

It's Alive!!!...or Is It?

Mrs. Stevenson

Characteristics & Needs of Living Things

Chemistry of Living Things

Living or Non-Living? How do you know?



Gummy Worms	Earthworms

Warm Up:

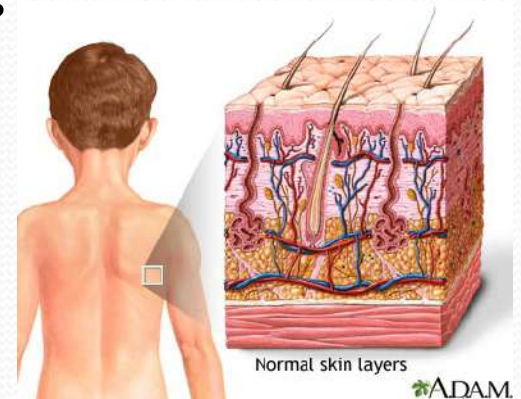
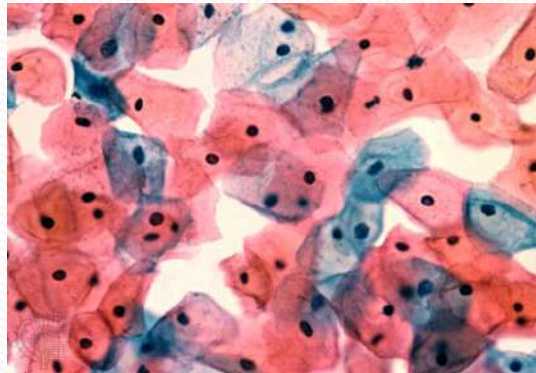
Living Things Respond to their Environment

Stimulus	Response
You forget to use a potholder, and touch the hot handle of a pan on the stove.	
Your parents turn on a light in the morning to wake you.	
Your dog sees a cat.	
A fly lands on a venus flytrap.	
Mrs. Stevenson comes into the classroom.	

Characteristics of Living Things

1. Made of Cells:

- All living things are composed of one or more cells.
- **Cell** – membrane-covered structure that contains all of the materials necessary for life
 - **Unicellular** - uni = one; made of one cell
 - Different cell parts within the cell perform different functions
 - **Multicellular** – multi = many; made of many cells
 - Different cells have specialized functions



Characteristics of Living Things

2. Respond to changes in the environment:

- Sense change in the environment & respond
 - **Stimulus** - anything that causes a reaction or change in an organism
 - Ex: gravity, light, heat, hunger
 - **Response** – the reaction to a stimulus
- **Homeostasis** - the maintenance of a constant internal state in a changing environment
 - Ex: Body temperature
 - Hot = sweating Cold = shivering



Characteristics of Living Things

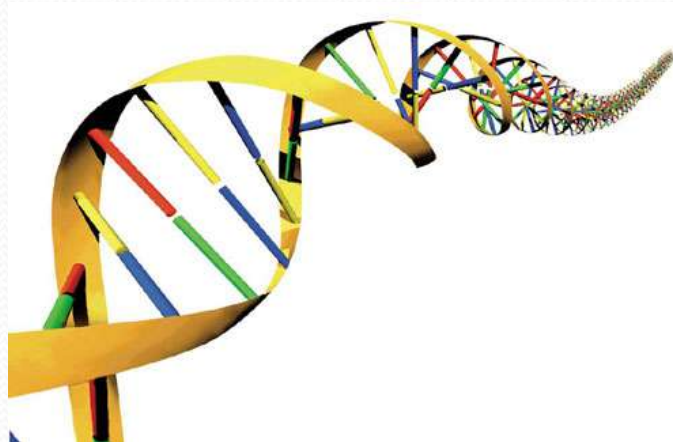
3. Reproduce:

- Living things make other living things similar to themselves.
- **Sexual reproduction** – reproduction in which the sex cells from two parents unite, producing offspring that share traits from both parents.
 - 2 parents
 - Most plants & animals
- **Asexual reproduction** - reproduction that does not involve the union of sex cells and in which one parent produces offspring identical to itself.
 - A parent (1 parent)
 - Most unicellular organisms

Characteristics of Living Things

4. Have DNA

- The cells of all living things contain DNA (deoxyribonucleic acid).
 - DNA controls the structure & function of cells
 - Pass DNA to offspring during reproduction
 - **Heredity** – the passing of traits from one generation to the next



Characteristics of Living Things

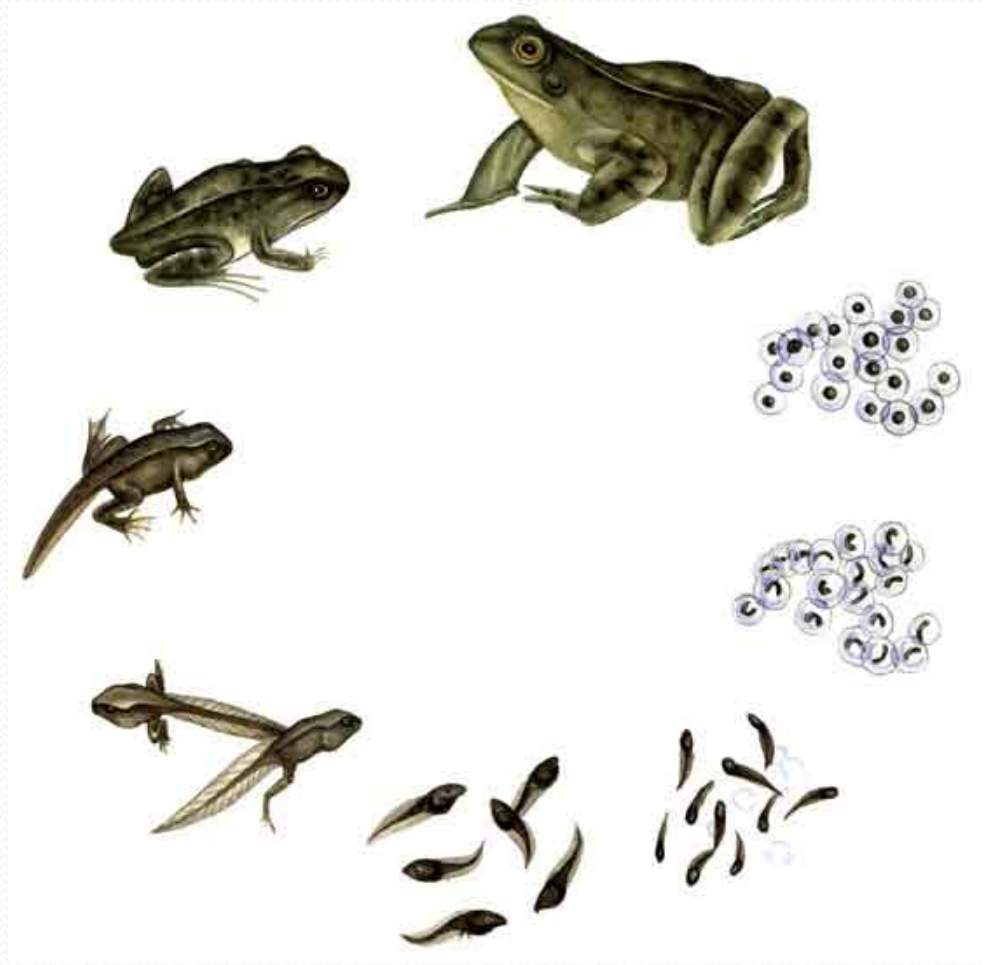
5. Use Energy:

- Organisms use energy to carry out the activities of life.
 - Ex: making food, moving materials into & out of cells, making new cells
- **Metabolism** – the sum of all chemical processes that occur in an organism
 1. Ingestion – taking in food
 2. Digestion – breaking down food so that it can be used
 3. Respiration – adding oxygen to release energy in food
 4. Excretion – getting rid of wastes

Characteristics of Living Things

6. Grow & Develop:

- **Growth**
 - Get larger
- **Develop**
 - Become more complex



Activating Prior Knowledge

- What does this bird need in order to survive in its habitat?



Activating Prior Knowledge

- Are these the same “needs” that this polar bear has?
Or this saguaro cactus?



Needs of Living Things

1. Water:

- Living things are made up of approximately 70% water
- Most chemical reactions (ex: metabolism) require water



Needs of Living Things

2. Air:

- A mixture of several gases, including oxygen and carbon dioxide
- Oxygen is used to release the energy in food
 - Cellular respiration
- Not every living thing needs oxygen
 - Anaerobic
 - an = without aero = air

Needs of Living Things

3. Living space:

- All organisms need a place to live that contains all of the things they need to survive.
- Space on Earth is limited
- Leads to competition for space

Needs of Living Things

4. Food:

- All living things need food for energy.
 - The SUN is the primary source of energy for living things!
 - **Producers** – organisms that can make their own food by using energy from their surroundings
 - aka: **Autotroph**
 - **Consumers** – organisms that eat other organisms or organic matter
 - aka: **Heterotroph**
 - **Decomposers** – organisms that get their food by breaking down the nutrients in dead organisms or animal wastes



Summarizing Activity:

Characteristics & Needs of Georgia's Animals

- In your groups, create a poster that illustrates:
 - The 3 characteristics of your assigned organism
 - The habitat of your organism with 3 of the needs of living things that were discussed in this presentation
- The laptop computers are available if you need to look up information about your organism.
 - http://georgiawildlife.com/conservation/georgia-animals-plants#Common_Animals

Warm up – You are what you eat!

- With your elbow partner, talk about the information on this nutrition label.
- What does all of this information mean?
- How would this food (a potato) benefit the consumer?



Nutrition Facts

Serving Size 1 potato (148g/5.3oz)

Amount Per Serving

Calories 100 **Calories from Fat** 0

% Daily Value*

Total Fat 0g **0%**

Saturated Fat 0g **0%**

Cholesterol 0mg **0%**

Sodium 0mg **0%**

Potassium 720mg **21%**

Total Carbohydrate 26g **9%**

Dietary Fiber 3g **12%**

Sugars 3g

Protein 4g

Vitamin A 0% • Vitamin C 45%

Calcium 2% • Iron 6%

Thiamin 8% • Riboflavin 2%

Niacin 8% • Vitamin B₆ 10%

Folate 6% • Phosphorous 6%

Zinc 2% • Magnesium 6%

*Percent Daily Values are based on a 2,000 calorie diet.

Chemistry of Life

- All matter (living & nonliving) is made of elements.
 - The basic unit of an element is the atom.
- Elements found in living things include (CHNOPS):
 - Carbon
 - Hydrogen
 - Nitrogen
 - Oxygen
 - Phosphorus
 - Sulphur

Periodic Table of the Elements

Periodic Table of the Elements

hydrogen

alkali metals

alkali earth metals

transition metals

poor metals

nonmetals

noble gases

rare earth metals

1 H																	2 He				
3 Li	4 Be															5 B	6 C	7 N	8 O	9 F	10 Ne
11 Na	12 Mg															13 Al	14 Si	15 P	16 S	17 Cl	18 Ar
19 K	20 Ca	21 Sc	22 Ti	23 V	24 Cr	25 Mn	26 Fe	27 Co	28 Ni	29 Cu	30 Zn	31 Ga	32 Ge	33 As	34 Se	35 Br	36 Kr				
37 Rb	38 Sr	39 Y	40 Zr	41 Nb	42 Mo	43 Tc	44 Ru	45 Rh	46 Pd	47 Ag	48 Cd	49 In	50 Sn	51 Sb	52 Te	53 I	54 Xe				
55 Cs	56 Ba	57 La	72 Hf	73 Ta	74 W	75 Re	76 Os	77 Ir	78 Pt	79 Au	80 Hg	81 Tl	82 Pb	83 Bi	84 Po	85 At	86 Rn				
87 Fr	88 Ra	89 Ac	104 Unq	105 Unp	106 Unh	107 Uns	108 Uno	109 Une	110 Unn												

- hydrogen
- alkali metals
- alkali earth metals
- transition metals
- poor metals
- nonmetals
- noble gases
- rare earth metals

58 Ce	59 Pr	60 Nd	61 Pm	62 Sm	63 Eu	64 Gd	65 Tb	66 Dy	67 Ho	68 Er	69 Tm	70 Yb	71 Lu
90 Th	91 Pa	92 U	93 Np	94 Pu	95 Am	96 Cm	97 Bk	98 Cf	99 Es	100 Fm	101 Md	102 No	103 Lr

What do elements have to do with cells?

- ▶ Elements combine to form compounds.
 - The basic unit is the molecule.

The Stuff of Cells

CELLS ARE THE SMALLEST OF ALL LIVING CREATURES. Usually, they can be seen only through a microscope. Like everything else we can touch and see, cells are made up of molecules, and molecules are made up of atoms.



1. ATOMS

Atoms are the most basic elements of the universe. Everything living and nonliving is made up of them. The most common atoms are carbon, hydrogen, nitrogen, and oxygen.



2. MOLECULES

Molecules are atoms that are bonded together. For instance, one water molecule is made up of two hydrogen atoms and one oxygen atom (H_2O).



3. CELLS

Cells are the most basic units of life. They are made up of many atoms and molecules.

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The Compounds of Life

- Living things are made of organic & inorganic compounds.
- Organic:
 - Proteins
 - Carbohydrates
 - Lipids (fats)
 - Nucleic acids

} All contain CARBON ...
Living things are carbon-based
- Inorganic: - usually do NOT contain carbon
 - Carbon dioxide – CO_2 (exception to the rule!)
 - Water – H_2O
 - Salt - NaCl

So...

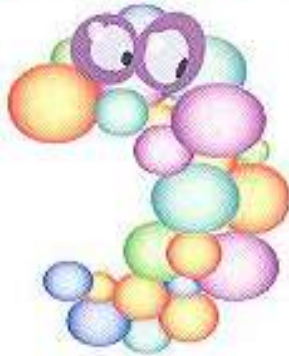
- The basic unit of matter is an ATOM, but the basic unit of life is the CELL.

Ingredients of Cells



WATER

Water makes up about 90 percent of a cell's weight. Here's what's in the other 10 percent:



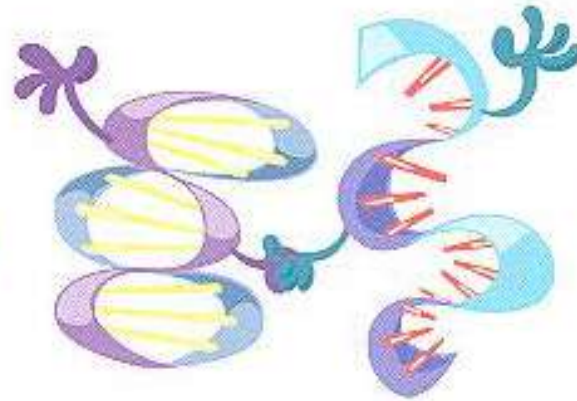
PROTEINS

About 5 percent are protein molecules, which in turn are made up of chemicals called amino acids.



CARBOHYDRATES

These are sugars, which are burned for quick energy. They make up about 2.5 percent.



NUCLEIC ACIDS

These go by their initials—DNA and RNA—and make up about 1.5 percent of

cells. They control the cells by supplying the codes that decide which chemicals get made and when.

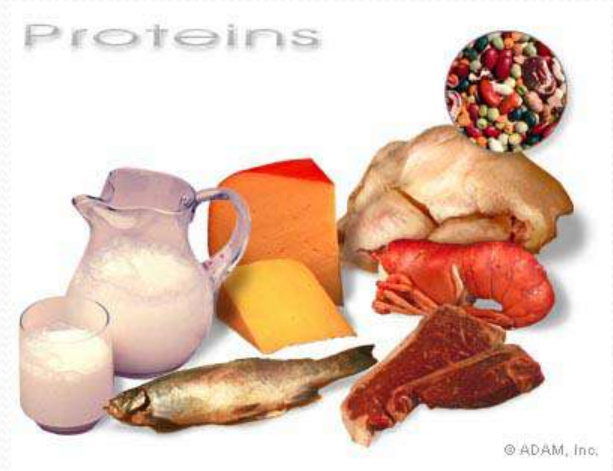


FATS

Fats, oils, and waxes called lipids make up about 1 percent—mostly in the cell's outer membrane.

Proteins

- ▶ Proteins are large molecules made of smaller molecules called amino acids.
- ▶ Made of:
 - Carbon, hydrogen, nitrogen
- ▶ Foods high in protein:
 - Meat, eggs, fish, nuts & beans
- ▶ Used for:
 - Building structures
 - Growth & repair
- ▶ Enzymes – types of proteins that speed up chemical reactions in living things.
 - Ex: saliva



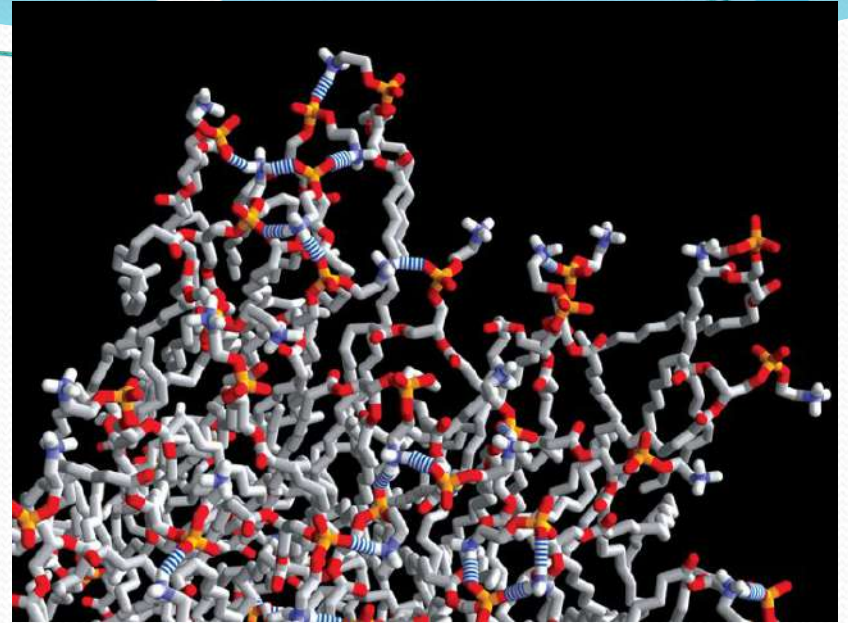
Carbohydrates

- ▶ Made of:
 - Carbon
 - Hydrogen
 - Oxygen
- ▶ Ex: sugars & starches
- ▶ Food:
 - Fruits & veggies & grains
- ▶ Used for:
 - Provides energy
- ▶ Found in the cell wall (cellulose) & cell membrane



Lipids

- Made of:
 - Carbon
 - Hydrogen
 - Oxygen
- Ex: fats, oils & waxes
- Cells store the energy in lipids for later use.



Nucleic acids

- ▶ Made of:
 - Carbon
 - Oxygen
 - Hydrogen
 - Nitrogen
 - Phosphorus
- ▶ Contain the instructions that cells need to carry out life functions.
- ▶ **DNA** (genetic material) & **RNA** (production of proteins)

