Honors Biology – Unit 1 – Chapter 1 "EXPLORING LIFE"

- 1. 13 levels of organization, emergent properties
 - subatomic particle, atom, molecule, organelle, cell, tissue, organ, organ system, organism, population, community, ecosystem, biosphere
- 2. energy cycle
 - producers, consumers, sunlight, chemical energy, heat, metabolism
- 3. structure vs. function
- 4. 7 important properties of life (characteristics of all living things)
 - order, regulation, growth and development, energy processing, response to the environment, reproduction, evolutionary adaptation
- 5. prokaryotes vs. eukaryotes
- 6. 3 domains: Bacteria, Archaea, Eukarya
- 7. 4 main kingdoms of Eukarya
 - Protista, Fungi, Plantae, Animalia
- 8. evolution, Charles Darwin, natural selection
- 9. the 6 steps of the scientific method
 - determine the problem, make a hypothesis, test your hypothesis, analyze the results, draw conclusions, replicate your work
- 10. variable, experimental group, control group

Honors Biology – Chapter 1 Word Roots "EXPLORING LIFE"

bio- = life (*biosphere:* all the environments on Earth that are inhabited by life); **-logy** = the scientific study of a subject (*biology:* the scientific study of life)

-ell = small (*organelle:* a small membrane-enclosed body with a specialized function within a cell)

eu- = true; **karyo-** = nucleus (*eukaryotic cell:* a cell with a membrane-enclosed nucleus and other membrane-enclosed organelles)

pro- = before (*prokaryotic cell:* a cell that has no nucleus)

tech- = skill or art (*technology:* the practical application of scientific knowledge)

PROPERTY OF:

HONORS BIOLOGY - UNIT 1 - CHAPTER 1 NOTES

EXPLORING LIFE

Science

Science = "having knowledge" Major sciences = Earth science, life science, chemistry, physics All the major sciences are inter-related

The Scientific Method

scientific method = a series of problem-solving procedures used by scientists

- 1. Determine the problem. (What do you want to find out?)
- 2. Make a hypothesis. (Write down an educated prediction to the problem.)
- 3. Test your hypothesis. (Perform an experiment. Follow a procedure to see if your hypothesis is correct.)
- 4. Analyze the results. (Present data using tables, charts, graphs, etc. Interpret the data by trying to find out what the data means)
- 5. Draw conclusions. (Explain the results of the experiment. State whether or not your hypothesis was correct.)
- 6. Replicating the work. (Your experiment is considered successful if other people can perform it and get the same results.)

Variable = a changeable factor in an experiment

An experiment can only test 1 variable at a time. (NO EXCEPTIONS!)

Control Group = a standard for comparison in an experiment

This is the part of the experiment that does not change

Experimental Group = the part of the experiment that is changed by the variable

Theory = an explanation backed by results obtained from repeated tests or experiments

Scientific Law = a rule of nature that describes the behavior of something.

Can be observed, but not proven!

Measurements

Length = the distance between two points (meter ... ruler)

Mass = the amount of matter in an object (gram ... balance)

Weight = a measure of the gravitational force on an object (Newton ... balance)

Area = the amount of surface included within a set of boundaries (meters squared ... ruler)

- Volume = the amount of space an object occupies (liter ... graduated cylinder or beaker)
- Density = the amount of matter that occupies a particular space (grams per milliliter ... balance and graduated cylinder or beaker)
- Temperature = a measure of how hot or cold something is (a measure of how quickly the molecules are moving around) (degrees ... thermometer)

SI Prefixes

K-H-D-B-D-C-M

King - Henry- Died - Before - Drinking - Chocolate - Milk

Kilo - Hecto - Deca - Base - Deci - Centi - Milli

Characteristics of Living Things

All living things...

- a. have order
- b. experience regulation
- c. grow and develop
- d. process energy
- e. respond to their environment
- f. reproduce
- g. evolve
- h. die

Microscopes

Light microscope = magnifies objects using light

PRO = cheap, easy to use, color

CON = cannot magnify images very much

Scanning electron microscope = magnifies the outer surface of an object using electron beams

PRO = provides a lot of detail

CON = expensive, black and white

Transmission electron microscope = magnifies the inner portion of an object using electron beams

PRO = provides a lot of detail

CON = expensive, black and white

Safety

Read the directions. Follow the directions. Ask the teacher for help. ALWAYS USE COMMON SENSE!

Major Themes in Biology

- 1. Levels of Organization
- 2. Structure-Function Relationship / Lock-and-Key Fit
- 3. Surface Area-to-Volume Ratio
- 4. Matter Cycles, Energy Flows
- 5. Evolution and Natural Selection

LEVELS OF ORGANIZATION IN BIOLOGY

BIGGEST

- 13. BIOSPHERE = all living things on Earth (the whole Earth)
- 12. ECOSYSTEM = all the communities in a very large area (desert, forest, grassland)
- 11. COMMUNITY = a group of organisms of different species (all the animals in a food chain)
- 10. POPULATION = a group of organisms of the same species (a pack of wolves)
- 9. ORGANISM = one individual (one lion, one person, one dog, etc.)
- 8. ORGAN SYSTEM = a group of organs with a specific function (nervous system, digestive system, respiratory system)
- 7. ORGAN = a group of tissues with a specific function (stomach, heart, brain)
- 6. TISSUE = a group of cells with a specific function (muscle tissue)
- 5. CELL = the smallest unit of life (brain cell, red blood cell, plant cell, animal cell)
- 4. ORGANELLE = a part found inside a cell (nucleus, cell membrane, mitochondria)
- 3. MOLECULE = a chemical made of 2 or more elements (water = H_2O , carbon dioxide = CO_2)
- 2. ATOM = the smallest unit made of only one element (hydrogen, carbon, helium, nitrogen)
- 1. SUBATOMIC PARTICLE = particles found inside an atom (protons, neutrons, electrons)

SMALLEST