# LIFE SCIENCE

## QUESTION CATALOGUE

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# Life Science

**Question Catalogue Index**

## I. UNITY AND DIVERSITY OF LIVING THINGS



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# IV. REPRODUCTION AND DEVELOPMENT

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774. When a soccer players runs faster and for a longer time the circulatory system supplies her body cells with more nutrients and oxygen then when she's resting. This statement best illustrates the concept of

**(A) homeostasis** (C) synthesis
(B) nutrition (D) cyclosis

1535. When an individual goes without eating for a day, his or her blood sugar level remains about the same throughout the day. This relatively constant condition is maintained by

**(A) homeostatic control** (C) reproduction
(B) egestion (D) growth of cells

1745. Which statement best describes an activity that will contribute to the maintenance of homeostasis in an organism?

(A) A shark swims toward a highly polluted region of the ocean.
**(B) A desert rattlesnake enters an underground burrow on a hot summer day.**
(C) Roots of a willow tree grow away from a moisture-rich region of the soil.
(D) A polar bear sheds most of its fur during the coldest months of the winter.

1952. Maintenance of the pH of human blood within a certain range is an example of

(A) digestion (C) respiration
(B) synthesis **(D) homeostasis**

2182. Which term refers to the maintenance of a stable internal environment in an organism?

(A) respiration (C) metabolism
(B) regulation **(D) homeostasis**

3332. During a race, the body temperature of a runner increases. The runner responds by sweating, which lowers body temperature. This process is an example of

**(A) maintenance of homeostasis**
(B) an alergic reaction
(C) egestion of waste products
(D) muscular fatigue

3893. In a changing external environment, an organism must be able to maintain relatively constant internal conditions. This maintenance of a stable internal environment is known as

(A) transport **(C) homeostasis**
(B) metabolism (D) nutrition

4183. Organisms undergo constant chemical changes as they maintain an internal balance known as

(A) interdependence (C) synthesis
**(B) homeostasis** (D) recombination

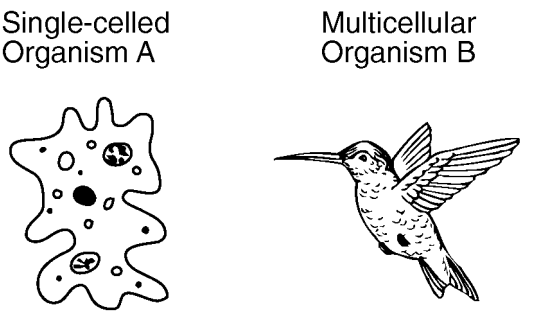
4024. When a person exercises, small blood vessels near the surface of the skin change in size and allow the body to cool. This best shows

(A) synthesis (C) excretion
**(B) homeostasis** (D) locomotion

4174. Both a deer and a tree react to changes in their external surroundings, helping them to maintain a constant internal environment. This statement describes

(A) predation (C) antibiotic resistance
**(B) homeostasis** (D) autotrophic nutrition

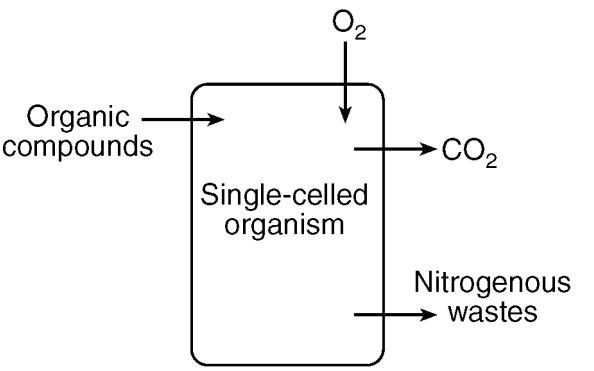
4203. Two organisms are represented below.




Which statement concerning organism *A* and organism *B* is correct?

(A) Organism *A* contains tissues while organism *B* lacks tissues.
(B) Organism *A* and organism *B* have the same organs.
**(C) Organism *A* and organism *B* have structures that allow them to maintain homeostasis.**
(D) Organism *A* lacks structures that maintain a dynamic equilibrium, while organism *B* has these structures.

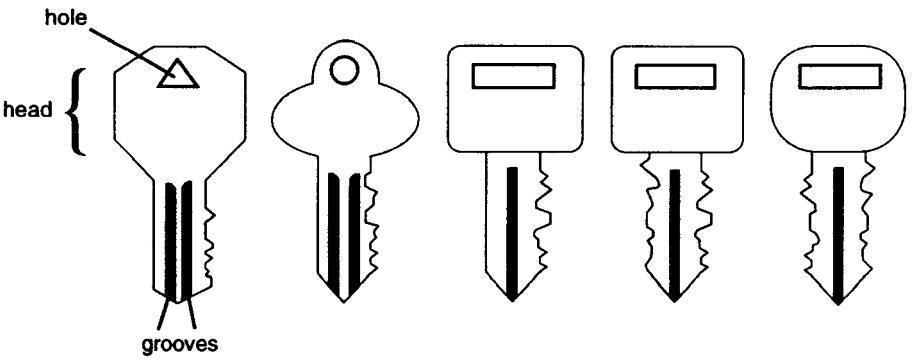
4210. The arrows in the diagram below indicate the movement of materials into and out of a single-celled organism.




The movements indicated by all the arrows are directly involved in

**(A) the maintenance of homeostasis**
(B) photosynthesis, only
(C) excretion, only
(D) the digestion of minerals

4069. Objects can often be separated into groups based on their characteristics. Look at the keys below.




Which one of the following characteristics could NOT be used to separate these keys into groups?

(A) The shape of the key head.
(B) The number of grooves in the key.
**(C) The number of holes in the key head.**
(D) The shape of the hole in the key head.

4070. Use the table below to help you answer the following question.

| Characteristics | Birds | Mammals | Insects | Reptiles |
|---|---|---|---|---|
| Are vertebrates (have a backbone) | Yes | Yes | No | Yes |
| Have wings | Yes | Some species | Most species | No |
| Lay eggs | Yes | Some species | Yes | Yes |
| Have hair | No | Yes | No | No |
| Have webbed feet | Some species | Some species | No | Some species |
| Nourish their young with milk | No | Yes | No | No |

An animal lays eggs and has webbed feet. It does not nourish its young with milk and does not have wings. Based on the information in this chart, this animal is a –

(A) bird (B) mammal (C) insect **(D) reptile**

53. Which groups are arranged in correct descending order according to a modern classification system?

(A) kingdom, genus, phylum, species
(B) phylum, kingdom, species, genus
**(C) kingdom, phylum, genus, species**
(D) phylum, genus, species, kingdom

1312. Which is the most specific term used to classify humans?

**(A) Sapiens** (C) Homo
(B) Animal (D) Chordate

168. The classification group which shows the greatest similarity among its members is the

(A) phylum (C) genus
(B) kingdom **(D) species**

290. In one modern classification system, organisms are grouped into five

**(A) kingdoms** (C) genera
(B) phyla (D) species

2529. Which organelles must be present within a cell of a geranium leaf for respiration and photosynthesis to occur?
(A) cell wall and lysosome
**(B) mitochondrion and chloroplast**
(C) centrosome and nucleus
(D) endoplasmic reticulum and ribosome

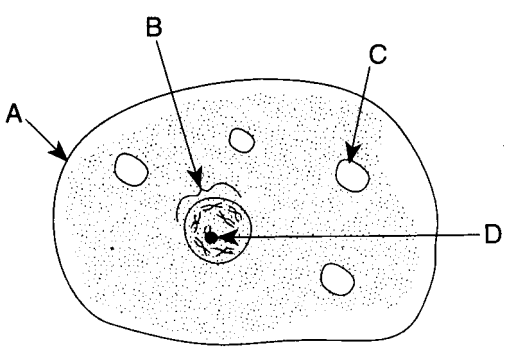
2651. Which structures could most likely be observed in cells in the low-power field of a compound light microscope?
**(A) cell walls and chloroplasts**
(B) ribosomes and endoplasmic reticula
(C) lysosomes and genes
(D) nucleotides and mitochondria

2652. What would most likely happen if the ribosomes in a cell were not functioning?
(A) The cell would undergo uncontrolled mitotic cell division.
**(B) The synthesis of enzymes would stop.**
(C) The cell would produce antibodies.
(D) The rate of transport of glucose in the cytoplasm would increase.

2861. Which unstained cellular organelles can be seen with a compound light microscope that has a total magnification of 400X?
(A) cell membrane, ribosomes, vacuole
**(B) cell wall, vacuole, chloroplast**
(C) nucleolus, chloroplast, ribosomes
(D) mitochondria, nucleus, centrioles

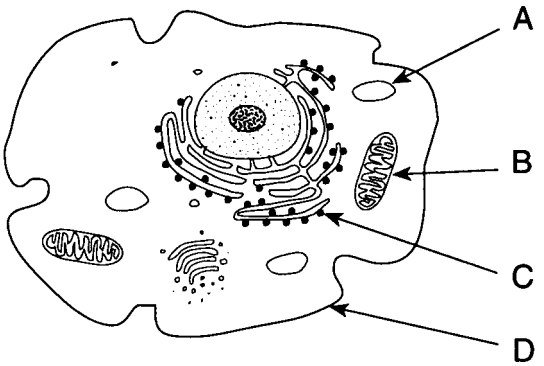
3111. After a cell was treated with a certain chemical, the ribosomes stopped functioning. Which cell activity was immediately affected by this change in ribosome function?
(A) intracellular transport
**(B) protein synthesis**
(C) aerobic respiration
(D) excretion of metabolic wastes

4012. A cell is represented in the diagram shown below.



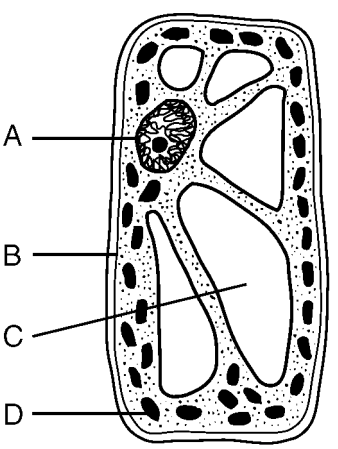

Which statement about the cell is correct?
(A) Structure *A* makes and secretes substances.
**(B) Structure *B* contains genetic material.**
(C) Structure *C* is a site of photosynthesis.
(D) Structure *D* is the site of respiration.

3228. Which letter in the diagram below indicates an organelle that functions primarily in the synthesis of long chains of amino acids?




(A) *A* **(C) *C***
(B) *B* (D) *D*

4022. Which letter indicates a cell structure that controls the movement of materials into and out of the cell?




(A) *A* (C) *C*
**(B) *B*** (D) *D*

4325. Which sequence of terms represents a decrease from the greatest number to the least number of structures present in a cell?
(A) nucleus → gene → chromosome
(B) gene → nucleus → chromosome
**(C) gene → chromosome → nucleus**
(D) chromosome → gene → nucleus

4214. Most of the hereditary information that determines the traits of an organism is located in
(A) only those cells of an individual produced by meiosis
**(B) the nuclei of body cells of an individual**
(C) certain genes in the vacuoles of body cells
(D) the numerous ribosomes in certain cells

116. The reactions involving most chemical compounds in living systems depend upon the presence of
(A) sulfur as an enzyme
**(B) water as a solvent**
(C) salt as a substrate
(D) nitrogen as an energy carrier

121. Which formula represents an organic compound?
(A) $NH_3$
(B) $H_2O$
(C) NaCl
**(D) $C_{12}H_{22}O_{11}$**

453. Which element is present in living cells and in *all* organic compounds?
(A) potassium
(B) sulfur
(C) nitrogen
**(D) carbon**

561. Which substance found in the cytoplasm of an ameba is an inorganic compound?
(A) nucleic acid
(B) amino acid
**(C) water**
(D) glucose

778. Which elements are present in all organic compounds?
(A) hydrogen and oxygen
(B) nitrogen and oxygen
(C) nitrogen and carbon
**(D) hydrogen and carbon**

1315. Which substances are inorganic compounds?
**(A) water and salts**
(B) proteins and carbohydrates
(C) fats and oils
(D) enzymes and hormones

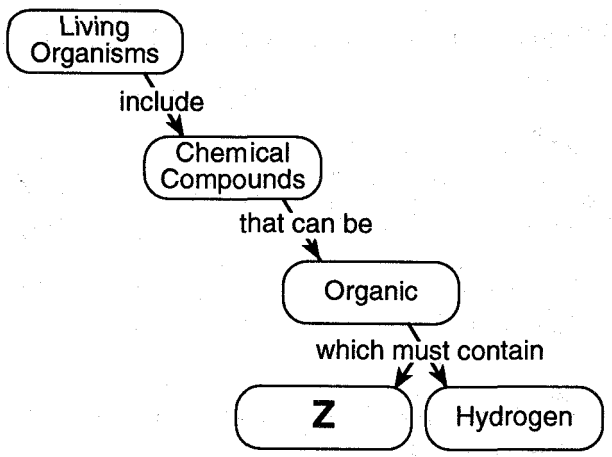
1633. An inorganic compound essential to the survival of animals is
(A) glucose
**(B) salt**
(C) maltase
(D) cellulose

1957. Organisms are composed of
(A) organic compounds only
(B) inorganic compounds only
**(C) both organic and inorganic compounds**
(D) neither organic nor inorganic compounds

2417. Which substance is an inorganic compound that is necessary for most of the chemical reactions to take place in living cells?
(A) glucose
(B) starch
**(C) water**
(D) amino acid

2530. In a living cell, which compound serves primarily as a substance in which most molecules and ions are dissolved?
(A) glycerol
(B) glucose
**(C) water**
(D) cellulose

1752. In the diagram below, which substance belongs in area Z?




(A) water
(B) oxygen
(C) nitrogen
**(D) carbon**

2653. Most of the chemical reactions occurring in a living cell depend on the presence of an inorganic compound known as
(A) glycerol
(B) glycogen
(C) maltose
**(D) water**

3011. Which substance is an inorganic compound?
**(A) water**
(B) glucose
(C) maltase
(D) insulin

3229. Groups *A* and *B* in the table below contain molecular formulas of compounds.

| Group *A* | Group *B* |
|---|---|
| $C_6H_{12}O_6$ | NaCl |
| $C_{12}H_{22}O_{11}$ | $NH_3$ |

How would the compounds in these groups be chemically classified?
(A) group A - inorganic
group B - organic
**(B) group A-organic**
**group B - inorganic**
(C) group A - monosaccharides
group B - disaccharides
(D) group A - disaccharides
group B - monosaccharides

141. The destruction of xylem tissues in a maple tree most directly interferes with the movement of
(A) carbon dioxide out of the leaves
**(B) water to the leaves**
(C) oxygen out of the leaves
(D) nutrients down to the roots

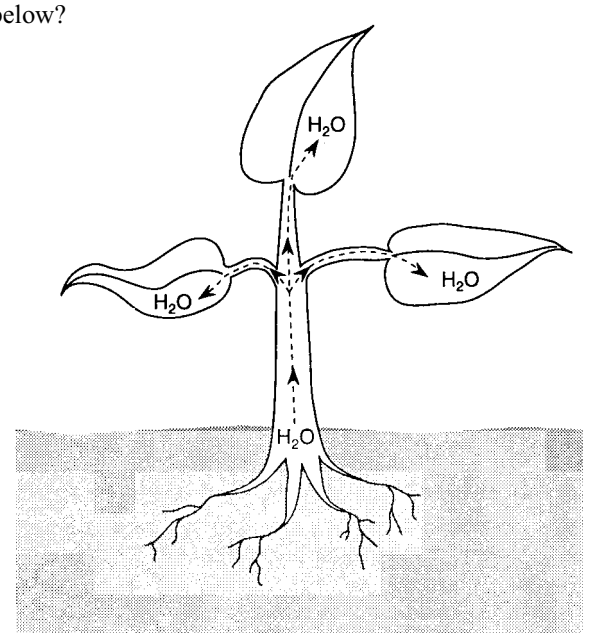
462. Sugars are transported from the leaves of a plant to the roots through the
**(A) phloem tissue** (C) pollen tubes
(B) xylem tissue (D) stomates

571. Xylem tissue in plants transports minerals and
(A) sugars (C) lipids
(B) proteins **(D) water**

903. In bryophytes, intercellular transport is accomplished by diffusion, since bryophytes
(A) live only in dry environments
**(B) lack vascular tissue**
(C) require no minerals from the soil
(D) contain vascular tissue

1036. Vascular tissue in plants consists of
(A) stomates and lenticels (C) spongy cells and xylem
**(B) xylem and phloem** (D) lenticels and phloem

1639. Which process is illustrated by the arrows in the diagram below?

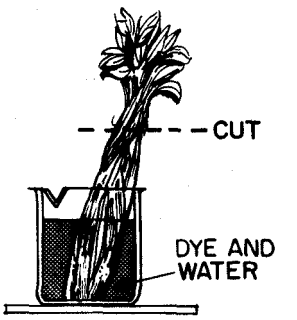



(A) enzymatic hydrolysis **(C) intercellular transport**
(B) cytoplasmic streaming (D) intracellular circulation

3637. The lenticels of certain plants have the same function as
(A) anthers (C) xylem
(B) phloem **(D) stomates**

1964. The vascular tissue in a stem and a leaf is an adaptation for the
(A) breakdown of inorganic raw materials
**(B) transport of nutrients and water**
(C) regulation of auxin distribution
(D) removal of gases from the plant

2437. A student placed a stalk of celery in a beaker of water which had been colored with a dye. After a few hours, the student cut the stalk at the place indicated in the diagram at the right and observed that the dye could be seen scattered in the stem tissue at the cut location. Within which structures in the stem was the dye observed?

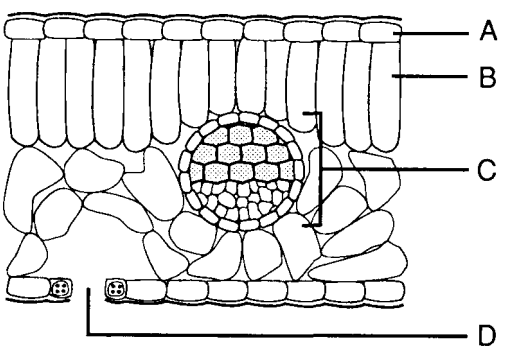



(A) epidermal cells (C) guard cells
(B) phloem cells **(D) xylem cells**

2540. In which tissue is water conducted upward through the stem of a vascular plant?
(A) epidermis (C) meristem
(B) cambium **(D) xylem**

2767. Most of the sugar transported from the leaves of plants travels through
(A) guard cells **(C) phloem tissue**
(B) cambium cells (D) xylem tissue

3019. The diagram below represents a cross section of a leaf.




Food manufactured in the leaf is transported to the rest of the plant by structure
(A) *A* **(C) *C***
(B) *B* (D) *D*

3449. Vascular tissue is vital to the health of a plant because it
**(A) transports food and water**
(B) hydrolyzes nitrogenous wastes
(C) assists in ingestion
(D) produces food and oxygen

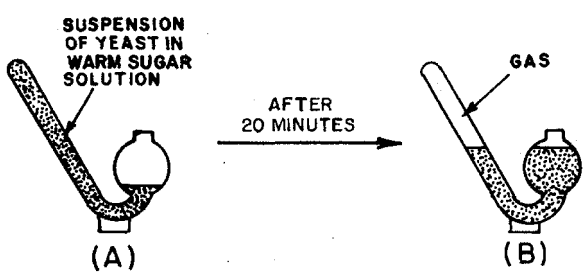
14. The presence of lactic acid in the cells of an animal's muscle tissue is an indication that the
(A) animal is not adapted to the use of glucose
(B) number of mitochondria in the muscle cells has increased
(C) animal carries on a complex form of respiration during daylight hours
**(D) muscle cells have been active during a period of oxygen deficiency**

142. Which type of organism can obtain energy as a result of alcoholic fermentation?
**(A) yeast**
(B) Paramecium
(C) Hydra
(D) earthworm

248. Anaerobic respiration is considered to be less efficient than aerobic respiration because
(A) less lactic acid is formed during anaerobic respiration than aerobic respiration
(B) anaerobic respiration requires more oxygen than aerobic respiration
**(C) the net gain of ATP molecules is less in anaerobic respiration than in aerobic respiration**
(D) less energy is required during anaerobic respiration than aerobic respiration

412. Lactic acid accumulates in the muscle tissues of humans during vigorous activity. During what process does this occur?
**(A) Anaerobic respiration**
(B) Aerobic respiration
(C) Photochemical reactions of photosynthesis
(D) Carbon-fixation reactions of photosynthesis

464. In the diagram below, what gas is probably present in fermentation tube *B*?

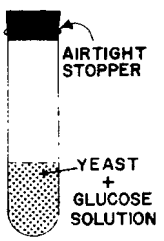



(A) $O_2$
**(C) $CO_2$**
(B) $N_2$
(D) CO

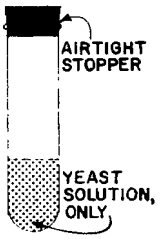
959. When glucose molecules are fermented by yeast, the products formed include molecules of
(A) glycogen
(C) oxygen
**(B) alcohol**
(D) cellulose

414. If the test tubes represented in the diagrams below were allowed to stand at room temperature for several hours, which test tube would most likely contain the greatest amount of alcohol and carbon dioxide?

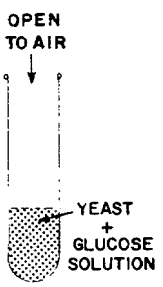
**(A)**



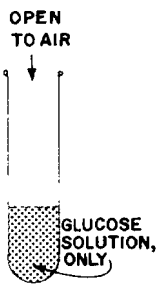

(C)




(B)




(D)




1039. The products produced by yeast cells as a result of anaerobic respiration include ATP and
(A) alcohol and oxygen
**(B) alcohol and carbon dioxide**
(C) water and oxygen
(D) water and carbon dioxide

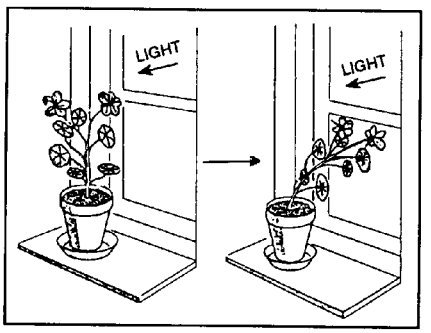
1558. Which substance causes fatigue when it accumulates in human muscles?
(A) excess oxygen
**(C) lactic acid**
(B) carbon dioxide
(D) adenosine triphosphate

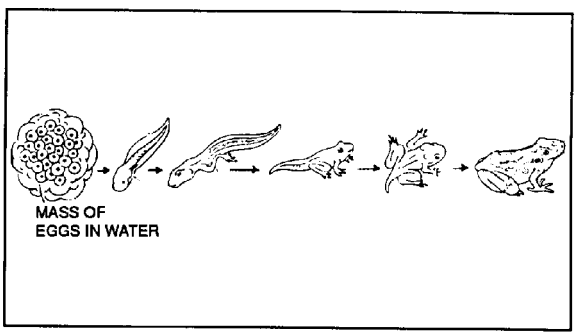
1590. Which substance is formed as a result of the process of anaerobic respiration?
(A) urea
**(C) ethyl alcohol**
(B) uric acid
(D) nitrogen

1642. Yeast cells produce carbon dioxide and alcohol as a result of
(A) photosynthesis
(C) dehydration synthesis
(B) aerobic respiration
**(D) fermentation**

1881. Fatigue and a buildup of lactic acid are most closely associated with
(A) aerobic respiration in cardiac muscle
**(B) anaerobic respiration in striated muscle**
(C) glycogen synthesis in visceral muscle
(D) gas exchange in smooth muscle

1044. The diagrams below show two sequences of events.




Both sequences of events most likely result from
(A) impulse transmission
(B) neurotransmitter secretion
(C) artificial selection
**(D) hormonal control**

2310. Many commercial florists successfully use plant auxins to
(A) destroy the toxic waste products of plant cells
**(B) encourage root formation on plant cuttings**
(C) change flower color
(D) slow down plant transpiration

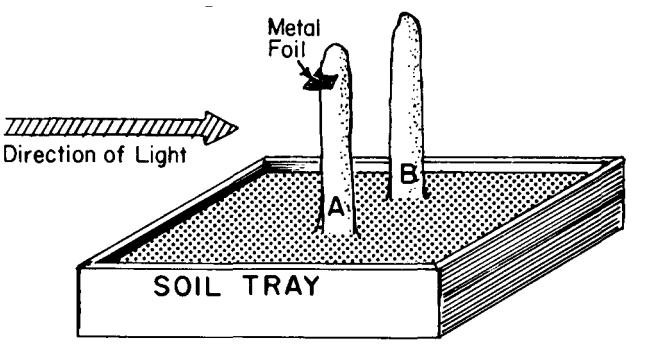
2441. Which compounds include plant growth hormones?
(A) carbohydrates
**(C) auxins**
(B) neurohumors
(D) pigments

2547. The bending of a stem toward light results mainly from the action of
(A) chlorophyll
(C) gravity
**(B) auxins**
(D) glands

2667. Which statement illustrates a plant tropism?
**(A) A stem bends toward the light.**
(B) An apple develops from a flower.
(C) Water moves through vascular tissue.
(D) Carbon dioxide diffuses out of a stem.

2773. The plant growth responses in young stems and the stimulation of rapid and extensive root formation on stem cuttings are most directly influenced by the presence of
**(A) auxins**
(C) carbon dioxide
(B) chlorophyll
(D) simple sugars

2904. The diagram below shows the tips of two oat seedlings exposed to a fixed light source. In seedling *A*, metal foil was inserted partially through the seedling just below the tip, blocking the flow of any chemicals down the side of the stem facing the source of light.




What was most likely observed after 3 days of exposure to the light?
(A) Seedling *A* grew away from the light source and seedling *B* grew toward the light source.
(B) Seedling *A* grew toward the light source and seedling *B* grew away from the light source.
(C) Both seedlings grew away from the light source.
**(D) Both seedlings grew toward the light source.**

3128. Which statement best illustrates a tropism?
(A) Insects chew small holes in the leaves of a maple tree.
**(B) The roots of a willow tree grow toward water.**
(C) A dog barks at a rabbit in a field.
(D) A bean plant absorbs minerals from the soil.

3456. What causes the stem of a tomato plant to bend toward light?
**(A) unequal auxin distribution**
(B) the adhesive property of water
(C) transpirational pull
(D) the storage of glucose

3641. Plants bend toward light because cells on the dark side of the stem elongate. This elongation is influenced by hormones known as
**(A) auxins**
(C) adenines
(B) antigens
(D) amylases

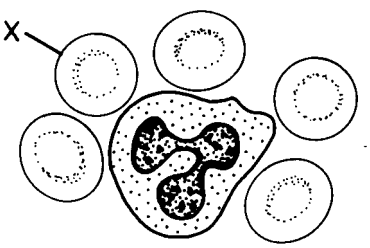
3910. Plants produce substances that regulate their growth patterns. These substances are known as
(A) pigments
(C) tropisms
**(B) auxins**
(D) neurotransmitters

374. Which cells are able to carry on the process of phagocytosis?
(1) nerve cells (3) red blood cells
(2) epidermal cells **(4) white blood cells**

583. What is a major difference between red blood cells and white blood cells?
**(1) Red blood cells contain hemoglobin, but white blood cells do not.**
(2) Red blood cells can move, but white blood cells cannot.
(3) Red blood cells contain nuclei, but white blood cells do not.
(4) Red blood cells engulf foreign bacteria, but white blood cells do not.

798. Which part of human blood transports hormones and nutrients?
**(1) plasma** (3) red blood cells
(2) platelets (4) white blood cells

914. The diagram below represents several human blood cells as observed through a compound microscope.




Which function is associated with cell *X*?
(1) antibody production (3) phagocytosis
**(2) oxygen transport** (4) peristalsis

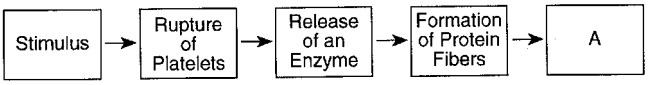
1600. The breaking apart of platelets in the blood helps in the
(1) synthesis of hemoglobin
**(2) formation of a clot**
(3) release of antibodies
(4) deamination of amino acids

1771. Red blood cells are produced in the
**(1) bone marrow** (3) liver
(2) lymph nodes (4) arteries

2025. Bleeding from a small cut soon stops due to the release of enzymes from
**(1) platelets** (3) hemoglobin
(2) activated antibodies (4) white blood cells

2777. A function of human blood is to
**(1) maintain homeostasis** (3) produce new cells
(2) produce energy (4) keep the heart beating

1925. The diagram below shows a sequence of events that occurs in humans.




Which information belongs in box *A*?
(1) increase in breathing rate
(2) decrease in body temperature
**(3) formation of a clot**
(4) formation of urea

1976. Which row in the chart below correctly represents substances found in the blood and intercellular fluid (ICF) of humans?

| | $CO_2$ | $O_2$ | Red Blood Cells | White Blood Cells |
|---|---|---|---|---|
| Row 1 | I | B | B, I | |
| Row 2 | B | B, I | | B |
| Row 3 | B, I | B, I | B | B, I |
| Row 4 | B, I | I | B | I |

Key: B = substance present in blood
I = substance present in ICF

(1) 1 **(3) 3**
(2) 2 (4) 4

2481. The synthesis of fibrin is controlled directly by
**(1) enzymes present in the blood**
(2) hormones secreted by the pituitary gland
(3) neurons in the medulla of the brain
(4) phagocytic cells within the intercellular fluid

2552. The *lack* of which blood component interferes most with the transport of oxygen in humans?
(1) white blood cells (3) platelets
**(2) red blood cells** (4) antibodies

3645. Which part of the blood is correctly paired with its function?
(1) red blood cells – fight infection
**(2) plasma – transports wastes and hormones**
(3) platelets – produce antibodies
(4) white blood cells – carry oxygen

311. Which membrane is both a protective sac and container for fluid in which an embryo is suspended?
(1) chorion (3) allantois
(2) placenta **(4) amnion**

429. Which type of fertilization and development is exhibited by birds and many reptiles?
(1) external fertilization and external development
(2) internal fertilization and internal development
(3) external fertilization and internal development
**(4) internal fertilization and external development**

430. Which structure is a source of food for embryos which develop externally?
**(1) yolk** (3) chorion
(2) placenta (4) amnion

530. An outer membrane which surrounds the other extraembryonic membranes is known as?
**(1) Chorion** (3) Allantois
(2) Amnion (4) Yolf sac

531. A membrane that contains fluid which protects the embryo from shock is known as?
(1) Chorion (3) Allantois
**(2) Amnion** (4) Yolk sac

532. A membrane which surrounds the major source of food for the developing embryo is known as?
(1) Chorion (3) Allantois
(2) Amnion **(4) Yolk Sac**

1110. Eggs that develop externally on land contain a membrane that collects and stores nitrogenous wastes until the egg hatches. This membrane is known as the
(1) amnion **(3) Allantois**
(2) yolk sac (4) chorion

1395. An embryonic structure that functions both as a respiratory membrane and as a site for the storage of nitrogenous wastes is the
(1) amnion **(3) Allantois**
(2) yolk sac (4) chorion

1601. A bluebird reproduces by laying eggs. Which characteristic does the embryo of a bluebird have in common with a human embryo?
(1) implantation in the wall of a uterus
(2) exchange of materials with the mother through a placenta
**(3) development within a watery environment inside an amnion**
(4) a protective shell surrounding a chorion

1603. Fertilized eggs that develop externally on land generally have more complex structures than those that develop in water because
**(1) eggs that develop on land cannot easily exchange materials with the environment**
(2) eggs that develop in water are in less danger from predators
(3) eggs that develop in water do not need oxygen
(4) a placenta supplies nutrients to eggs that develop in water

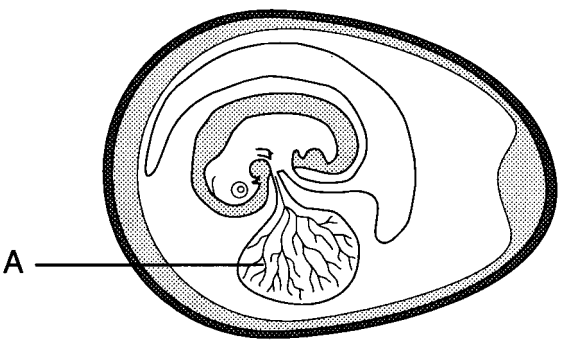
1828. Although the platypus is considered an unusual mammal because it lays eggs that are similar to reptile eggs, the platypus embryo is similar to a human embryo in that it
(1) implants in the uterine wall
(2) stores wastes in an Allantois
(3) possesses a protective shell around the chorion
**(4) develops in a watery environment inside an amnion**

2378. Which structure is *not* associated with embryonic development in a chicken egg?
(1) amnion (3) allantois
**(2) cotyledon** (4) chorion

2491. During the development of a chicken egg, which embryonic membrane is used for both respiration and excretion?
(1) amnion (3) placenta
**(2) allantois** (4) yolk sac

2494. Embryos of both sea and land animals develop in a watery environment. The fluid for the developing land animal is found within the
(1) umbilical cord **(3) amnion**
(2) yolk sac (4) allantois

3299. A developing bird embryo is represented in the diagram below.




Stored food is transported to the embryo through blood vessels located in structure *A*, which represents the
(1) amnion (3) allantois
(2) chorion **(4) yolk sac**

42. Corn seedlings grown in the dark appear white. After being exposed to sunlight, the same seedlings turn green. The whiteness of these seedlings was most probably due to
(1) albinism
**(3) environment**
(2) linkage
(4) multiple alleles

598. Which is an example of environmental influence on gene expression?
(1) the production of plants bearing oval squash from parent plants bearing round and long squash
**(2) the effect of light on chlorophyll production in plants**
(3) the pattern of inheritance for sex-linked traits in humans
(4) the production of human offspring with blood type AB

1353. A green corn plant, when grown in reduced light for a period of time, will show a yellowing of leaves. This yellowing is partly due to the
(1) effect of pH on gene action
(2) increase in polyploidy in the plant
**(3) effect of light on gene action**
(4) expression of recessive traits is reduced

1996. Two cuttings taken from the same parent plant may differ in phenotypes when they are grown in separate containers. This difference is most likely due to
(1) the presence of heterozygous genotypes
(2) cross-pollination
(3) the development of polyploidy
**(4) environmental factors**

2223. Corn seeds of the same species were separated into two groups. One group was grown in the dark and the other group was grown in the light. All other environmental conditions remained constant. After a week, the seeds germinated in the dark produced no green-leafed plants and 97 white-leafed plants, while seeds germinated in the light produced 74 green-leafed plants and 23 white-leafed plants. The plants originally grown in the dark were then placed in the light. After 2 days, 73 white-leafed plants turned green and 24 stayed white. From these observations, it may be concluded that
(1) neither heredity nor environment is important in determining the phenotype of corn plants
**(2) both heredity and environment are important in determining the phenotype of corn plants**
(3) environment is the only factor that determines the phenotype of corn plants
(4) heredity is the only factor that determines the phenotype of corn plants

2458. A certain species of plant produces blue flowers when the soil pH is above 7.0. However, when the soil pH is below 7.0, the flowers are pink. Which statement best explains this color change?
(1) Mutagenic agents can alter genotypes.
**(2) The environment influences gene action.**
(3) Polyploidy produces 2n gametes.
(4) Chromosomal mutations produce color effects.

2795. Potato tubers turn green when they are exposed to sunlight. This is most likely due to
(1) independent assortment of two genes
(2) the presence of a sex-linked gene
(3) codominance of all genetic traits in potatoes
**(4) the interaction of genes with the environment**

3151. Which example illustrates the modification of a phenotype by an environmental factor?
(1) A homozygous gray squirrel is the same color as a heterozygous gray squirrel.
(2) Pink-flowering four-o'clocks that were allowed to self-pollinate produced offspring with red, pink, and white flowers.
**(3) Seedlings germinated in darkness are white, but most of these seedlings turn green when placed in light.**
(4) A person heterozygous for sickle-cell anemia has a higher-than-normal resistance to malaria.

3266. In an experiment, corn seeds were germinated and grown in the dark. When leaves developed, they were white. Several days later, the plants were exposed to sunlight and the leaves turned green. A possible explanation for this color change is that the
**(1) expression of the genes controlling chlorophyll production is influenced by environmental factors**
(2) genes that control chlorophyll production cannot be expressed until the plant is mature
(3) alleles for leaf color in corn plants are codominant
(4) exposure to ultraviolet radiation present in sunlight caused a mutation in the corn plants

3660. A garden hose that had been lying on a green lawn for several days was removed. Which statement best explains the presence of yellow grass in the area where the hose had been?
(1) The lack of sunlight under the hose altered the genes of the grass.
(2) Gene expression is not affected by the environment.
(3) The hose altered genes in the grass, causing the grass to switch from autotrophic to heterotrophic nutrition.
**(4) The lack of sunlight under the hose affected chlorophyll production.**

49. Occasionally a female may have either three X-chromosomes, or two X-chromosomes and a Y-chromosome in each body cell. This abnormal condition would be due to
(1) multiple alleles (3) artificial selection
**(2) nondisjunction** (4) crossing-over

282. The presence of only one *X*-chromosome in each body cell of a human female produces a condition known as Turner's syndrome. This condition most probably results from the process known as
(1) polyploidy **(3) nondisjunction**
(2) crossing-over (4) hybridization

390. Which statement correctly describes the normal number and type of chromosomes present in human body cells of a particular sex?
(1) Males have 22 pairs of autosomes and 1 pair of sex chromosomes known as XX.
(2) Females have 23 pairs of autosomes.
**(3) Males have 22 pairs of autosomes and 1 pair of sex chromosomes known as XY.**
(4) Males have 23 pairs of autosomes.

490. Occasionally during meiosis, a single homologous chromosome pair may fail to separate. A human gamete produced by such a nondisjunction would have a chromosome number of
(1) 23 (3) 25
**(2) 24** (4) 26

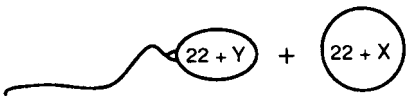
595. Nondisjunction of the sex chromosomes of a human female during meiosis may result in her daughter inheriting a condition represented by
(1) *YY* (3) *XY*
**(2) *XXX*** (4) *XYY*

1459. The sex of a human baby is usually determined by the
(1) egg cell involved in fertilization
**(2) sperm cell involved in fertilization**
(3) rate of development of the placenta
(4) blood type of the mother

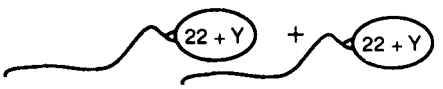
2221. The development of a normal human zygote into a male or female is determined by
(1) an autosome contributed by the egg
(2) a sex chromosome contributed by the egg
(3) an autosome contributed by the sperm
**(4) a sex chromosome contributed by the sperm**

2456. In humans, sex is normally determined at fertilization by
**(1) one pair of sex chromosomes**
(2) 2 pairs of sex chromosomes
(3) 11 pairs of autosomes
(4) 22 pairs of autosomes

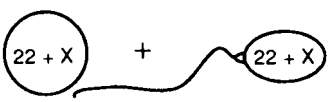
1065. Which pair of gametes can unite to produce a zygote that will develop into a normal human male embryo?
**(1)**



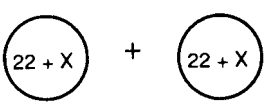

(2)



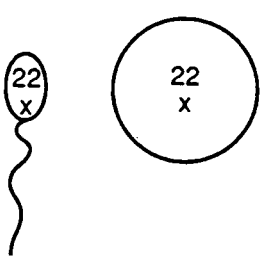

(3)




(4)



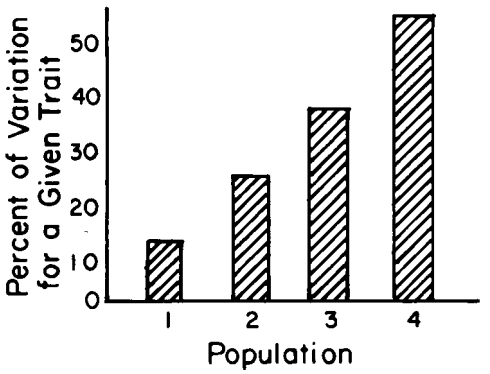

1351. The diagram below represents human gametes.




Which statement best describes the fertilized egg that would result if this sperm cell and egg cell unite?
(1) It would contain 44 autosomes and develo into a male.
**(2) It would contain 44 autosomes and develop into a female.**
(3) It would contain 46 sex chromosomes and develop into a female.
(4) It would contain 46 sex chromosomes and develop into a male.

3146. A normal human egg cell contains
**(1) 22 autosomes and one *X*-chromosome**
(2) 22 autosomes and one *Y*-chromosome
(3) 44 autosomes and *XX*-chromosomes
(4) 44 autosomes and *XY*-chromosomes

217. The graph below represents the percent of variation for a given trait in four different populations of the same species. These populations are of equal size and inhabit similar environments.




In which population is the greatest number of individuals most likely to survive significant environmental changes related to this trait?

(1) 1 (3) 3
(2) 2 **(4) 4**

223. In a certain area, DDT-resistant mosquitoes now exist in greater numbers than ten years ago. What is the most probable explanation for this increase in numbers?

**(1) Genetic differences permitted some mosquitoes to survive DDT use.**
(2) Mosquito eggs were most likely to have been fertilized-when exposed to DDT.
(3) DDT acted as a reproductive hormone for previous generations of mosquitoes.
(4) DDT serves as a new source of nutrition.

331. Certain strains of bacteria that were susceptible to penicillin in the past have now become resistant. The probable explanation for this is that

(1) the mutation rate must have increased naturally
(2) the strains have become resistant because they needed to do so for survival
**(3) a mutation was retained and passed on to succeeding generations because it had high survival value**
(4) the principal forces influencing the pattern of survival in a population are isolation and mating

398. Natural selection can best be defined as

(1) survival of the strongest organisms
(2) elimination of the smallest organisms by the largest organisms
**(3) survival of those organisms genetically best adapted to the environment**
(4) survival and reproduction of those organisms that occupy the largest area in an environment

399. Many modern evolutionists have accepted much of Darwin's theory of evolution, but have added genetic information that gives a scientific explanation of

(1) overproduction
(2) the struggle for existence
(3) the survival of the fittest
**(4) variations**

498. In areas of the American Southwest, certain insect species are quickly becoming resistant to continuous applications of chemical insecticides. The increase in the number of insecticide-resistant species is due to

(1) inheritance of acquired traits
(2) variability through asexual reproduction
(3) geographic isolation
**(4) natural selection**

602. Which statement about the individuals within a population that survive to reproductive age is consistent with Darwin's theory of natural selection?

(1) They transmit characteristics acquired by use and disuse to their offspring.
(2) They tend to produce fewer offspring than those that do not survive.
**(3) They are the ones best adapted to exist in their environment.**
(4) They will perpetuate unfavorable changes in the species.

708. Which concept was *not* included by Darwin in his theory of evolution?

(1) overproduction in a population
(2) struggle for existence
**(3) genetic basis for variations**
(4) survival of the fittest

710. Certain insects resemble the twigs of trees. Based on modern evolutionary theory, the most probable explanation for this is that

(1) a single gene mutation caused the resemblance
(2) the insects changed because they ate the wood of the trees
(3) genes were transferred from the trees to the insects
**(4) natural selections of many variations had occurred**

821. The modern theory of evolution states that a basis for variation within a species is provided by

**(1) mutations** (3) use and disuse
(2) asexual reproduction (4) overproduction

1678. Which concept states that the presence of favorable variations enables organisms to adapt successfully to a change in the environment?

**(1) natural selection** (3) artificial selection
(2) use and disuse (4) reproductive isolation

293. In a study made over a period of years in a certain part of the country, the research showed that there was a low amount of rainfall, a wide seasonal variation in temperature, and short periods of daylight. These environmental factors are
(1) abiotic factors of little importance to biotic factors
**(2) abiotic factors that limit the type of organisms present in the area**
(3) biotic factors important to saprophytes in the area
(4) biotic factors which are affected by the abiotic factors

342. The whole area of the Earth where ecosystems operate is known as
(1) a biome
**(3) the biosphere**
(2) a community
(4) the atmosphere

502. Which is an example of a biotic factor that would limit the size of a deer herd?
**(1) populations of predators**
(2) severe summer drought
(3) lack of oxygen at high altitudes
(4) heavy winter snowfalls

608. Which event illustrates the interaction of an abiotic factor with a biotic factor in the environment?
(1) The lamprey eel survives by parasitizing trout.
(2) The temperature of water affects its oxygen level.
**(3) The low light intensity of the forest affects the growth of pine trees.**
(4) A gypsy moth caterpillar eats the leaves of an apple tree.

712. In the marshlands of the northeastern United States, the purple loosestrife plant has replaced many native plants. The success of the purple loosestrife plant is most likely due to its ability to
(1) control secondary consumers
(2) conserve natural resources
(3) transfer energy from soil minerals
**(4) compete for abiotic factors**

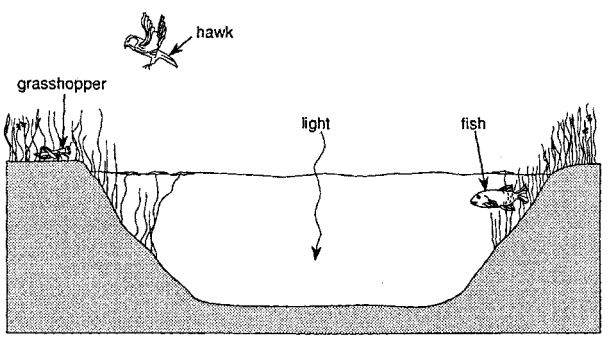
765. Which is an example of a changing biotic factor in an ecosystem?
(1) seasonal changes in temperature
(2) an increase in sunlight during the summer
**(3) seasonal migration of birds**
(4) an increase in the usual amount of winter snowfall

827. Which is a biotic factor in the environment of a fresh-water fish?
(1) the amount of light penetrating the water
(2) the temperature of the water
(3) the mud on the pond bottom
**(4) the algae growing in the water**

943. In an ecosystem, the calcium compounds found in rocks are best described as
**(1) inorganic and abiotic**
(3) organic and abiotic
(2) inorganic and biotic
(4) organic and biotic

1185. Requirements of some submerged aquatic plants in a pond include oxygen and carbon dioxide dissolved in the water as well as nitrates and magnesium in the mud where the plants grow. The resource that is in the shortest supply acts as the
(1) abiotic factor
(3) biotic factor
**(2) limiting factor**
(4) growth factor

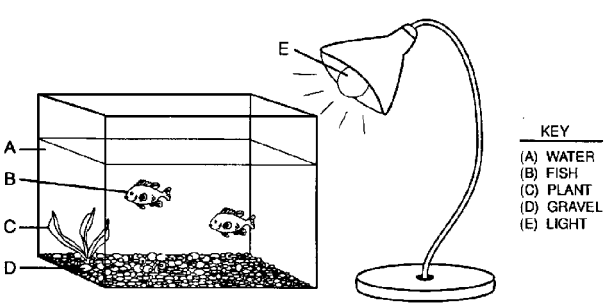
1299. Which is an abiotic factor that functions as a limiting factor for the autotrophs in the ecosystem below?




(1) grasshopper
(3) fish
(2) hawk
**(4) light**

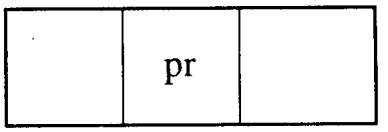
1363. Which is an abiotic factor that would affect the ability of a species of tree to survive in a particular habitat?
**(1) availability of minerals in the soil**
(2) type and number of tree parasites present
(3) climax vegetation of the area
(4) type and number of herbivores present

1476. In the diagram of an aquarium setup below, which letters indicate abiotic factors?




(1) *A*, *B*, and *C*, only
**(3) *A, D,* and *E,* only**
(2) *A, B*, *D*, and *E*, only
(4) *A*, *B*, *C*, *D*, and *E*

2401. A prepared slide was placed on the stage of a compound microscope so that the slide faced the student, as shown in the diagram below.




Which image will the student most likely observe with the low-power objective?

(1) 

(3) 

(2) 

**(4)** 

2402. A student is examining stages of mitotic cell division with a compound microscope. Some of the steps she takes are listed below.

*A* Focus under high power using the fine adjustment.
*B* Position the specimen under low power.
*C* Scan the field of view under low power.
*D* Focus under low power using the coarse adjustment.
*E* Adjust the diaphragm opening.

What sequence of steps should the student follow?

(1) *A-C-B-E-D*
**(3) *B-E-D-C-A***
(2) *D-A-B-C-E*
(4) *C-E-B-A-D*

2647. A student observing a cheek cell with the low power of a compound microscope switched to high power, and the cell was no longer in view. What did the student most likely fail to do before switching to high power that resulted in the cell's disappearance?

(1) change the ocular
(2) clean the low-power objective
(3) measure the cell
**(4) center the specimen**

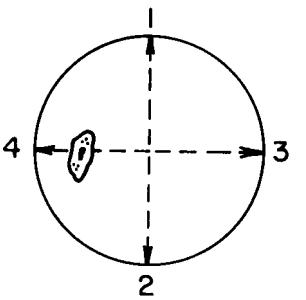
2863. A paramecium on a slide can usually be found more easily by using the low-power objective rather than the high-power objective, because with low power

(1) the field is not as bright
(2) the organism can be seen in greater detail
(3) smaller organisms can be seen
**(4) a larger part of the slide can be seen**

3099. A student views some cheek cells under low power. Before switching to high power, the student should

(1) adjust the eyepiece
**(2) center the image being viewed**
(3) remove the slide from the stage
(4) remove the coverslip

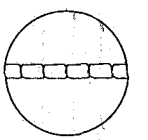
2865. The diagram below shows a cell as seen in the low-power field of a compound microscope.

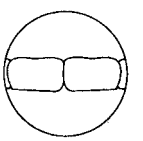


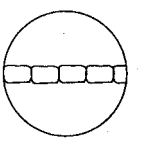

In which direction should the slide be moved to center the cell in the field of view?

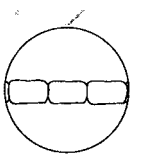
(1) toward 1
(3) toward 3
(2) toward 2
**(4) toward 4**

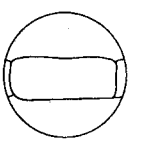
3000. The diagram at the right represents a strand of algae viewed under the low-power objective of this microscope. Under the high-power objective, how would this same slide appear?



(1) 

(3) 

(2) 

**(4)** 

3005. A student would most likely place cotton fibers in a drop of paramecia culture placed on a slide in order to

(1) interfere with the functioning of the contractile vacuoles
(2) cover the eyespots to interfere with responses to light
(3) stop the formation of pseudopods to prevent ingestion
**(4) slow down the movement of the paramecia**

3109. Which piece of laboratory equipment would be best to use for observing a living cell with a diameter of 70 micrometers?

(1) graduated cylinder
(2) ultracentrifuge
(3) dissecting microscope
**(4) compound light microscope**