

Introduction to Biology...Life is Good

- **Biology** = the study of life
- **Organism** = any individual living thing

- **Biosphere**: everywhere life exists
- **Biodiversity**: variety of life
 - increases from poles to equator
 - is greater near the equator



- What is a **species**? Group of organisms that can interbreed and produce **fertile** offspring

****** It is possible, in some cases, to breed different species of organisms and produce offspring, but the offspring may be infertile.



Horse
(fertile)

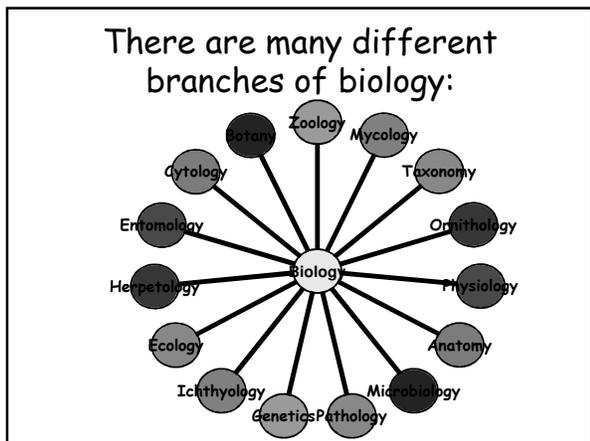


Donkey
(fertile)



Mule
(infertile)

Branches of Biology



 **Characteristics of Living Things:**

1) All living things are made of small units called cells

- Organisms may be:
 - Unicellular—made of only one cell
 - Multicellular—made of many cells



2) All living things reproduce

- 2 Types:
 - Asexual—involves only one parent cell
 - Sexual—involves 2 parent cells called sperm & egg



3) All living things respond to stimuli.

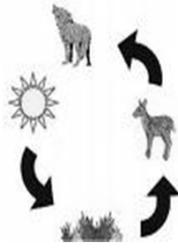
4) All living things adapt to their environment

- 2 Types:
 - Short-term—dog shedding hair in summer
 - Long-term—evolutionary change; thumbs



5) All living things need energy

Metabolism—total of all chemical reactions that take place in an organism



6) All living things grow & develop

Growth—increase in size only



Development—internal changes that organisms undergo as they grow.



7) All living things maintain homeostasis

- Homeostasis: maintenance of constant internal conditions in an organism



8) All living organisms contain genetic information (DNA)

- Genes are made of DNA.
- The traits that we have come from our genes.
- Offspring resemble their parents.



9) All living organisms have a life span

10) All living organisms are organized.

Themes in Biology

Structure & Function

Homeostasis

Evolution

(change in allele frequency; occurs through adaptations)

2 major concepts:
Natural Selection
Descent with Modification

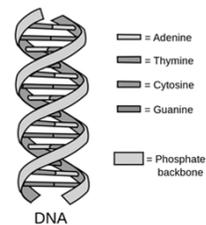
Cells

Discovery of cell
Cell Theory

Reproduction

DNA/Inheritance

Deoxyribonucleic Acid
Structure of DNA



Interaction with Environment

Nutrient Cycling
(water cycle, carbon cycle, oxygen cycle, etc)

Energy Transfer
(photosynthesis/cell respiration)

Unity/Diversity

Organization/Emergent Properties

Levels of organization

Scientific Inquiry

Scientific Method
Presenting Data

THE SCIENTIFIC METHOD

A. State the problem after making observations.

B. Form a hypothesis—an educated guess that can be tested.

C. Test the hypothesis (experiment)
2 parts:

1. Control
2. Variable—can be independent or dependent

DRY MIX

SCIENTIFIC METHOD (CONT.)

D. Record data—information received from the experiment
**Data can be presented as a graph, table, or chart.

E. Draw conclusions.
**This is where you use data from the experiment to determine if your hypothesis is accepted or rejected.
**If a hypothesis is proven time and time again, then it becomes a theory.

F. Report results.

HYPOTHESIS	Independent variable (What I change)	Dependent variable (What I observe)	Controlled variables (What I keep the same)
If fertilizer is added, then a plant will grow taller.	Different amounts of fertilizer	Growth of the plant measured by its height	<ul style="list-style-type: none"> ·Same size pot ·Same type of plant ·Same type and amount of soil ·Same amount of water and light ·Make measurements of growth for each plant at the same time <p>The many variables above can each change how fast a plant grows, so to insure a fair test of the fertilizer, each of them must be kept the same for every pot.</p>