# Bio102 - Introductory Biology

**January 12, 2015**

-overview of the syllabus
-get textbook from The Bookie

Notes

- Characteristics of life:
  - Respond to external stimuli
  - Alter the environment
  - Sense the environment
  - Adapt to the environment
  - Use energy
  - Reproduce
  - Contain materials only found in living organisms
  - Maintain constant internal environment
  - Have a high degree of organization
- To maintain these nine characteristics, we need to practice homeostasis
  - Positive feedback – enhances and continues to increase levels
  - Negative feedback – counteracts and reduces levels
  - Living things can only survive in  a very narrow range of tolerances – temperature, pH, salinity….
  - Feedback loops and homeostasis
    - Stimulus-something is too high or too low (change in heat, high temperature)
    - Receptors-body part that picks up on the change (pain receptor, temperature receptor, skin, the nervous system)
    - Control center-something has to change, something is responsible for making that change (adjust fluid balance, chemically, hormonally)
    - Effectors- what brings level back to normal, what's responsible for making the chance
    - Response-levels are back to where they are supposed to be

**January 14, 2015**

- Natural organization:
  - Chemical -  atoms and DNA, basis of life
  - cellular – a whole collection of cells that are almost identical, all working together towards the same purpose
  - tissue – most organs are made up of two or more types of tissue
  - organ – organs that are more related
- hierarchy of life beyond the individual
  - individual or species – a single human or animal
  - human population – a group of individuals
  - biological community – all the living organisms that interact together

- ecosystem – in addition to all the living organism, we add the nonliving components.
- Biosphere – all of the parts of our existence where life can exist. Which includes the atmosphere, the lithosphere, and the hydrosphere and anywhere life can exist.

- Human biology is structured and logical
  - Prokaryotes have two domains – eubacteria and archaebacterial
  - Eukaryotes have one domain – eukaryotes
    - 1st sort – does it have a nucleus and internal membranes?
    - No – prokaryote Yes – eukaryote
  - Eukaryotes have four kingdoms
    - Protista, animals, fungus, and plants
    - Protista, animalia, fungi, plantae
  - Prokaryotes bring down two domains and have same kingdoms (eubacteria and archaebacteria)
- Kingdom – Animalia are all multicellular organisms that ingest nutrients rather than synthesize them
- Phylum – chordata all animals with a vertebral column or **dorsal hollow notochord**, a structure along the top of animals that protect their central nervous system.
- Class – mammalia all vertebrates with placenta development, mammary glands, hair or fur, and a tail located behind the anus.
- Order – primates are mammals adapted to life in trees with opposable thumbs
- Family – hominidae are primates that move primarily with bipedal (two footed locomotion)
- Genus – homo hominids with large brain cases or skulls

**January 21, 2015**

TEST FRIDAYYYYYY

- what are the origins of modern humans?
  - the human ancestors are dead twigs on the family tree
    - the order primate is characterized by five digit hands with an opposable thumb, finger nails and toe nails, and stereoscopic vision with forward facing eyes.
    - a 12th of a percent difference in terms of the genetic makeup compared to chimpanzees and apes.
    - most scientist agree on a basic pathway out of Africa when primates began to walk upright as its usual form of locomotion.
      - homo sapiens posses an upright, bipedal stance, an opposable thumb, an enlarged brain case, and the capacity for complex speech and communication.
      - Omo I and Omo II (H.s.) put the emergence of modern humans at about 195,000 years ago.
  - H. Sapiens started migrating and populating the globe 100-140,000 years ago ????
    - outcompeted all other hominid species

        - how do we interact?
        - what is our role
        - what sort of force do we exert on the environment

- where do we come from and where do we fit?
    - energy flows while nutrients cycle. energy flows in one direction
        - radiation – when a campfire releases heat
        - convection – when the heat is in the air around it and bouncing off the air around it, heating those molecules. it's a fluid in this state
        - conduction – when we have the heat going from object to object
    - think of nutrients as chemicals and compounds
    - the sun is the primary source of energy
        - Light energy from the sun goes to the producers, the producers convert it to chemicals that can be stored. This is known as photosynthesis.
    - nutrition cycle:
        - Producers: make own food
        - consumers: eat other consumers and/pr producers
        - decomposers: break down dead matter
        - abiotic nutrients: nonliving
- what does the human body have in common with the world around it?
    - important systems
        - system → basic concept underlying symptom
        - skeletomuscular → protein structure/function
        - nervous → osmosis/diffusion, cell structure, function
        - sensory → cell structure/function
        - cutaneous → energy flow, protein structure,/function
        - lymphatic → protein structure/function
        - cardiovascular → osmosis/diffusion
        - respiratory → osmosis/diffusion
        - digestive → energy flow
        - urinary → osmosis/diffusion
        - endocrine → protein structure/function, osmosis
    - we are consumers, consumers can't make food from light energy. we must obtain it from other organisms.

## January 28, 2015

- in class assignment-ionic bonds and drawing atoms
- life has a unique chemistry
    - elements are made of atoms
        - smallest possible piece of an element
    - atomic structure is the foundation of life
        - first orbital-2
        - second orbital-8