNA's structure

ANSWER:

16) LIFE SCIENCE *Multiple Choice* Which of the following cell types is most directly responsible for the production of antibodies:

- W) lymphocyte
- X) osteocyte
- Y) neuron
- Z) erythrocyte

ANSWER:

21) LIFE SCIENCE *Short Answer* Bowman's capsule, nephron, and glomerulus are structures found in what human organ?

ANSWER:

21) LIFE SCIENCE *Short Answer* A single codon on a messenger RNA is made of how many nitrogen bases?

ANSWER:

1) LIFE SCIENCE *Multiple Choice* In a skiing accident, Jerry fractured his malleolus. Which of the following did he fracture:

- W) collar bone
- X) jaw
- Y) wrist
- Z) ankle

ANSWER:

1) LIFE SCIENCE *Short Answer* Which 2 of the following 4 diseases is caused by infectious agents that are not considered to be alive: sleeping sickness; measles; TB; chicken pox

ANSWER:

6) LIFE SCIENCE *Multiple Choice* Which of the following statements of human biology is MOST accurate:

- W) when blood is exposed to air it turns from blue to red
- X) the air we exhale from our lungs has about 50% less oxygen than inhaled air

- Y) every cell in our body has a nucleus  
Z) the thymus gland is an important part of the immune system, especially early in development

ANSWER:

- 6) LIFE SCIENCE *Short Answer* Which 2 of the following 4 trees would most likely be found in greatest abundance in a boreal forest: fir, sycamore, cottonwood, spruce

ANSWER:

- 11) LIFE SCIENCE *Multiple Choice* The human salivary glands produce which of the following enzymes that aid in the digestion of starch:

- W) pepsin  
X) amylase  
Y) insulin  
Z) glycogen

ANSWER:

- 11) LIFE SCIENCE *Short Answer* Which 2 of the following 4 diseases are caused by viruses: chicken pox; strep throat; cholera; herpes

ANSWER:

- 16) LIFE SCIENCE *Multiple Choice* Which of the following statements concerning plants is NOT true:

- W) red maple trees have red flowers  
X) conifer trees are wind-pollinated  
Y) pollen is a rich protein source for bees  
Z) legume crops typically require high nitrogen fertilizers

ANSWER:

- 16) LIFE SCIENCE *Short Answer* Ribosomes are most often attached to what organelle during protein synthesis?

ANSWER:

- 21) LIFE SCIENCE *Short Answer* What human organ is responsible for the production of insulin?

ANSWER:

- 21) LIFE SCIENCE *Multiple Choice* Which of the following parts of the body would an anthropologist find most valuable in identifying a humanoid as male or female:

- W) skull  
X) backbone  
Y) rib cage  
Z) pelvis

ANSWER:

- 1) LIFE SCIENCE *Multiple Choice* Which of the following is NOT true about the respiratory system in the human body:

- W) the right lung has 2 lobes and the left lung has 3 lobes  
X) when the diaphragm relaxes, air escapes from the lungs  
Y) the uvula is in the back of the soft pallet  
Z) the airways between the nose and the top of the windpipe are lined with cells that have cilia  
ANSWER:

- 1) LIFE SCIENCE *Short Answer* Order the following stages of mitosis from the earliest to the latest: anaphase; prophase; metaphase; telophase  
ANSWER:

- 6) LIFE SCIENCE *Multiple Choice* Which of the following statements is NOT true concerning energy storage in organisms:

- W) a potato plant stores starch in a tuber  
X) a human stores glycogen in its liver  
Y) mammals use ATP for long term energy storage in fat cells  
Z) fructose is a common sugar stored in fruits

ANSWER:

- 6) LIFE SCIENCE *Short Answer* Concerning flowering plants, which 2 of the following 4 environmental variables are typically most important for seed germination: temperature; light; moisture; fertilizer

ANSWER:

- 11) LIFE SCIENCE *Multiple Choice* The sternocleidomastoid muscle, sometimes called



the SCM, is found in which of the following parts of the human body:

- W) neck
- X) pelvis
- Y) knee
- Z) foot

ANSWER:

11) LIFE SCIENCE *Short Answer* Name any and all of the following 4 molecules that are NOT enzymes: amylase; insulin; transaminase; collagen

ANSWER:

16) LIFE SCIENCE *Multiple Choice* Which of the following plants does NOT produce seeds:

- W) pine tree
- X) dandelion
- Y) lily
- Z) fern

ANSWER:

16) LIFE SCIENCE *Multiple Choice* Which of the following is NOT part of a flower's reproductive structure:

- W) stigma
- X) pollen
- Y) placenta
- Z) epididymous (read as: ep-ee-DID-ih-muss)

ANSWER:

21) LIFE SCIENCE *Multiple Choice* Which of the following statements is NOT true concerning the human body:

- W) white bone marrow has more fat than red bone marrow
- X) muscles are attached to bones by tendons
- Y) hair and fingernails are made mostly of the protein chitin (read as: KEYE-tin)
- Z) albumin is a common protein in the blood plasma

ANSWER:

21) LIFE SCIENCE *Short Answer* What common fabric is derived from the stalk of the flax plant?

ANSWER:

1) LIFE SCIENCE *Multiple Choice* Which of the following is NOT true:

- W) tincture of iodine turns blue-black when added to starch
- X) pasteurization does not sterilize milk
- Y) bacteria naturally found on the skin of grapes are useful in the fermentation of grapes into wine
- Z) yogurt is made by adding certain strains of bacteria to milk

ANSWER:

1) LIFE SCIENCE *Short Answer* What are the three sections of the human small intestine, starting with the one immediately after the stomach and progressing in order thereafter?

ANSWER:

6) LIFE SCIENCE *Short Answer* What is the oxygen carrying protein that is the primary component of red blood cells in humans?

ANSWER:

11) LIFE SCIENCE *Multiple Choice* Which of the following is the best description of the semipermeable membrane that makes up the cell membrane of human cells:

- W) it is made mostly of lipids and sugars and is quite rigid
- X) it regulates the entrance and exit of molecules from the cell and is made of mostly lipids and proteins
- Y) it surrounds the cell wall and regulates the transfer of water and organic molecules into and out of cells
- Z) it is made mostly of protein and filters fluids entering cells

ANSWER:

11) LIFE SCIENCE *Short Answer* How many codons are in the genetic code?

ANSWER

16) LIFE SCIENCE *Multiple Choice* Which of the following parts of a cell plays the most direct role in joining amino acids into proteins:

- W) nucleolus
- X) nucleus
- Y) ribosome
- Z) mitochondrion

ANSWER:

16) LIFE SCIENCE *Short Answer* Order the following four items from the smallest to the largest:

*E. coli*; polio virus; erythrocyte; sun flower pollen

ANSWER:

21) LIFE SCIENCE *Short Answer* At the start of metaphase during mitosis in human cells, how many chromatids will a typical chromosome have?

ANSWER:

21) LIFE SCIENCE *Multiple Choice* Which of the following structures is NOT properly matched with its primary function in plants:

- W) root cap and protection of growing root tip
- X) stomata and gas exchange in leaves
- Y) root hairs and absorption of soil nutrients and water
- Z) phloem and storage of starch and water

ANSWER

1) LIFE SCIENCE *Multiple Choice* Which of the following is the best example of a biological or organic catalyst that is composed of amino acids:

- W) ribonucleic acid
- X) amylase
- Y) testosterone
- Z) estrogen

ANSWER

2) LIFE SCIENCE *Multiple Choice* Which of the following animals would most likely contain substantial amounts of chitin:

- W) cat
- X) clam
- Y) crab
- Z) bird

ANSWER:

6) LIFE SCIENCE *Multiple Choice* Which of the following is a vein that is unusual because it returns oxygen-rich blood to the heart:

- W) aorta
- X) coronary
- Y) pulmonary
- Z) carotid

ANSWER:

11) LIFE SCIENCE *Multiple Choice* DNA is made from repeating subunits called nucleotides. Which of the following best describes the 3 main molecules from which a nucleotide is composed:

- W) a base, an amino acid, and a sugar
- X) a base, a ribosome, and a phosphate
- Y) a base, an amino group, and a phosphate
- Z) a base, a sugar, and a phosphate

ANSWER:

11) LIFE SCIENCE *Multiple Choice* Which of the following does NOT typically occur during mitosis in normal human cells:

- W) chromosomes line up on the metaphase plate
- X) spindle fibers attach to chromosomes
- Y) crossing over and synapsis
- Z) duplicated chromosomes split into two equal parts

ANSWER:

16) LIFE SCIENCE *Multiple Choice* Which of the following is typically the largest organelle in plant cells:

- W) lysosome
- X) mitochondrion
- Y) vacuole
- Z) ribosome

ANSWER:

16) LIFE SCIENCE *Short Answer* Name all of the following 4 diseases that are NOT caused by protozoans: malaria; sleeping sickness; tuberculosis; polio

ANSWER:

21) LIFE SCIENCE *Short Answer* In humans, urine is collected from the kidneys and delivered to the urinary bladder by what tubular structures?

ANSWER:

21) LIFE SCIENCE *Short Answer* How many mitotic divisions must one egg cell of a plant undergo to produce 8 nuclei?

ANSWER: 3

1) LIFE SCIENCE *Multiple Choice* Which of the following is the BEST reason why in a human embryo, certain cells mature into muscle cells while others become brain cells:

- W) they contain different genes
- X) they contain different chromosomes and therefore different proteins
- Y) they have the same chromosomes but different genes
- Z) they have the same chromosomes but differ mainly in the activation of genes and production of proteins

ANSWER:

1) LIFE SCIENCE *Short Answer* In a typical non-sex human cell, if cytokinesis (read as: SIGH-toe-kin-EE-sis) did not occur at the end of mitosis, how many chromosomes would the cell contain?

ANSWER:

6) LIFE SCIENCE *Short Answer* What is the name of the form of RNA that carries an amino acid and binds to a codon on the messenger RNA?

ANSWER

6) LIFE SCIENCE *Short Answer* If blue eye color is recessive and brown eye color is dominant, what is the chance that a blue-eyed woman, who is married to a man who is brown-eyed and who also carries the blue-eyed gene, will have a brown-eyed child?

ANSWER:

11) LIFE SCIENCE *Multiple Choice* A typical mitochondrion is about the same size as:

- W) a polio virus
- X) a red blood cell
- Y) most bacteria
- Z) a ribosome

ANSWER:

11) LIFE SCIENCE *Short Answer* When using a binocular compound light microscope, what is the magnification that results if an objective lens of 80X power is used with ocular lenses that are 12X power?

ANSWER:

16) LIFE SCIENCE *Multiple Choice* Which of the following instruments or techniques would most commonly be used to separate red blood cells from plasma:

- W) dialysis
- X) paper chromatography
- Y) autoclaving
- Z) centrifugation

ANSWER:

21) LIFE SCIENCE *Short Answer* Which one of the following 5 organisms is NOT related to the others: *E. coli*; *Streptococcus*; *Paramecium*; *Staphylococcus*; anthrax bacillus

ANSWER:

21) LIFE SCIENCE *Short Answer* Human hemophilia is caused by a recessive gene carried on the X chromosome. If a woman is a carrier and marries a non-hemophiliac man, what chance is there that a daughter of theirs will have hemophilia?

ANSWER:

1) LIFE SCIENCE *Multiple Choice* Which of the following statements concerning evolution is NOT true:

- W) many insects have co-evolved with plants
- X) a whale's flipper and a human's arm are examples of homologous structures
- Y) evidence for evolution is found in both fossils and genetic analysis

Z) mutations are mistakes in genes which prevent evolution from progressing

ANSWER:

1) LIFE SCIENCE *Multiple Choice* Which of the following is NOT a characteristic of cellular enzymes:

- W) they are made of amino acids
- X) they are consumed in the reaction they stimulate
- Y) they allow reactions to occur at faster rates
- Z) they are critical in thousands of cellular functions

ANSWER:

6) LIFE SCIENCE *Multiple Choice* Milfoil, spurge, cheat grass, and zebra mussels are common examples of:

- W) keystone species
- X) invasive species
- Y) successor species
- Z) genetically engineered species

ANSWER:

11) LIFE SCIENCE *Multiple Choice* A plant growing towards a light source is most directly an example of:

- W) phototropism
- X) gibberellin inactivation by auxin
- Y) activation of growth hormones by light
- Z) increased meiosis in shoot tips

ANSWER:

11) LIFE SCIENCE *Short Answer* What is the most common term used by biologists for the specific form of diffusion that causes a red blood cell to shrink when placed in a saturated salt solution?

ANSWER:

16) LIFE SCIENCE *Multiple Choice* Which of the following is LEAST likely true for plants that depend on wind for pollination:

- W) they produce large amounts of pollen
- X) they produce dry pollen of small size
- Y) they have brightly colored flowers
- Z) they have small, numerous green flowers

ANSWER:

16) LIFE SCIENCE *Multiple Choice* Nitrogen fixation is most crucial for producing a component of which of the following basic biological molecules:

- W) carbohydrate
- X) lipid
- Y) protein
- Z) sugar

ANSWER:

21) LIFE SCIENCE *Short Answer* What two ions, when diffusing across a cell membrane, are primarily responsible for signal conduction in nerves?

ANSWER:

21) LIFE SCIENCE *Short Answer* Through what specific structure must a messenger RNA pass when leaving the nucleus and passing immediately into the cytoplasm?

ANSWER:

2) LIFE SCIENCE *Short Answer* Give the scientific names for the three types of bacteria that correspond to spherical, rod, and spiral shapes?

ANSWER:

2) LIFE SCIENCE *Multiple Choice* Which of the following statements is NOT true concerning genes and DNA:

- W) genes have a sequence of bases that determines the sequence of amino acids in a protein
- X) all DNA in eukaryotic cells have 4 different base nucleotides
- Y) chromosomes in humans are made of pure DNA
- Z) human non-sex cells typically have 46 chromosomes

ANSWER:

4) LIFE SCIENCE *Short Answer* Which 2 of the following 5 molecules would NOT be

considered a carbohydrate: amylase; cellulose;  
starch; cholesterol; sucrose

ANSWER

5) LIFE SCIENCE *Short Answer* In humans,  
the foot is to the metatarsal as the hand is to the  
what?

ANSWER:

1) LIFE SCIENCE *Multiple Choice* Which of  
the following is NOT true concerning DNA:

- W) it has 2 strands
- X) it contains nitrogen bases
- Y) it contains repeating phosphates
- Z) it contains the 6-carbon sugar ribose

ANSWER:

3) LIFE SCIENCE *Multiple Choice* Which one  
of the following parasitic diseases will most  
likely cause massive destruction of red blood  
cells:

- W) sleeping sickness
- X) malaria
- Y) yellow fever
- Z) Chaga's disease

ANSWER:

3) LIFE SCIENCE *Short Answer* A deficiency  
in what vitamin in humans most commonly  
result in night blindness?

ANSWER:

4) LIFE SCIENCE *Multiple Choice* Which of  
the following is NOT a typical characteristic of  
human vitamins:

- W) they are needed in small quantities in the  
diet
- X) they help certain biochemical reactions occur
- Y) they are consumed in biochemical reactions  
and not able to be reused
- Z) they are unable to remain in sufficient  
quantities in humans

ANSWER