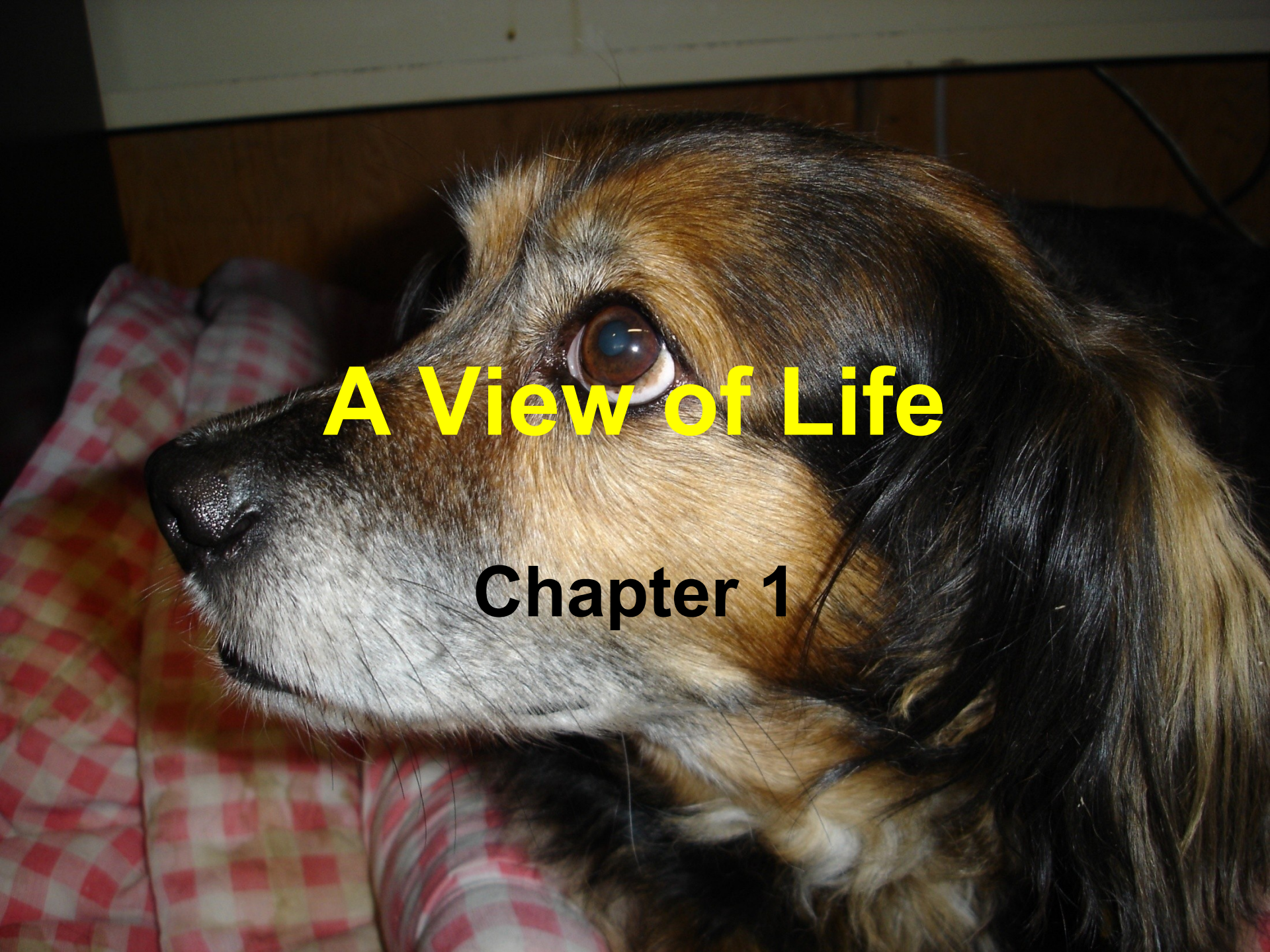
A View of Life
Chapter 1

You will never use most of the information in this class!!!

- Then why are you here?
- Why is this class important?

Knowledge = Power

What is (How c

- Energy, evolution, scientific th
  atoms, ions, acids, bases, car
  lipids, pr
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Just to nam

Now, I get it!

pair our cells,
genetics,
nation, transgenic
assify life, life,
rchaeans,
gy, communities,
here, life?

IMHO, the study of biology will give you the knowledge as well as the WAY to make informed decisions throughout your life. Let's begin!!!

Life on Earth is notable for its:

1.Unity 

2.Diversity

How are living things the same?

Well, what are some characteristics of all living things?

Take a few seconds to think!

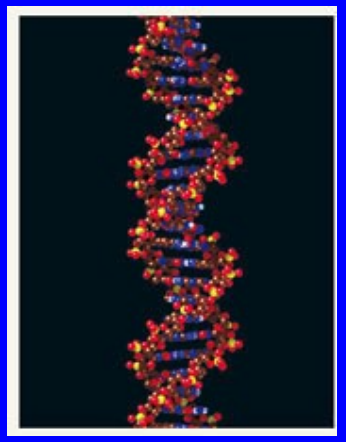
Characteristics of Life

1. Living things are organized!

- **Atoms**
  - Fundamental building blocks of all substances
- **Molecules**
  - Consisting of two or more atoms
- **Cell**
  - The smallest unit of life
- **Organism**
  - An individual consisting of one or more cells

- **Population**
  - Individuals of the same species in the same area
- **Community**
  - Populations of all species in the same area
- **Ecosystem**
  - A community and its environment
- **Biosphere**
  - All regions of the Earth where organisms live

atom



molecule

cell

multicelled organism

population

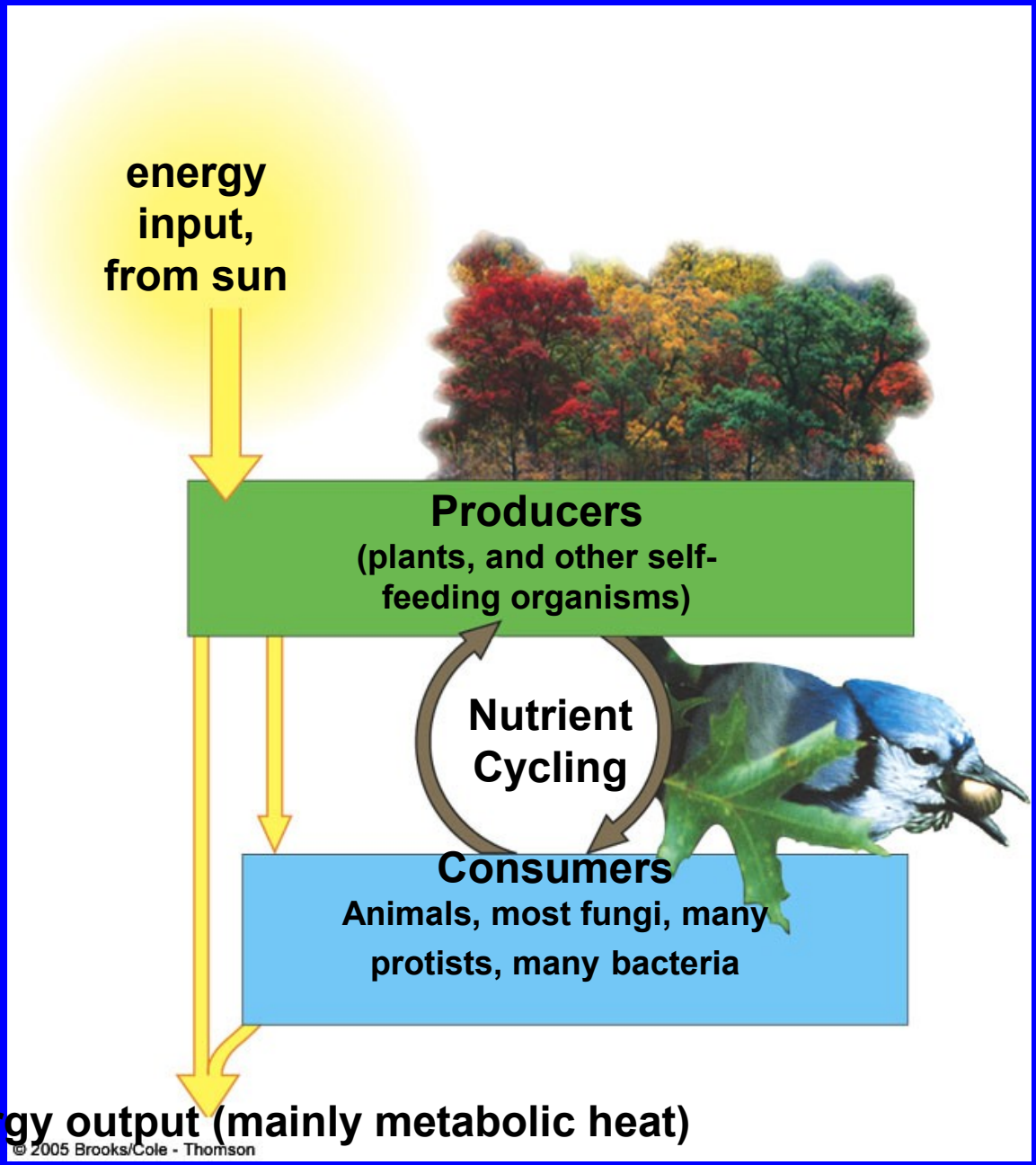
community

ecosystem

biosphere

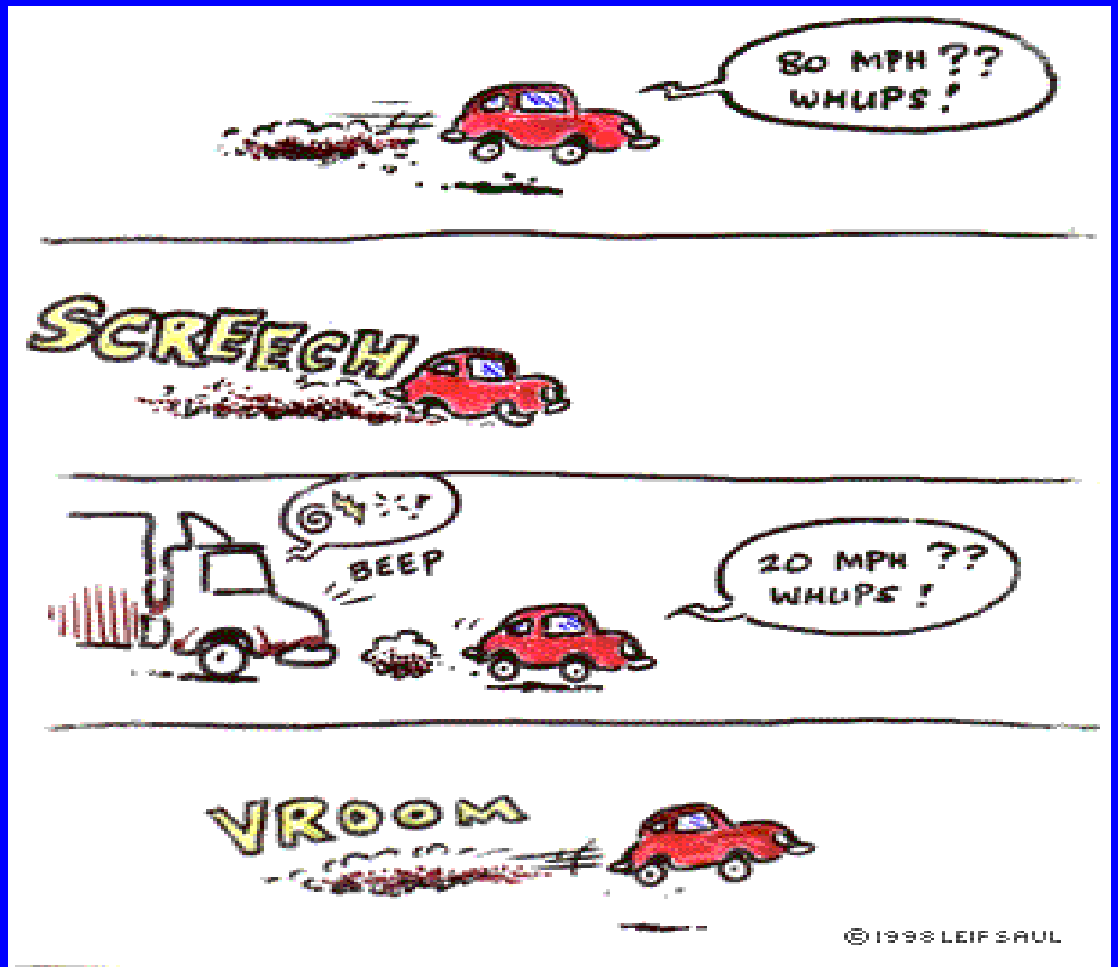
Characteristics of Life

2. Living things acquire materials and energy!



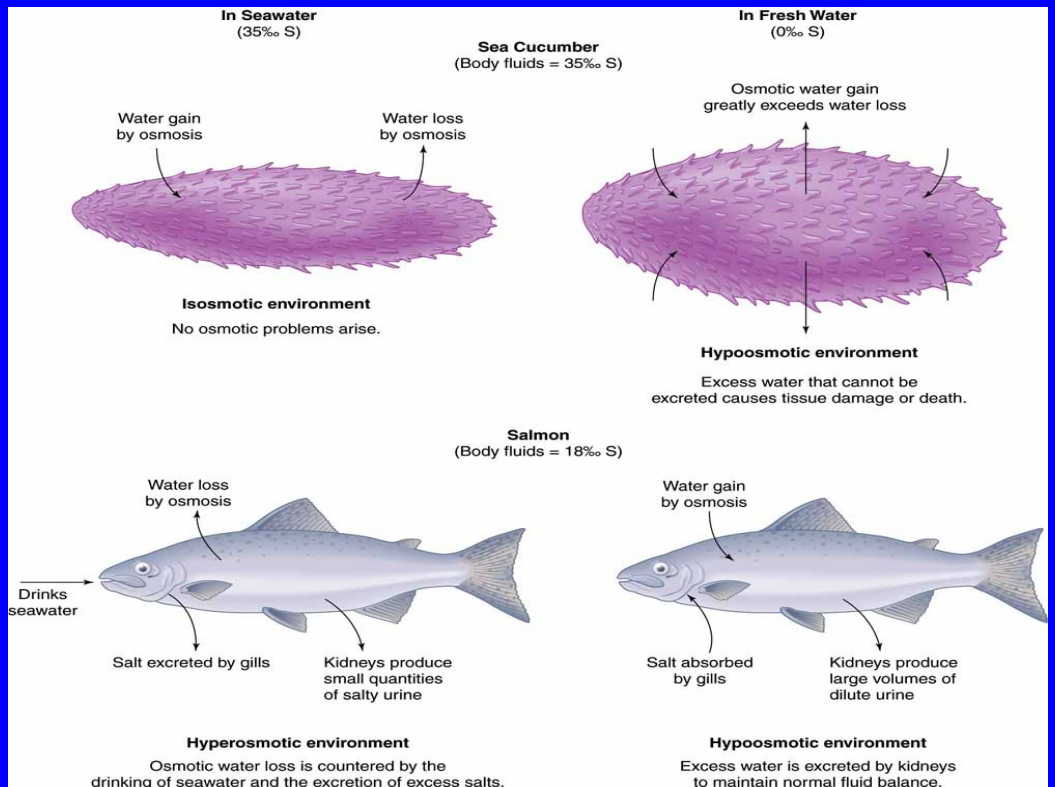
Characteristics of Life

3. Living things respond.
   How do you respond?



Homeostasis – a response example!

- Maintenance of internal environment within range suitable for cell activities
  - Pancreas maintains level of sugar in blood by secreting hormones
  - You sweat to cool your body temperature!

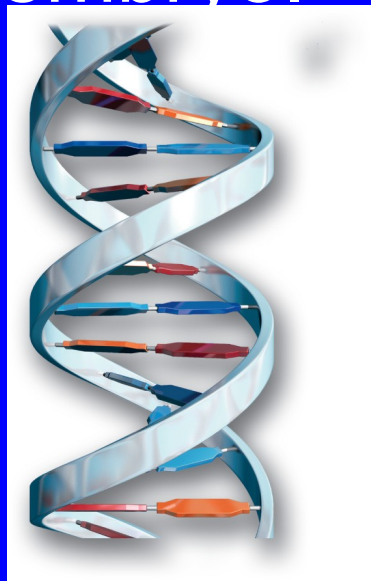


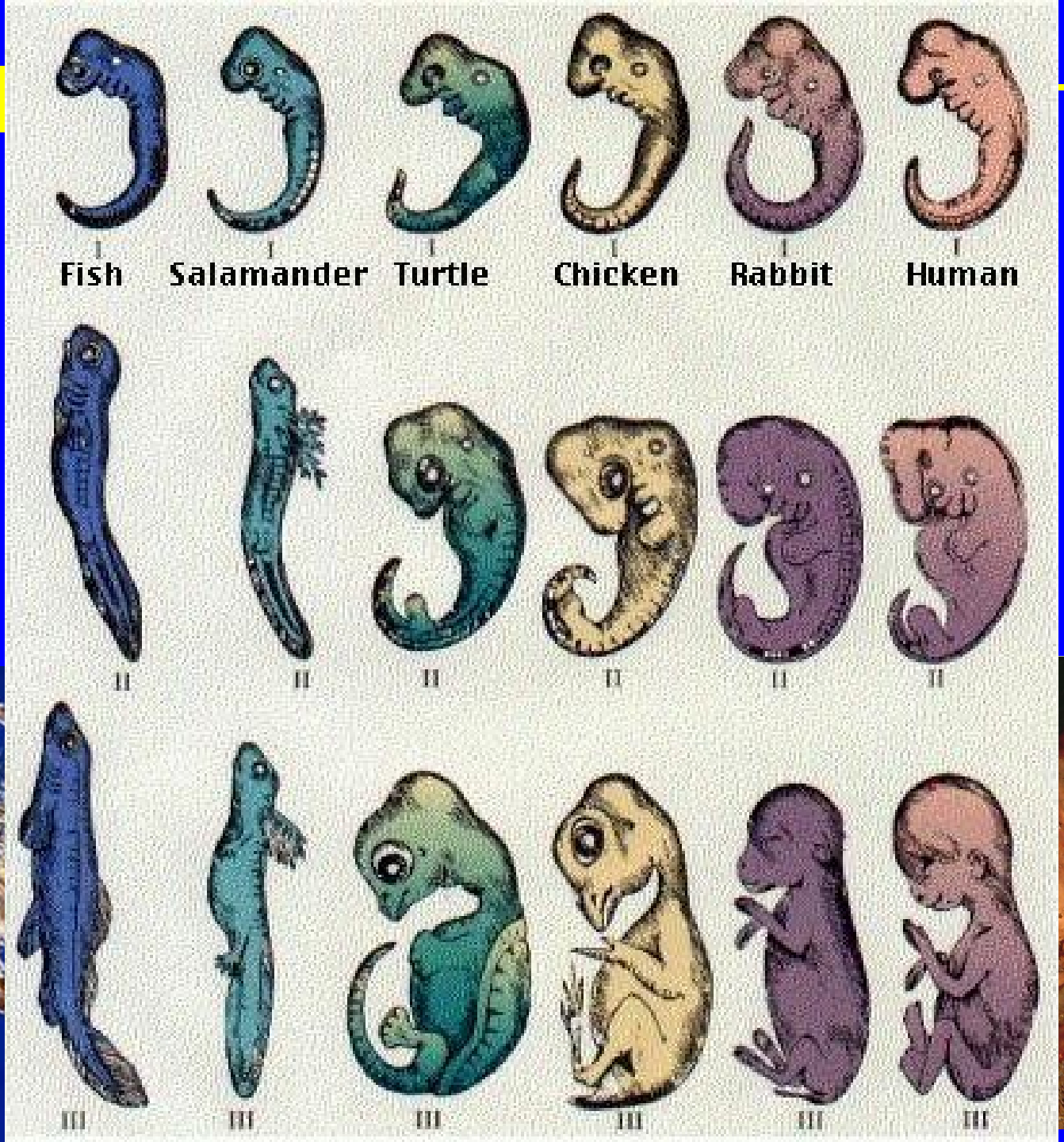
Characteristics of Life

4. Organisms Grow and Reproduce

- Every living thing can make another organism like itself or reproduce.
  - Bacteria simply split in two.
  - Union of egg and sperm produces embryo.

- **DNA is the blueprint!**



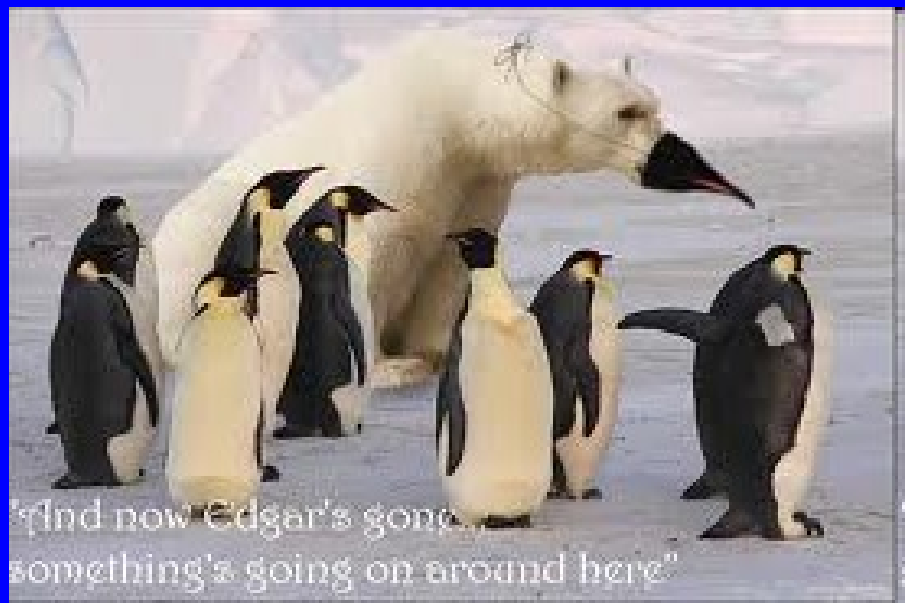

Fish
Salamander
Turtle
Chicken
Rabbit
Human

Characteristics of Life

5. Living things adapt.

- Modifications that make organisms suited to their way of life

- **Penguins can survive in the cold!**



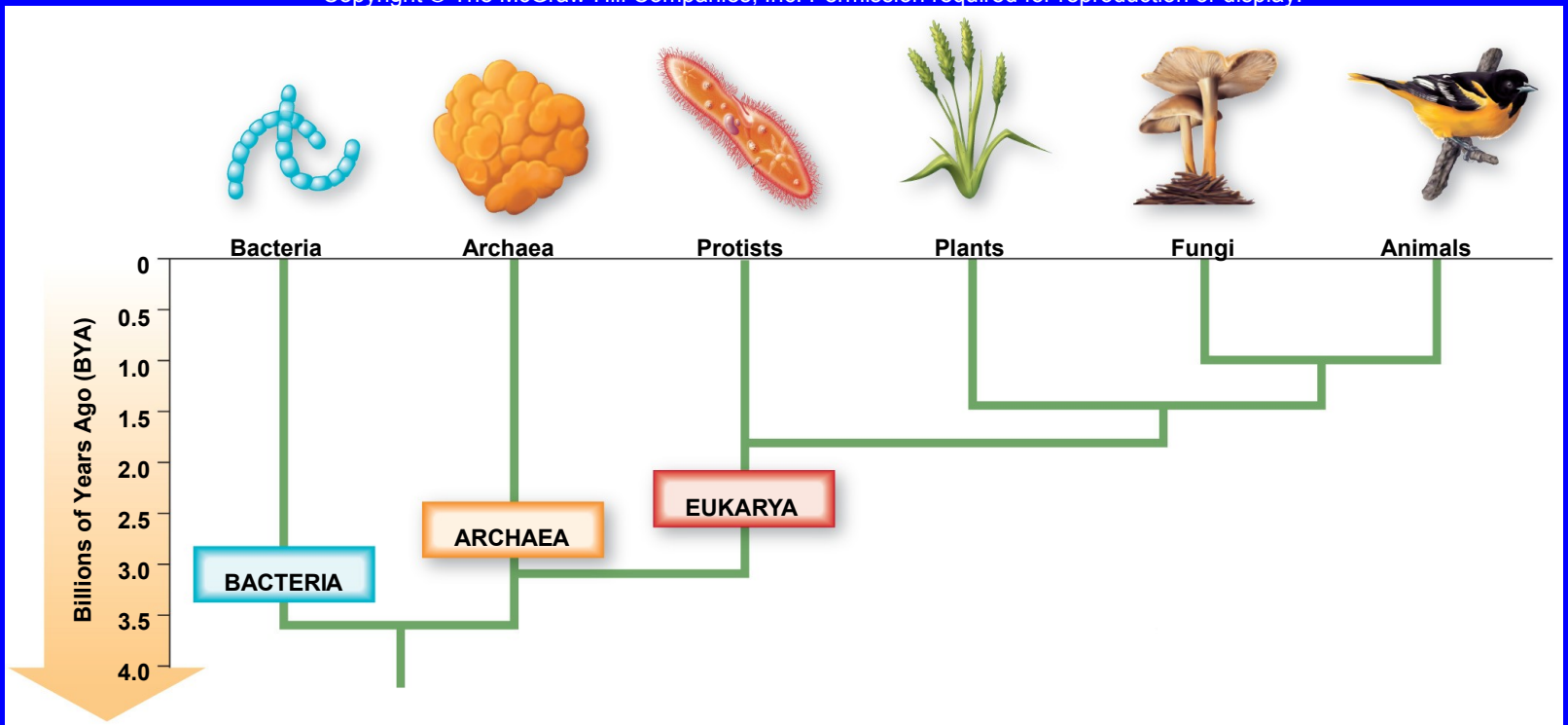
Life on Earth is notable for its:

1. Unity

2. Diversity ←

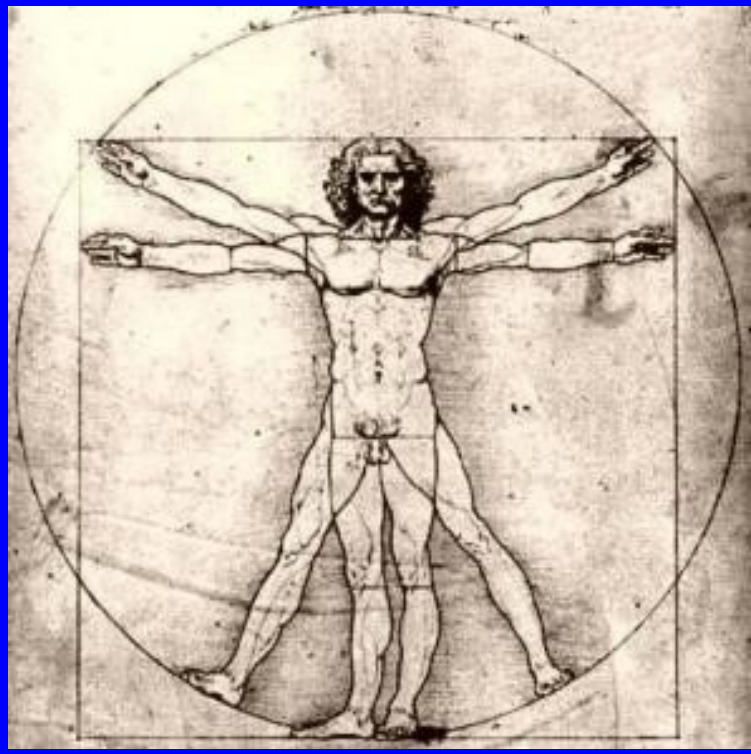
Biodiversity of Life

- Of an estimated 100 billion kinds of organisms that have ever lived on Earth, as many as 100 million are with us today
- Classification scheme attempts to organize this diversity



Classifying organisms in least specific terms to most specific:

1. Domain Eukarya
2. Kingdom Animalia
3. Phylum Chordata
4. Class Mammalia
2. Order Primates
3. Family Hominidae
4. Genus Homo
5. Species Sapien



How Science Works

- Biology is the scientific study of life

Scientific Method

1. Observe phenomenon
2. Develop hypotheses – a testable explanation of the observed phenomenon
3. Make predictions
4. Devise test of predictions - experimentation
5. Carry out test and analyze results

A Scientific Approach – you use the scientific method all the time, but don't know it!!!

1. Observe phenomenon
2. Develop hypotheses – a testable explanation of the observed phenomenon
3. Make predictions
4. Devise test of predictions - experimentation
5. Carry out test and analyze results

- **Your car won't start!!!**
- **My battery is dead!!!**
- **If I replace the battery, my car will start!!!**
- **I'll put a new battery in and see if my car will start!!!**
- **You put a battery in, and cross your fingers!!!**

Experimental Design

- Experimental group
  - Group with a single variable characteristic to be tested against a control group in an experiment
- Control group
  - Group identical to the experimental group, except for the variable being tested
- Variable
  - A single characteristic in a set of individuals that differs from the control group in an experiment

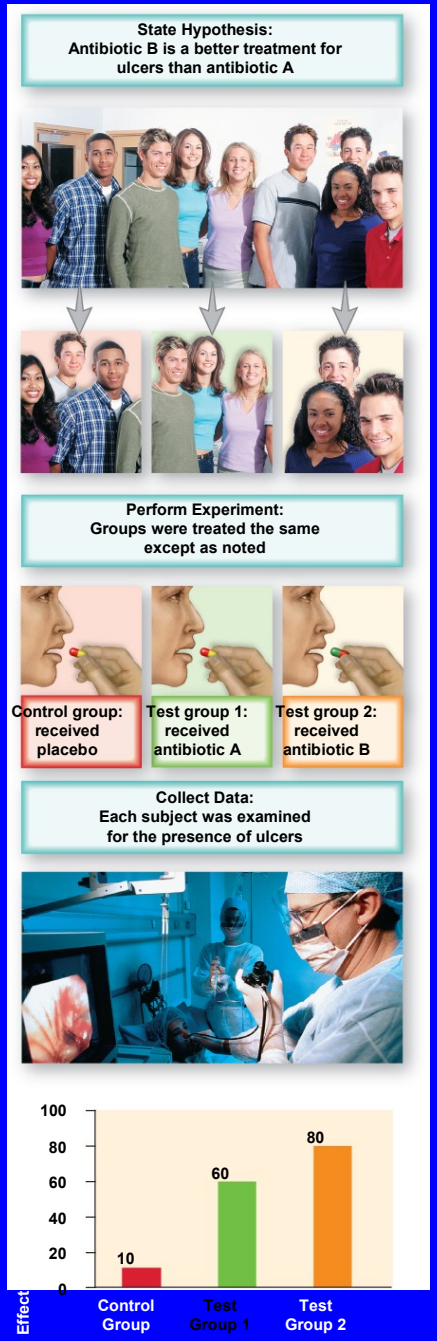
An experimental example!

- Hypothesis : Antibiotic B is better than Antibiotic A in current use for the treatment of ulcers.
- 3 experimental groups
  - Reduce possible variances by randomly dividing large group.
  - Control group receives placebo.

What is the variable???

Which is the experimental group?

Which is the control group?



Experimental Design

- Sampling error
  - Nonrepresentative sample skews results
  - Minimize by using large samples
  - The goal is to reduce possible errors as much as possible in any experiment

Sampling error illustration!

Scientific Theory

- A hypothesis that has been tested for its predictive power many times and has not yet been found incorrect

- Has wide-ranging explanatory power
  - Darwin's Theory of Evolution by Natural Selection

Limits of Science

- Scientific approach cannot provide answers to subjective questions
- Cannot provide moral, aesthetic, or philosophical standards
- The fact that theories can change based on new discoveries is one of science's greatest strengths!

Assignment!!! Due by next Friday 1/14
Turn in via Catalyst website!!!
Contact me with any problems/questions

Utilize the scientific method outside of class. Needs to be different than an example we talked about in class!!!

1. Observe phenomenon
2. Develop hypotheses – a testable explanation of the observed phenomenon
3. Make predictions
4. Devise test of predictions - experimentation
5. Carry out test and analyze results
6. Write it up – should be ½ to 1 page long. Worth 5 pts. No quiz next Tuesday.