Chapter One: The Science of Biology
Lesson 1.3: Patterns of Life

Biology: the science that employs scientific methodology to study living things

- *Bio*- means "life"
- *-ology means "study of"*

All living things (organisms) have these characteristics:

- Made up of cells
    - Cells: smallest units of an organism that can be considered alive
        - Complex and highly organized
- Reproduce
    - **Sexual reproduction:** cells from two different parents unite to produce the first cell of the new organism
    - **Asexual reproduction:** the new organism has a single parent
- Universal genetic code
    - **DNA:** Deoxyribonucleic acid
        - Directions for inheritance are carried by this molecule
- Grow and develop
    - Single-celled organisms grow by increasing in size
    - Multicellular organisms grow by cells dividing and making new cells – the number of cells increases therefore the organism increases
- Need for materials and energy
    - **Metabolism:** a combination of chemical reactions through which an organism builds up or breaks down materials
- Response to the environment
    - **Stimulus:** a signal to which an organism responds
        - Examples include light and temperature
- Maintain an internal balance

    - **Homeostasis:** relatively constant internal physical and chemical conditions that organisms maintain
        - Example: sweat when you are hot and shiver when you are cold
- Evolution
    - **Evolve:** change over time
        - Survival of the fittest

Fields of Biology:

- Global ecology – how living organisms affect the atmosphere and climate and how all this has a global impact on life on Earth
- Biotechnology – editing and rewriting the genetic code – correct damaged genes that give us diseases or genetically engineer bacteria to clean up toxic wastes
- Tree of life – discovered 1.8 million different kinds of living organisms with many more to be discovered
- Ecology and evolution of infectious diseases
    - HIV to bird flu to drug-resistant bacteria and understanding the challenges for public health around the world
- Genomics and Molecular biology
    - Studies of DNA and other molecules inside cells
    - 1980s created the field of genomics

Scientists use the metric system when collecting data.

- International System of Units (SI)
- Uses a scale with multiples of 10

Safety is important in all science labs – we will follow all rules written by Mrs. Kessel