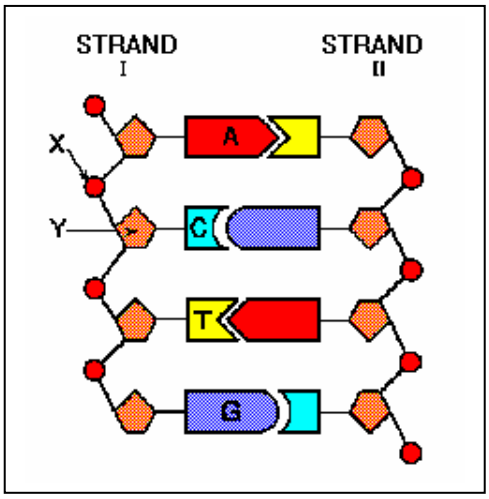
Web Demo and Topics

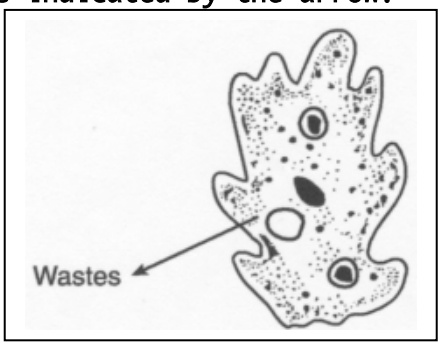
Biology Objective & Essay Questions

1) Base your answer to the question on the diagram which represents a portion of a DNA molecule.



The correct sequence of bases in Strand II would be
1) thymine, guanine, adenine, cytosine
2) uracil, guanine, adenine, cytosine
3) adenine, cytosine, guanine, thymine
4) cytosine, adenine, guanine, uracil

2) A single celled organism is represented in the diagram below. An activity is indicated by the arrow.



If this activity requires the use of energy, which substance would be the source of this energy?
1) DNA
2) ATP
3) a hormone
4) an antibody

3) Which compound is a carbohydrate?
1) $C_{12}H_{22}O_{11}$
2) C_6H_6O
3) $C_6H_{12}N$
4) $C_5H_{10}O$

4) The ability of certain hormones to attach to a cell is primarily determined by the
1) receptor molecules in the cell membrane
2) protein in the cytoplasm of the cell
3) amount of DNA in the cell
4) concentration of salts outside the cell

5) Most cell membranes are composed principally of
1) DNA and ATP
2) proteins and lipids
3) chitin and starch
4) nucleotides and amino acids

6) Which process involves the transfer of energy from carbohydrates to ATP molecules?
1) photosynthesis
2) egestion
3) respiration
4) cyclosis

7) Which process is regulated by a series of enzymes?
1) photosynthesis, only
2) respiration, only
3) both photosynthesis and respiration
4) neither photosynthesis nor respiration

8) One of the major mechanisms for transport of molecules inside the cells of an autotroph is
1) osmosis 2) cyclosis 3) locomotion 4) transpiration

9) Pseudopodia, chitinous appendages, and setae are structures that assist various animals in
1) the transmission of impulses
2) avoiding predators
3) the synthesis of protein
4) aerobic respiration

10) As a result of normal liver function, there is no prolonged increase in blood sugar after meals. This function contributes to the maintenance of
1) homeostasis
2) extracellular digestion
3) assimilation
4) intracellular digestion

11) Immediately after a frightening experience, a person's blood is likely to show higher than normal concentrations of
1) antigens
2) hormones
3) enzymes
4) nucleic acids

12) Systolic pressure is caused when which of the following contract?
1) aorta 2) ventricle 3) pacemaker 4) atrium

13) A barefoot boy walking down the road stepped on a sharp stone. He immediately jerked his foot up, cried out in pain, and inspected the injury. The boy's awareness of pain was centered in the brain at the

1) cerebrum
2) cerebellum
3) medulla
4) spinal cord

14) A florist discovers a mutant germanium that produces flowers of exceptional beauty. Geraniums that produce flowers most like those of the mutant plant may be produced by

1) binary fission
2) gametic fusion
3) sexual reproduction
4) vegetative propagation

15) The actual distribution of alleles for a trait in a population tends to

1) fluctuate in 5-year cycles
2) resist the forces of environment and isolation
3) remain constant with time
4) reflect the adaptive value of the trait controlled by the alleles

16) Of 357 plants of a single species growing on a small plot of ground, 62 reached maturity. Which part of Darwin's Theory of Natural Selection does this observation best illustrate?

1) mutations exist among members of a species
2) variations are inherited
3) there is a struggle for existence among members of a species
4) favorable variations are passed to the next generation

17) In an ecosystem, the presence of many different species is critical for the survival of some forms of life when

1) ecosystems remain stable over long periods of time
2) significant changes occur in the ecosystem
3) natural selection does not occur
4) the finite resources of Earth increase

18) In an experiment, what should be the relationship between the control group and the experimental group?

1) they should differ in size.
2) they should resemble each other in at least two respects.
3) they should not be similar in any respect.
4) they should be identical in all respects but one.

19) Select the substance that is best described by the statement.

Substances

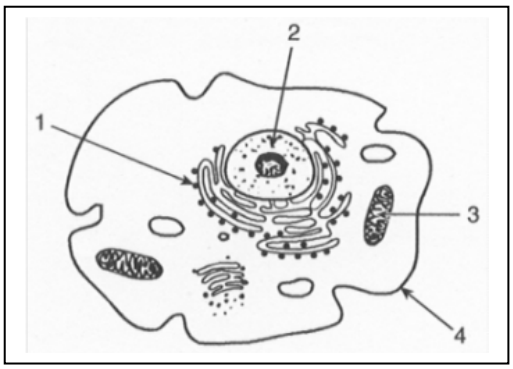
1) Distilled water
2) Lugol's iodine solution
3) Concentrated salt solution
4) Benedict's solution

When used to prepare a wet mount of plant cells which are then observed with a microscope, this substance makes the nucleus more visible.

20) When stained with certain dyes, nucleoproteins appear black. These dyes would most likely be used to
1) identify specific nucleoproteins within cells
2) stain all types of cell organelles
3) determine the chemical composition of nucleoproteins
4) indicate the presence of nucleoproteins within cells

Sample Biology Essay Questions

1) Base your answer to the question on the diagram below.



A) Describe how structure 1 and 2 interact in the process of protein synthesis?
B) For structure 3 and 4, write the number of the structure and describe how it aids the process of protein synthesis.

2) Compare asexual reproduction to sexual reproduction. In your comparison, be sure to include
* which type of reproduction results in offspring that are usually genetically identical to the previous generation and explain why this occurs.
* one other way these methods of reproduction differ

3) Describe a malfunction that can occur in the circulatory system. Your answer must include at least"
* the name of the system and a malfunction that can occur in this sytem
* a description off a possible cause of the malfunction identified
* an effect this malfunction may have on any other body system.

4) For many years, humans have used a variety of techniques that have influences the genetic makeup of organisms. These techniques have led to the production of new varieties of organisms that possess characteristics that are useful to humans. Identify one technique

presently being used to alter the genetic makeup of an organism, and explain how humans can benefit from change. Your answer must include at least:

* the name of the technique used to alter the genetic makeup
* a brief description of what is involved in this technique
* one specific example of how this technique has been used
* a statement of how humans have benefited from the production of this new variety of organism.

5) Patients to Test Tumor Fighter

Boston - Endostatin, the highly publicized experimental cancer drug that wiped out tumors in mice and raised the hopes of cancer patients, will be tested on patients this year.

"I think it's exciting, but.... you always have the risk that something will fail in testing," said Dr. Judah Folkman, the Harvard University researcher whose assistant, Micahael O'Reilly, discovered endostatin.

Endostatin and a sister protein, angiostatin, destroy the tumors' ability to sprout new blood vessels. This makes cancer fall dormant in lab animals, but no one knows if that will happen in humans.

The Associated Press

A) Explain why it is necessary to test these experimental drugs on human volunteers as well as on test animals.

B) State one reason that mice are often used by scientists for testing experimental drugs that may be used by humans.

6) In desert environments, organisms that cannot maintain a constant internal body temperature, such as snakes and lizards, rarely go out during the hot, sunny daylight hours. They stay in the shade, under rocks, or in burrows during the day. Explain how this behavior helps maintain homeostasis in these organisms.

7) Ladybugs were introduced as predators into an agriculture area of the United States to reduce the number of aphids (pests that feed on grain crops). Describe the positive and negative effects of this method of pest control. Your response must include at least

* two advantages of this method of pest control
* two possible dangers of using this method of pest control

8) ECOLOGICAL PROBLEM:

Increased amounts of nitrogen and phosphorus in a lake

* state how humans have caused the problem
* describe one specific effect that the problem will have on the ecosystem
* state one specific action humans could take to reduce the problem

9) The Pine Barrens is a government protected environment located on the eastern end of Long Island. A proposal has been made to allow a shopping mall to be built in the middle of the Pine Barren. Although the developer has promised jobs for people in the surrounding communities, some community members oppose the building of the mall due to the negative effect it would have on this fragile ecosystem.

Identify two negative effects this mall would most likely have on the Pine Barrens.

10) Describe a malfunction that can occur in the excretory system. Your answer must include at least"

* the name of the system and a malfunction that can occur in this sytem
* a description off a possible cause of the malfunction identified
* an effect this malfunction may have on any other body system.

BIOLOGY TOPICS

ATP
Biochemistry: Chemical Bonding
Carbohydrates
Cell Membrane
Cell Theory
Cell Wall
Cellular Respiration
Centrosomes
Characteristics of Enzymes
Classification Scheme - Nomenclature
Comparison – Receptor Proteins & Antibodies
Comparison of Plants & Animals Cells
Complex Organisms
Endoplasmic Reticulum
Factors Affecting Enzyme Activities
Golgi Bodies
Synthesis
Inorganic Compounds
Lipids
Lock & Key Model
Lysosomes
Metabolism & Homeostasis
Mitochondria
Nucleic Acids
Nucleus
Organic Living Chemicals
pH
Plastids
Proteins
Ribisomes
Roll Call - Animals
Roll Call -Pants - Bryophytes & Tracheophytes
Roll Call: Protista
Scientific Thinking
Science & Ethical Values
Types of Microscopes & History
Respiration: Physical
Roots
Spectrum
Tropisms
Use of Isotopes
Xylem - Phloem
Accessory Structures
Adrenal Glands
Allergy
Antibodies
Behavior- Voluntary
Bacteria
Blood - Lymph
Blood Pressure
Blood Typing
Bones & Cartilage
Brain - Cerebrum – Cerebellum - Medulla
Circulation - Heart & Blood Vessels
Experimental Investigation
Human Digestive System
Endocrine Glands & Transport
Gall Bladder
General Digestive Function
Gonads - Ovaries & Testis
Heart
Homeostasis
Human Respiration
Kidneys
Life Expectancy
Liver
Lungs
Major Infections in Hospitals
Malfunctions - Digestive System
Malfunctions – Heart
Malfunctions - Immune System
Malfunctions - Nervous System

Vacuoles
Vitamins
Animal Circulation
Animal Locomotion
Animal Respiration
Animal: Ingestion - Digestion - Egestion
Chemical Control: Endocrine
Comparison: Endocrine VS Neuron
Excretion in Animals
Excretion Process
Locomotion: Process
Neurons & Impulse Transmission
Ntrition: Heterotrophic
Nutrition: Protozoa/Hydra/Earthworm/Grasshopper
Outcomes: Maintenance/Energy/Storage/Control
Regulation: Animals
Secretion Products
Synthesis Process
Transport - ABSORPTION
Transport: Protozoa/Hydra/Earthworm/Grasshopper
Aerobic Respiration (Cellular)
Anaerobic Respiration (Cellular)
Autotrophs
Chromatography
Dispersal of Fruits & Seeds
Experimental Investigation
Heterotroph
Leaves
Lenticels
Meristem
Nitrates in Plants
Other Plant Hormones
Photoperiodism
Photosynthesis - Autotrophs
Plants Growth
Plants Hormones
Respiration in Plants

Malfunctions - Pancreas
Malfunctions - Respiratory System
Malfunctions – Transport System
Mechanical Structures
Muscle - Skeletal - Smooth & Cardiac
Nerves
Neurons - Sensory - Motor & Interneuron
Pancreas
Parathyroid Gland
Pituitary Gland
PKU - Phenylketonuria
Protection - Clotting - White BC
Protein Digestion - Experiment
Reading Comprehension
Safety Precautions
Spinal Chord
Sweat Glands
Systemic - Coronary & Lymphatic Circulation
Tendons & Ligaments
Thyroid Gland
Viral Disease
Animal Egg Comparison
Animal Sperm
Asexual - Regeneration - Vegetative
Asexual Reproduction - Methods
Asexual Reproduction - Results
Cell Division - Cleavage - Gastrulation
Cell Division – Meiosis
Cell Division - Mitosis
Comparison - Meiosis vs Mitosis
Embryo Development - External
Embryo Development - Internal
Female Reproductive System - Gamete Formation
Flower - Parts
Hermaphrodites

Human - Prenatal Development
Human – Zygote Formation
Karyotypes
Male Reproductive System - Gamete Formation
Menstruation & Menopause
Parthenogenesis
Pituitary & Endocrine Glands
Plant Growth
Plants - Embryo Formation
Plants - Male & Female Gamete - Zygote Formation
Seed formation & Germination
Sexual Reproduction - Female
Sexual Reproduction – Gamete Formation
Types of Fertilization - Comparison
Types of Fertilization - External
Types of Fertilization - Internal
Change in Chromosome Structure
Cloning
Cytoplasmic Inheritance
DNA Replication
Gene - Chromosome Theory

Heterotroph Hypothesis - The Primitive Earth
Lamarck’s Theory
Modern - Summary
Population Equilibrium
Probable Order of Evolution
Punctuated Equilibrium
The Hardy Weinberg Principle
The Hardy Weinberg Principle - Condition
Bacteria - Incubator - Lab
Competition - Evironment
Data Interpretation
Ecological Organization - Living Things
Ecological Succession
Environmental Factors - Abiotic
Environmental Factors - Biotic
Food Chains & Food Webbs
Food Pyramids
Food Relationships - Decomposers
Food & Symbiotic Relationships
Experimental Invesigation
Graph Interpretation

Gene Linkage & Crossing Over
Gene Mutation
Genetic Diseases
Genetic Engineering
Heredity & Environment
Incomplete Dominance
Mendelian Principles
Modern Genetics: DNA Structure
Multiple Alleles
Mutagenic Agents
Mutations: Chromosome Change in Number
Plant & Animal Breeding
Population Genetics
Punnett Square Technique
Punnett Square Terms
RNA & Genetic Code
RNA & Protein Synthesis
Sex DETERMINATION
Sex Linkage
Stem Cells
Abiogenesis/Spontaneous Generation
Adaptive Radiation
Natural Selection - A Struggle for Existence
Natural Selection - General
Natural Selection – Inheritance of Variation
Natural Selection - Overpopulation
Natural Selection – Survival of the Fittest
Natural Selection - Variation
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Definition of Terms: Gene Frequency
Definition of Terms: Gene Pool
Definition of Terms: Population
Definition of Terms: Specie
Disproving Lamarck’s Theory
Endangered Species
Evolution Evidence – Compare Anatomy
Evolution Evidence - Comparative Biochemistry
Evolution Evidence - Comparative Embryology
Evolution Evidence - Fossils
Evolution Evidence - Geographic Distribution
Evolution - Defined
Evolution and the Hardy Weinberg Principle
Factors Influencing Variation - Environment
Factors Influencing Variation - Genetics
Factors Influencing Variation - Isolation
Factors Influencing Variation – Sexual Reproduction
Heterotroph Hypothesis - Aggregate to Organism
Heterotroph Hypothesis – Anaerobe to Autotroph
Heterotroph Hypothesis - Autotroph to Aerobe
Heterotroph Hypothesis – Formation of Compounds
Heterotroph Hypothesis - General
Evolution Evidence
Heterotroph Hypothesis – Heterotroph to Anaerobe
Global Problems - General
Negative Environmental Influences - Land
Positive Environmental Influences - Human
Positive Environmental - Organisms
Positive Environmental - Resources
Positive Environmental Influences - Water
Positive Environmental - Economic
Positive Environmental - Forest/Plat Life
Positive Environmental - Soil/Water
Positive Environmental Influences
Material Cycles: Nitrogen Cycle
Material Cycles: Water - Carbon Dioxide
Renewable & Nonrenewable Resources
World Biomes - Aquatic
World Biomes - Deciduous Forest - Desert
World Biomes - Taiga - Tundra
World Biomes - Terrestrial - General
World Biomes – Tropical Rain Forrest
Graphing & Interpretation
Lab – Bean Seed
Lab - Blood
Lab - Chromatography
Lab - Date INTERPRETATION
Lab - Diffusion
LAB - Dissection - Grasshopper
Lab - Dissection – Earthworm
Lab - Dissection - Frog
Definition of Terms: Evolution
Lab – Elodia Leaves
Lab - Equipment
Lab - Experiments - Scientific Theories
Lab - Fermentation Process
Lab - Flower
Lab - Food Testing
Lab - Frog Respiration Study
Lab - Graph Interpretation
Lab - Green Algae
Lab - Indicators
Lab - Interpreting Data
Lab - Investigations
Lab - Measurements
Lab - Microscope
Lab - Microscope Field
Lab – Microscope - Measurements
Lab – Mitochondria
Lab - Mold Spors Growth
Lab - Photosynthesis
Lab - Safety Precautions
Lab - Slide Technique
Lab - Techniques
Lab - Thermometer
Lab Skills

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BIOLOGY ESSAY TOPICS

Abiotic and Biotic Factors
Acid Rain
Active Transport
AIDS
Amphibian Population
Asexual and Sexual reproduction
Cells Involved in Immunity
Cell Structures - Function
Circulatory Disorders
Circulatory System
Data Construction and Interpretation
Data Table and Interpretation
Design Laboratory Procedures
Diagram Interpretation
Digestive Disorders
DNA - Base Sequence
Drugs
Ecosystems
Ecological Problems
Ecological Succession
Effect of temperature on the Body
Endocrine Glands
Environmental Problems - Solutions
Evolution
Excretory Disorders
Experimental Interpretation - Procedures
Female Reproduction
Fetal Development
Food Pyramids
Food web
Formation
Genetic Disorders
Genetic Engineering
Genetics
Graphing and Graph Interpretation
Guard Cells
Homeostasis
Human Genome
Human systems
Immune System
Insect Behavior
Lab Interpretation
Lab - Roots
Laboratory Skills
Lock and Key
Mammoth
Meiosis
Microscope Skills
Natural Food Web
Natural Selection
Nervous Disorders
Osmosis
Ozone
Pancreas
Plants
Prenatal Care
Protein Synthesis
Photosynthesis
Reading Comprehension
Reading Comprehension - Drawing
Reading Comprehension - Table
Recycling
Respiration
Respiratory Disorders
Safety
Scientific Process
Sex Determination & Temperature
Sexual Reproduction - Gamete

Sickle Cell Anemia
Single Celled Organisms
Solving Problems
Space Ship
Specialized Organelles
Survival of Species
Valdez Accident