

## NOTES: 1.3: Studying Life

### VOCABULARY:

Biology	Sexual reproduction	Homeostasis
DNA	Asexual reproduction	Biosphere
Stimulus	Metabolism	Evolve

**What are some characteristics of living things? What does it mean to be "ALIVE"?**

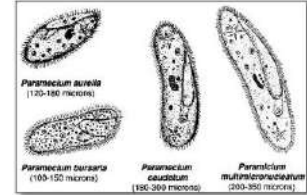
1) Living things are \_\_\_\_\_.

- Made up of cells

- UNICELLULAR: \_\_\_\_\_

- MULTICELLULAR: \_\_\_\_\_

- Each cell contains the genetic material: \_\_\_\_\_



2) Living things are based on \_\_\_\_\_: \_\_\_\_\_!

3) Living things \_\_\_\_\_.

- ASEXUAL: \_\_\_\_\_

- SEXUAL: \_\_\_\_\_

### 4) GROWTH & DEVELOPMENT:

- Growth: \_\_\_\_\_ (could be at the cellular level)

- Development: cells increase in number and \_\_\_\_\_.

### 5) RESPONSE TO THE ENVIRONMENT:

#### Examples of stimuli:

- Heat
- Light
- Pressure
- Sound
- Gravity

#### Examples of responses:

- A plant seed only germinates when there is sufficient water and temperature.

• \_\_\_\_\_

• \_\_\_\_\_

### 6) MAINTAINING INTERNAL BALANCE:

- HOMEOSTASIS: \_\_\_\_\_

-Example: How do humans maintain the same body temperature?

-If we get too hot → \_\_\_\_\_

-If we get too cold → \_\_\_\_\_



7) Living things require \_\_\_\_\_.

- All living things use energy: they either make their own energy or consume energy

→ PHOTOSYNTHESIS: \_\_\_\_\_

→ METABOLISM: combination of chemical reactions through which an organism builds up or breaks down materials

### 8) ADAPTATION & EVOLUTION

- \_\_\_\_\_: any structure, behavior, or internal process that enables an organism to respond to stimuli and better survive in a particular environment

- EVOLUTION: \_\_\_\_\_

-a group of organisms can change over time

-even though an individual develops, their \_\_\_\_\_

## **Branches of Biology**

- Diversity of life is so great, biology is separated into branches

- **ZOOLOGY**: animals

- **ETHOLOGY**: \_\_\_\_\_

- **MICROBIOLOGY**: bacteria

- **PALEONTOLOGY**: \_\_\_\_\_

- **BOTANY**: \_\_\_\_\_

## **Levels of Organization**: (in order from largest to smallest)

Biosphere > Ecosystem > Community > Population > Organism > Organ Systems > Organs > Group of Cells (Tissues) > Cells > Molecules > Atoms > Protons, Neutrons, Electrons

## **Metric System**

• Length: \_\_\_\_\_

• Volume: \_\_\_\_\_

• Mass: \_\_\_\_\_

• Temperature: \_\_\_\_\_

## **GRAPH** = \_\_\_\_\_

- 1) \_\_\_\_\_;
- 2) x and y axis \_\_\_\_\_;
- 3) \_\_\_\_\_ for both the x and y axis;
- 4) scale is evenly and correctly spaced for data;
- 5) \_\_\_\_\_.

## **MICROSCOPES!**

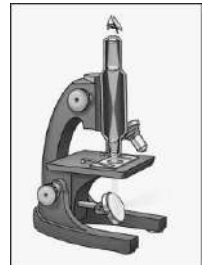
- **COMPOUND LIGHT MICROSCOPE**: most common scope

**Advantages**: get higher magnification than with a dissecting scope.

**Drawbacks**: the light comes from below so sample must be very **thin** so you can see

-Useful for viewing single cells

-*Usually* view dead things with this microscope.



- **DISSECTING MICROSCOPE**: used to view dissection or small live (sleeping) animals such as fruit flies.

**Advantages**: can view samples that are alive; large field of view

**Drawbacks**: magnification is not as high as other microscopes.

- **SCANNING ELECTRON MICROSCOPE (SEM)**: used to see **very small** "stuff"

**Advantages**: can study very small objects *such as viruses and individual molecules*; limit of resolution is 1000x that of a light microscope.

**Drawbacks**: done in a vacuum, so object must be dead; also very expensive!

## **Laboratory Techniques**

- **Cell Culture**: \_\_\_\_\_

- **Cell fractionation & Centrifugation**: \_\_\_\_\_

- 1) Cells are blended;
- 2) Added to a liquid and placed in a tube;
- 3) Centrifuge at 20,000 revolutions per minute;
- 4) Spinning separates the cell parts by density.

