What is LIFE?

“Quality distinguishing vital functioning interacting beings from those which are not”

7 Characteristics Attributed to Life:

> Define life by:

1. Are ORDERED / ORGANIZED:
   - Levels of LIFE’S Organization:

   Non-Living
   \[
   \text{Atoms} \downarrow \text{Molecules} \downarrow \text{Organelle} \downarrow \text{Cell} \downarrow \text{Tissue} \downarrow \text{Organ} \downarrow \text{Organism}
   \]

   Living

2. Regulation: Maintain HOMEOSTASIS

   \[\text{Homeos} = \frac{\text{Stasis}}{\text{Optimal function relies on}}\]

3. Energy Processing: Require energy:

   • Energy required to maintain:

   \[\Rightarrow \text{Two primary sources:}\]

   1.

   2.

   a. Photosynthesis: \[\text{photo} = \frac{\text{synthesis}}{}\]
Consumer:

- **Metabolism**: Rate of:

4. Reproduction:

- Pass on “blueprints of lie’s:
- Molecular “Blueprints”:

5. Growth and Development:

- Programmed development of:
- Orchestrated by:

6. Respond to environment (surrounding):

- Organisms must adjust to:

7. **Evolution**:

- Capacity for populations to change over time – to be more:

Are Viruses Alive?

“The Scientific study of Life”

- **Science**:
  - Investigation into the:
    - “Digging deeper into arenas where understanding is incomplete” F. Collins
    - Progressive, *Self correcting*, ever enlarging:

- **Core of Science**:
  a. Ask questions about the:
  b. Attempt to:
    - *Accumulation of*:
2 Scientific Approaches:

1. Discovery Science:
   - Study of a natural phenomena through:
     - Data:
   - Provides systematic insight into:
     - Allows for the development of:

Jane Goodall:

2. Hypothesis Driven Science:
   - Formal Scientific Inquiry: Scientific Method
     - Seeks to:
     - Uses Experimentation to:
   - Hypothesis:

Scientific Method:

1. Ask yourself “What do I want to learn more about”, or “I wonder what would happen if …”

2. Research to help you make an educated guess, or hypothesis, and then answer your question

3. Test your hypothesis by making a plan and conducting experiments

4. Make careful observations and write down what happens

5. Use your information to draw conclusions about your experiment. Was your hypothesis correct?

6. Explain your results by presenting your experiment, conclusions, and observations
Science is NOT an accumulation of Facts, but rather a set of tentative answers to questions

- **Theory**: Comprehensive explanation based on:
  - ✓
  - ✓ Theory of Evolution

**Law**: Widely accepted theories supported by all:
- ✓ 1st Law of Thermodynamics

“*If I have seen farther than others it is because I have stood on the shoulders of giants*”

Sir Isaac Newton

**Study Questions:**
1. Define Biology
2. What are the characteristics of life? Using these characteristics, is fire alive?
3. Define Science. What is at the root of science? What is the scientific method? and how is it utilized?
4. Explain each of the steps of the scientific method.
5. What is a hypothesis? What are characteristics of a good hypothesis?
6. What is the “control group” and how is it different from the “experimental group”?
7. What is the difference between a hypothesis, conclusion, theory, and law?
8. Can an experiment prove a hypothesis? Why do we believe information discovered through scientific discovery to be true or valid?
9. Is science an accumulation of facts or will the filed of knowledge continue to change?

- ✓ Read the syllabus
- ✓ Complete the Syllabus Quiz (download from course website): DUE Wednesday Feb. 5th