DAYTONA STATE COLLEGE

GENERAL BIOLOGY I
TEST I

REVIEW

BE ABLE TO DEFINE

- Biology
  - The study of life
- Hypothesis
  - A proposed explanation of a natural phenomenon, must be testable and falsifiable
- Alternative Hypothesis
  - The opposite of the hypothesis
- Theory
  - A hypothesis that has stood the test of time, and has a large amount of supporting evidence
- Testable
  - Quantifiable, measurable
- Falsifiable
  - Can be disproven
- Eukaryote
  - Has cells with a nucleus and membrane-bound organelles
- Prokaryote
  - Cells have no nucleus or membrane bound organelles

BE ABLE TO DEFINE

- Proton
  - Positively charged particle in the nucleus of an atom. (Mass = 1 amu)
- Neutron
  - Non charged particle in the nucleus of an atom. (Mass = 1 amu)
- Electron
  - Negatively charged particle that orbits the nucleus of an atom.
- Electron Orbital
  - The area where an electron may be found
- Hydrophilic
  - Will mix with water (polar)
- Hydrophobic
  - Repels water (non-polar)
- DNA
  - Deoxyribonucleic Acid, used for storing information in a cell
- RNA
  - Ribonucleic Acid, used to carry information to be processed and turned into protein

BE ABLE TO DEFINE

- Nucleotide
  - A nitrogenous base acid + A 5-carbon sugar (deoxyribose or ribose) + a phosphate group, building blocks of DNA and RNA
- Positive Feedback
  - A cycle in which one signal triggers increase in another, which increases the original signal. System output increases until system crashes. i.e. childbirth
- Negative Feedback
  - One signal triggers increase of another, which decreases the original signal, Maintains balance. i.e. insulin and glucagon
- Artificial Selection
  - Selection by humans for specific traits in animals or plants
- Natural Selection
  - Selection by the environment for certain traits in animals or plants
- Common Descent
  - All things are descended from a common ancestor, i.e. all species evolved from one organism
- Solvent
  - What a chemical is dissolved in, usually water
- Solute
  - What is being dissolved

BE ABLE TO DEFINE

- Photosynthetic
  - Uses photons (sunlight) to make food, i.e. makes glucose via photosynthesis
- Heterotrophic
  - Uses existing sources of food, i.e. eats other things
- Isotope
  - An atom of a given element with extra neutrons (extra mass) in its nucleus
- Trace Element
  - Elements that make up less than .01% of human body weight
- Atomic Number
  - The number of protons in an atom's nucleus, defines the element
- Atomic Mass
  - The mass of protons and neutrons in an atom
- Calorie
  - The heat required to raise one gram of water one degree centigrade.
    - Metric unit of Energy.
- Kilocalorie
  - 1000 Calories

CONCEPT QUESTIONS

- What are the characteristics that distinguish a living organism from a non-living substance?
  - Order, Evolutionary adaptation, Response to environment, Regulation (or homeostasis), Energy processing, Growth, Development, Reproduction
- Know the scientific method.
  - Observation, Question, Hypothesis, Prediction, Experiment
- What did the Pasteur experiment prove?
  - No spontaneous generation
- Know the order of the hierarchy of life
  - Atom, molecule, organelle, cell, tissue, organ, organism, population, community, ecosystem, and biosphere.
    - Be able to define each term and give examples

THE HIERARCHY OF LIFE

	Examples (where relevant use plant and animal examples)	Define
Atom		
Molecule		
Organelle		
Cell		
Tissue		
Organ		
Organism		
Population		
Community		
Ecosystem		
Biosphere		

THE HIERARCHY OF LIFE

	Examples (where relevant use plant and animal examples)	Define
Atom	Oxygen, Hydrogen, Nitrogen	Smallest unit of matter
Molecule	Water (H_20) Carbon Dioxide ($C0_2$)	Two or more atoms held together by covalent bond(s)
Organelle	Mitochondria, chloroplast	a membrane bound structure; like nucleus, mitochondria, or chloroplast
Cell	animal cell, plant cell	Basic or smallest unit of life
Tissue	skin or heart muscle tissue	A group of cells with one function
Organ	heart	A group of tissues with one function.
Organism	a single person, a single Zebra	a single organism
Population	number of Zebras in a certain area	Organisms of one species in an area.
Community	All the animals and plants in a forest	all populations of all species in one particular area
Ecosystem	The Ocean, Artic, or Desert Ecosystem	all biotic (living) and abiotic (non-living) factors that interact with the biotic in an area.
Biosphere	The Earth or maybe northern and southern hemisphere	all ecosystems on earth or global ecosystem

CONCEPT QUESTIONS

- How does energy flow through an ecosystem?
  - One way
- What is the ultimate source of energy for almost all ecosystems?
  - The sun
- What are an ion, element, and a molecule?
  - Ion: an atom with a different number of electrons, a charged atom
  - Element: A pure substance, made of only one type of atom
  - Molecule: Two or more atoms bound together
- What part of the atom defines an element?
  - The number of protons
- Which four elements comprise 96% of the human body?
  - Carbon, Hydrogen, Oxygen, Nitrogen
- What is a hydrogen bond?
  - A dipole-dipole interaction between Hydrogen and either Oxygen, Nitrogen, or Fluorine.
- What is an ionic bond?
  - A bond between two atoms, where electrons are transferred from one atom to the other
- What is a covalent bond?
  - A bond between two atoms, where electrons are shared between both atoms

CONCEPT QUESTIONS

- What is a polar covalent and nonpolar covalent bond?
  - Polar covalent bonds are bonds between two non-metals of different electronegativities.
  - Nonpolar covalent bonds are bonds between two non-metals of the same electronegativities.
    - When differences in electronegativities is very small the bond is considered to be nonpolar.
- Which carries the partial negative and which carries the partial positive charge in water?
  - Oxygen carries the partial negative,
    Hydrogen carries the partial positive
- In addition to oxygen-hydrogen bond, nitrogen-hydrogen bond is
  - polar
- The carbon-hydrogen bond is
  - *non-polar*

CONCEPT QUESTIONS

- What is the pH scale?
  - A measure of the concentration of hydrogen ions present in a substance, it represents the acidity of the solution.
- What magnitude of [H] or [OH] does each number represent?
  - pH = -log[H]
  - Therefore each number is a magnitude of ten.
- How much more acidic is pH 6 than pH 7?
  - **10 times more acidic**
- How much more acidic is pH 4 than pH 7?
  - **1000 times more acidic**

CONCEPT QUESTIONS

- Be able to identify whether a molecule is positive or negative based on whether oxygen or hydrogen is attracted to it.
  - If Oxygen is attracted to a molecule then the molecule is positive
  - If Hydrogen is attracted to a molecule then the molecule is negative.
- What is the order of taxonomy from kingdom to species?
  - **K**ingdom, **P**hylum, **C**lass, **O**rder, **F**amily, **G**enus, **S**pecies;
    - **k**eep **p**iling **c**hocolate **o**n **f**or **g**oodness **s**ake
- What are the characteristics of the three domains and the characteristics of kingdoms of Eukarya?

WHAT ARE THE CHARACTERISTICS OF THE THREE DOMAINS AND THE CHARACTERISTICS OF KINGDOMS OF EUKARYA?

	Example organism	Characteristics of Domain (and then kingdom of Eukarya)
Domain = Archaea		
Domain = Bacteria		
Domain Eukarya		
Domain Eukarya Kingdom = Protista		
Domain Eukarya Kingdom =Animalia		
Domain Eukarya Kingdom =Plantae		
Domain Eukarya Kingdom =Fungi		

WHAT ARE THE CHARACTERISTICS OF THE THREE DOMAINS AND THE CHARACTERISTICS OF KINGDOMS OF EUKARYA?

	Example organism	Characteristics of Domain (and then kingdom of Eukarya)
Domain = Archaea	Thermophile or Halophile	Live in extreme environments (Salt and Heat for example)
Domain = Bacteria	E. Coli	Prokaryotes, meaning they do not have membrane bound organelles. Also true bacteria have a peptidoglycan cell wall.
Domain Eukarya	Paramecium, Human, Sunflower, Mushrooms	multicellular organisms
Domain Eukarya Kingdom = Protista	Paramecium	single celled organisms
Domain Eukarya Kingdom =Animalia	Cheetah, Whale, Human	multicellular eukaryotic heterotrophic organisms that ingest organic materials.
Domain Eukarya Kingdom =Plantae	Oak Tree, Sunflower	multicellular eukaryotic photosynthetic organisms
Domain Eukarya Kingdom =Fungi	Mushrooms	multicellular heterotroph that digests externally

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Questions

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