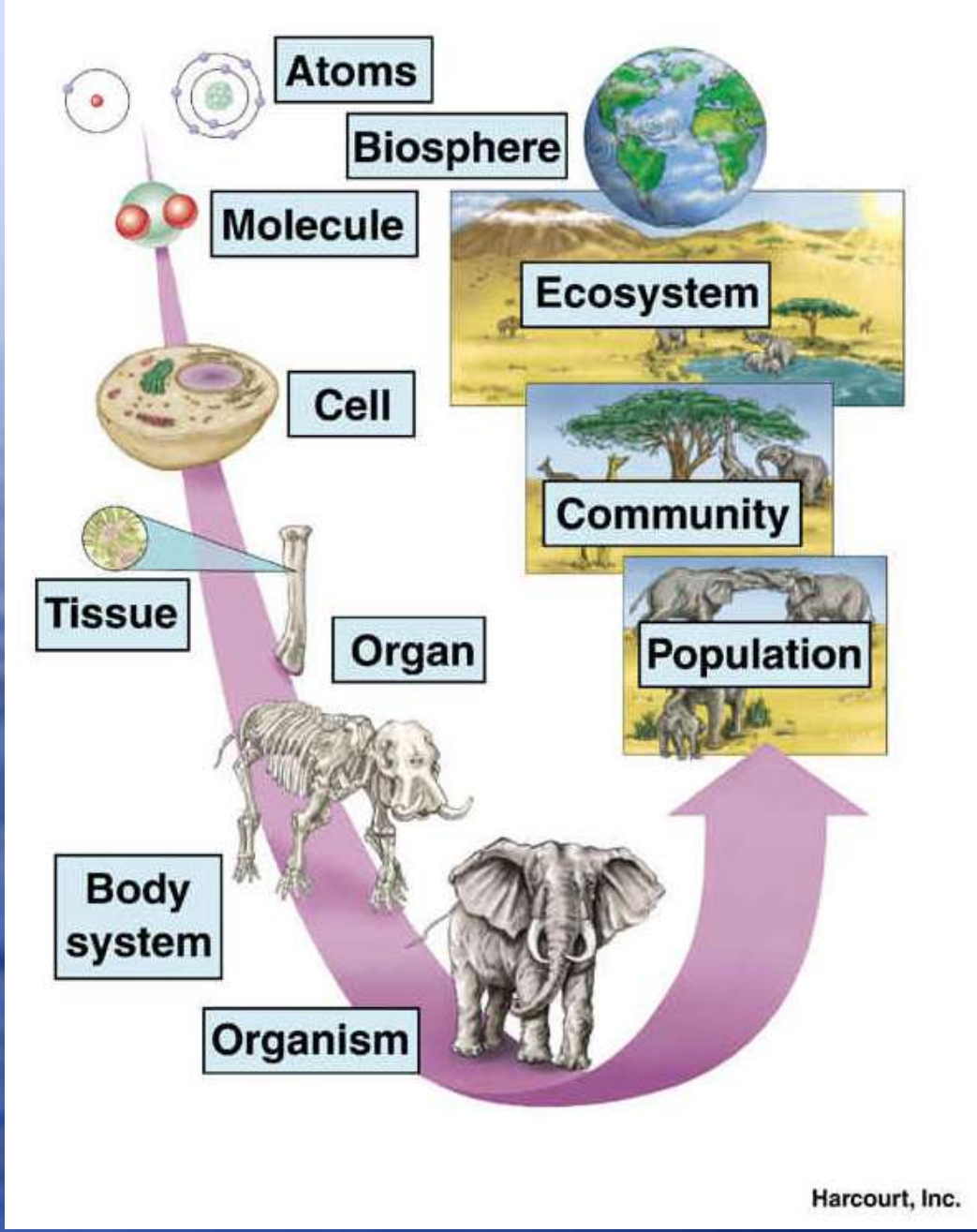
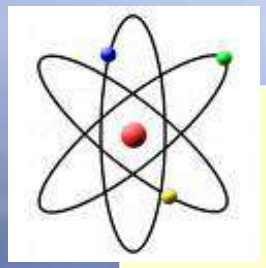
Levels of Organization studied in BIOLOGY …

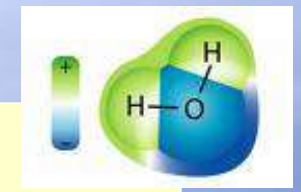


From the smallest level…



1. ATOMS

The smallest unit of matter that cannot be broken down into anything simpler by chemical means.

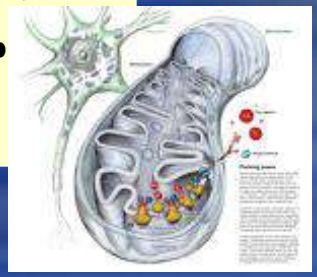


2. Molecules

The smallest units of most compounds formed by the chemical bonding of atoms.

3. Organelles

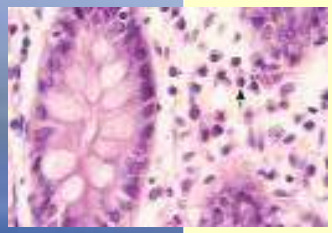
Specialized structures that perform important cellular functions within cells.



4. Cell

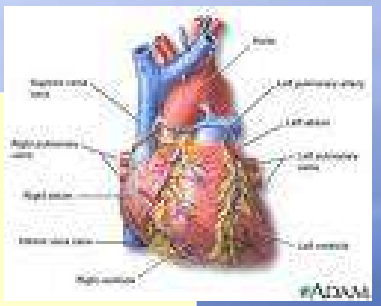
The smallest unit of life – collections of living matter enclosed by a barrier that separates them from their surroundings.

From the smallest level…



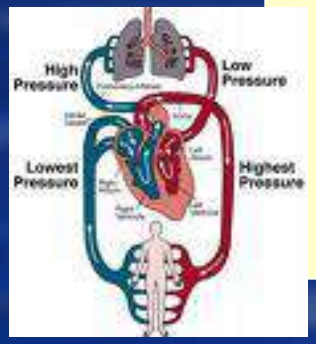
5. Tissues

Groups of similar cells that perform a particular function.



6. Organs

Groups of tissues that work together to perform closely related functions.



7. Organ Systems

Groups of organs that work together to perform closely related functions.

8. Organisms

Living things composed cells (multicellular organisms).

Species =a group of organisms so similar to one another that they can breed and produce FERTILE OFFSPRING.

...to the largest level.

9.Population

Groups of individuals of the same species that live in the same area.

10. Community

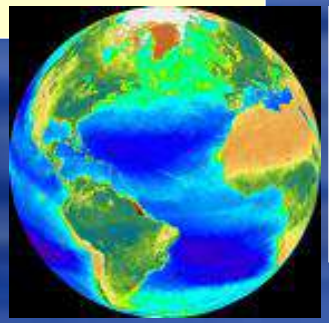
Groups different populations that live together in a defined area.

12. Biome

Groups of ecosystems t have the same climate and similar dominant communities

11.Ecosystem

Groups of all the organisms that live in a particular place, together with their nonliving environment.



13. Biosphere

Part of the Earth in which life exists including land, water, air and atmosphere.

How is life characterized within these levels…
What is life defined by?

WARM-UP Questions

1. Put the following in order from smallest to largest:
   - → Biome
   - → Organism
   - → Organelle
   - → Atom
   - → Community
   - → Population
2. What is a niche?
3. Give an example of a tissue? An example of an organ?

Good Afternoon! Today we will….

1. Let's Quiz ourselves!
   - Please complete this quick quiz to test yourself to see if you can remember the important objectives that we learned last week…We will review the answers in a moment.
2. Homework check!
   - Please have your completed Metric Conversions worksheets out so that we can check the answers once we finish the self-check quiz.
3. Today's Objective: What is Life? Activity
   - Today's objective is to derive (brainstorm) what characteristics we can use to determine if something is living or was once living (*BIOTIC*) or is nonliving (*ABIOTIC*)!

Scientific Method, Graphing and Metric System Self-Check

- 1.A _____ graph will compare numbered data to numbered data, showing a correlation or connection between two variables, but a _____ graph will compare a series of variables in word form to numbered data.
  - a.Pie, Bar
  - b.Independent, Dependent
  - c.Line, Bar
  - d.Bar, Line

- 2.The _____ variable is always graphed on the Y-axis. This is the *measured* data!
  - a.Dependent
  - b.Constant
  - c.Controlled
  - d.Independent

- 3.The Metric System or SI system is a base _____ system, meaning that conversions between units are as simple as moving decimal points to the right or left!
  - a.12
  - b.15
  - c.10
  - d.2

- 4.The _____ is the base unit for length, a _____ is the base unit for mass, and the _____ is the base unit for volume in the metric system.
  - a.Inch, Gram, Centimeter
  - b.Meter, Gram, Liter
  - c.Meter, Ounce, Milliliter
  - d.Yard, Gram, Ounce

- 5._____ data is a number such as, "the plant grew 5 centimeters"" but _____ data is a worded observation such as, " the plant turned brown around the edge of the leaves."
  - a.Controlled, Dependent
  - b.Qualitative, Quantitative
  - c.Independent, Qualitative
  - d.Quantitative, Qualitative

- **6.Place the following steps in order according to the Scientific Method:**
  - ___4___ Max observed the feeders for two weeks, keeping careful data on the number of hummers at each feeder.
  - ___1___ Max watched a hummingbird drink from a feeder in his backyard one day. He wondered if the hummingbirds were more attracted to the sugar water in the feeder or the ants crawling on the feeder.
  - ___6___ Max wrote a description of his work, discussing what he had observed and reporting the data he had collected, and mailed it to the Audubon Society. His article was published in their magazine.
  - ___2___ Max inferred that if the hummingbirds were attracted to the ants, then the hummers would chose to feed from the feeder covered in ants more than the feeder kept ant-free.
  - ___5___ Max put his data into a chart and then graphed the numbers of birds at each feeder.
  - ___3___ Max planned to watch the hummingbirds to see which feeder (with or without ants) the birds preferred.

What is Life?

Inside each lab tray are 14 items. Your task is to classify each of the objects as living, once living, or non-living. *Please be responsible with the items in the trays and be respectful of your group mates' time and opinions.* Not everyone will agree as to how to categorize life, however we will work together to complete the concept map on the back of the lab. Everyone is responsible for completing the lab today and sharing their reasoning with group mates and the whole class!

- Paper
- Buckeye
- Plant Leaf
- Salt
- Sponge
- Rubber band
- Cork
- Water
- Meal Worm
- Feather
- Paper clip
- Shell
- Rock
- Pinto bean

E-Text Access:

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- Dragonfly Text…Chapter 1.3, DNA is chapter 12.1
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  - User name = biology
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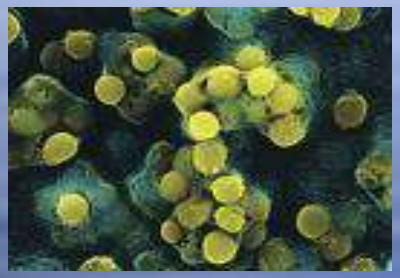
Characteristics of Life:

1. Composed of Cells
2. Reproduction
3. Growth & Development
4. Obtain & Use Energy…METABOLISM
5. Respond to Environment…HOMEOSTASIS
6. DNA is the 'Universal Genetic Code
7. Evolution and Adaptation

A cell is the basic unit of life…All cells come from preexisting cells

- *Unicellular*
- Organisms composed of a single cell



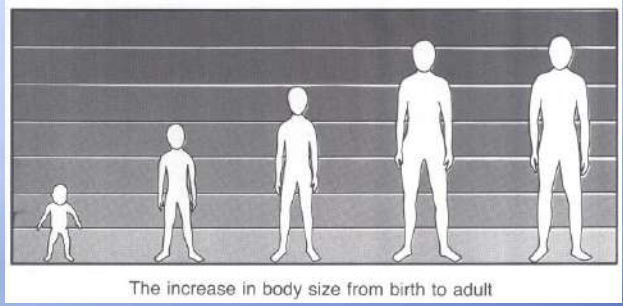
- *Multicellular*
- Organisms composed of many cells…diversity and specialization of function (over 85 types of cells in the human body)

Ahhh…Reproduction

- Asexual Reproduction:
  - Single parent copies its DNA and then divides or 'buds' to produce GENETICALLY IDENTICAL OFFSPRING.
  - This can mean 'rapid-fire' reproduction of great numbers of identical organisms

- Sexual Reproduction:
  - Two different parent cells unite to produce the first cells of a new organism.
  - Offspring are GENETICALLY UNIQUE leading to greater genetic diversity and speciation on Earth.

All organisms Grow and Develop


The increase in body size from birth to adult

- Single celled organisms (like bacteria) growth is mostly a simple increase in size

- Multicellular organisms undergo extensive development from a single fertilized egg dividing many, many times to produce the multitude of cells in mature organisms
- Differentiation is the changing of shape and structure to perform different functions.

Obtain and Use Energy

- All living things obtain energy from their environment or surroundings and use it for growth, development, reproduction, and excretion – these processes occur at different rates…

  METABOLISM = Anabolism (synthesizing compounds – expends energy) + Catabolism (breaking compounds into simple components – releases energy)

  = Combination of chemical reactions (total activity) that build and break down materials as organisms carry out their life processes.

Living organisms RESPOND to the Environment

- Organisms detect and respond to a **STIMULUS** (signal) or anything in the environment that causes a response whether internal or external.

***Internal stimuli are things like blood glucose level (low levels make you feel hungry, possibly weak, tired, head-achy, etc)**

***External stimuli include light, touch, sound, heat, smell, sight…**

Homeostasis…'autopilot'

- **The autonomic (self-controlled) processes by which organisms respond to stimuli such that conditions in the body are kept suitable to sustain life**

DNA is the 'Universal Genetic Code'

- All life is based on a UNIVERSAL GENETIC CODE…DNA (a 4 letter code) is common to ALL life, determining the inherited traits of all organisms!
- DNA is a type of biomolecule known as a Nucleic Acid that had a three dimensional shape called a double helix. *The shape of DNA allows for duplication and 'reading' or*

Organisms show Evolution and Adaptation

- EVOLUTION is ability of a group of organisms to change over time. This invaluable for survival in constantly changing environments…
- An ADAPTATION is a trait of a living thing that helps it compete and survive to reproduce in its environment.