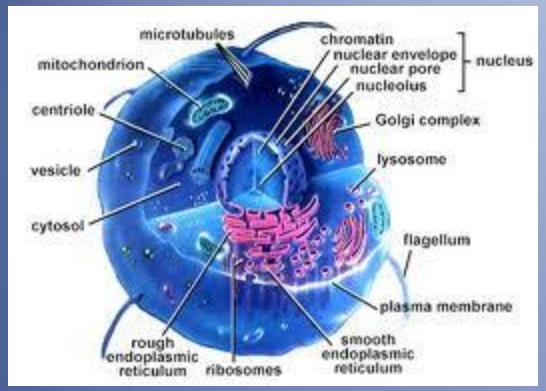
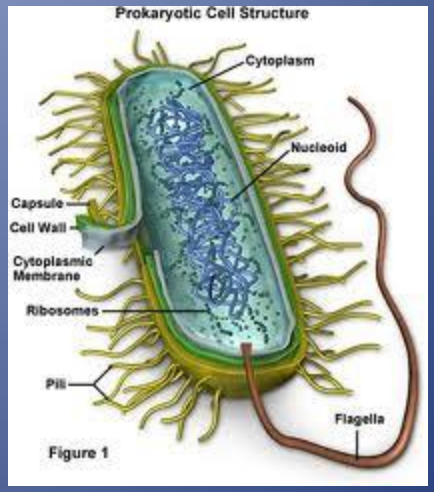
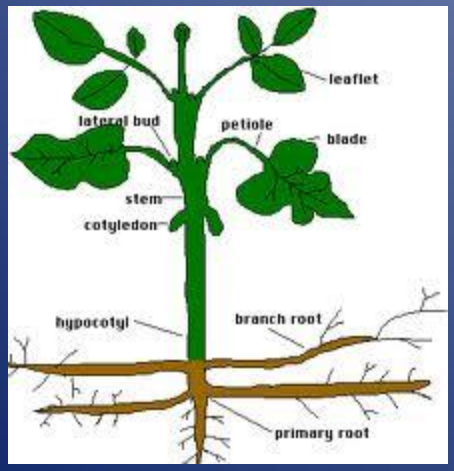
BIOLOGY 1


microtubules
mitochondrion
centriole
vesicle
cytosol
chromatin
nuclear envelope
nuclear pore
nucleolus
nucleus
Golgi complex
lysosome
flagellum
plasma membrane
rough endoplasmic reticulum
ribosomes
smooth endoplasmic reticulum


Prokaryotic Cell Structure
Cytoplasm
Nucleoid
Capsule
Cell Wall
Cytoplasmic Membrane
Ribosomes
Pili
Flagella
Figure 1


leaflet
lateral bud
petiole
blade
stem
cotyledon
hypocotyl
branch root
primary root

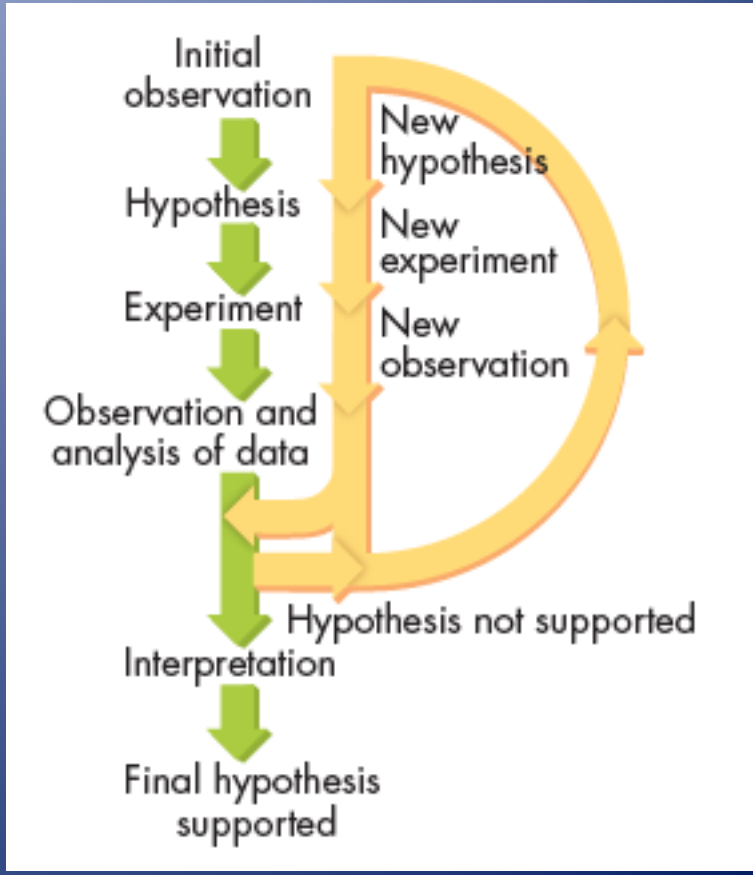

Fish
Salamander
Tortoise
Chick
Hog
Calf
Rabbit
Human
www.bible.ca
Evolutionary Biology, Douglas J. Futuyma, 1998, p 653

What is Science?

- **Science** = an organized way of gathering and analyzing evidence about the natural world
  - Provides natural explanations for events in the natural world
  - Uses those explanations to understand patterns in nature and to make predictions about natural events

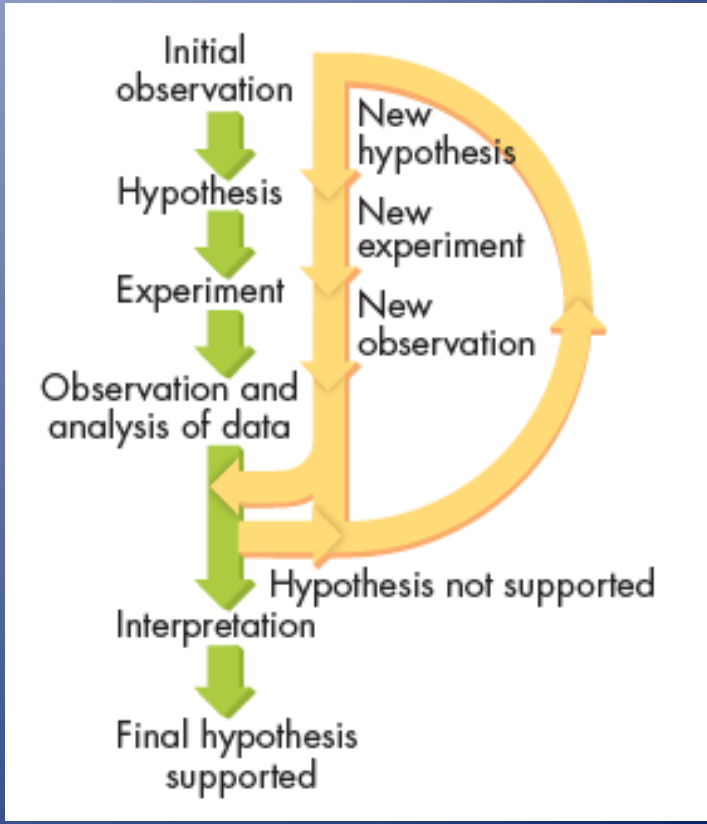
The Scientific Method

- **Observation** – noticing and describing events in an orderly way
- **Hypothesis** – a scientific explanation for a set of observations that can be tested



The Scientific Method Continued

- **Controlled experiment** – an experiment where only one variable is changed
  - **Independent Variable** – the variable that is changed by the experimenter
  - **Dependent Variable** – the variable that changes in response to the independent variable



Independent/Dependent Variables

Examples of experiments –

1) Do high school students get better grades if they sleep 8 hours the night before a test ?

Independent variable – Amount of sleep

Dependent variable – Grade on the test

2) Do people who take vitamins get sick less often?

Independent variable – Taking a vitamin

Dependent variable – How often people get sick

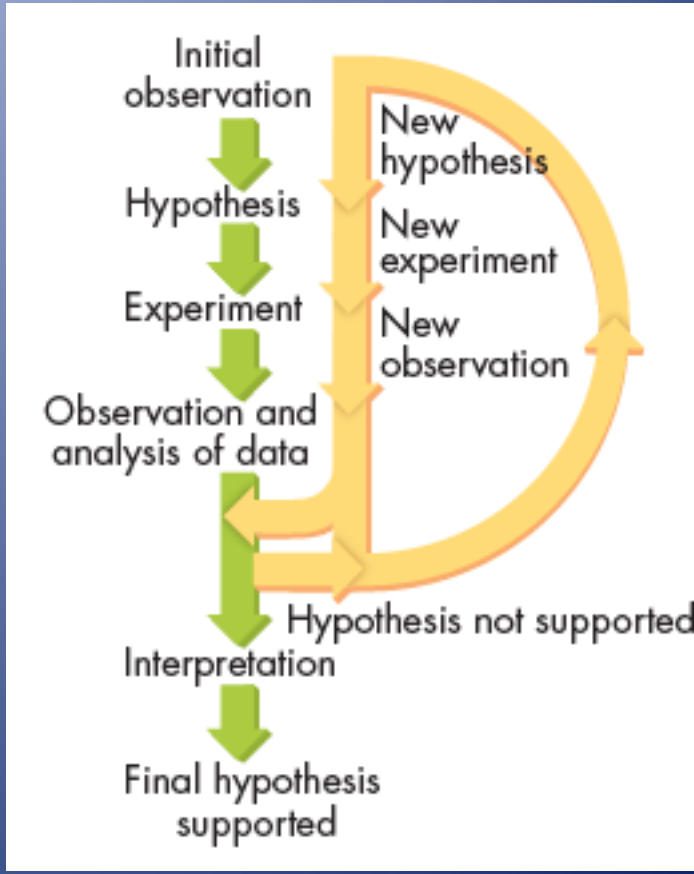
Data Collection

- Collect and analyze data
  - **Quantitative data** – numbers obtained by counting or measuring (height, number of leaves, etc.)
  - **Qualitative data** – descriptive observation (direction of movement, description of appearance, etc.)

Drawing Conclusions

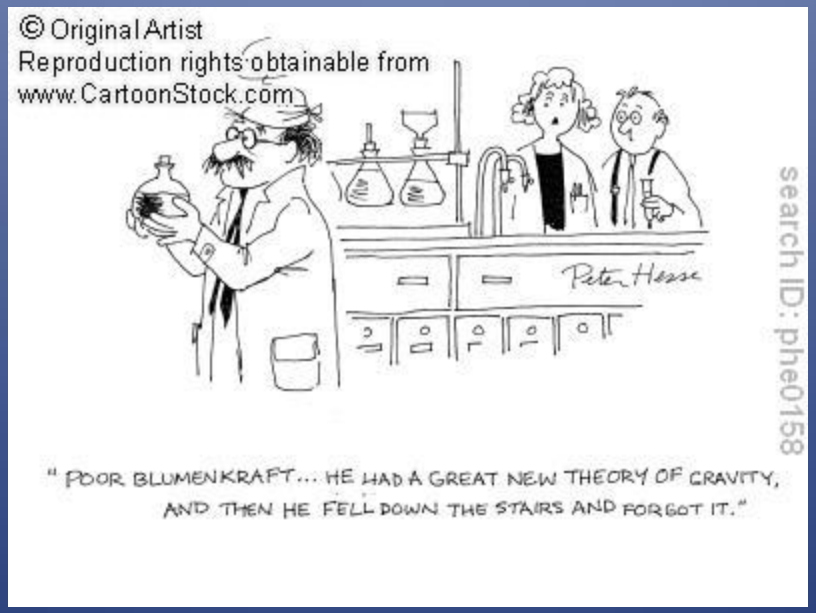
- Did the experiment support the hypothesis?
- What new hypotheses can be made and tested?

- In biology, not all hypotheses can be tested in a controlled experiment– ex. Does taking prenatal vitamins during pregnancy cause a higher IQ



Scientific Theory

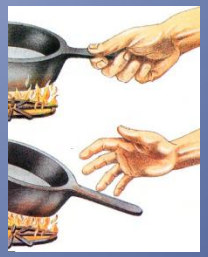
- **Theory** = a well-tested explanation that unifies a broad range of observations and hypotheses
  - Theories have been tested and supported by many lines of evidence
  - They are the dominant view among scientists

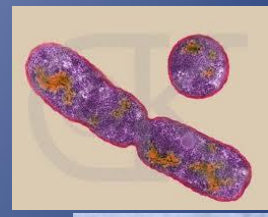


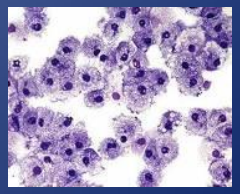
Living Things!!!!!!

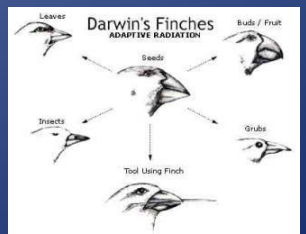
Characteristics of Living Things

1) Universal genetic code – DNA
2) Grow and develop
3) Respond to their environment
4) Reproduce (sexually or asexually)
5) Maintain a stable internal environment = **homeostasis**
6) Obtain and use material and energy = **metabolism**
7) Made of cells
8) As a group – they evolve (change)









Measurement

Metric Unit	Unit	Instrument
Length	meter (m)	ruler
Mass	gram (g)	balance
Volume	liter (l)	graduated cylinder
Temperature	Celsius (C)	thermometer

Measurement Continued

kilo - 1000 (1 kilometer = 1000 meters)

centi = 1/100 (1 centimeter = 1/100 meter)

(in other words – there are 100 centimeters in 1 meter)

milli = 1/1000 (1 millimeter = 1/1000 meter

(there are 1000 millimeters in 1 meter)

(there are 10 millimeters in 1 centimeter)

- millimeter = mm centimeter = cm