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:

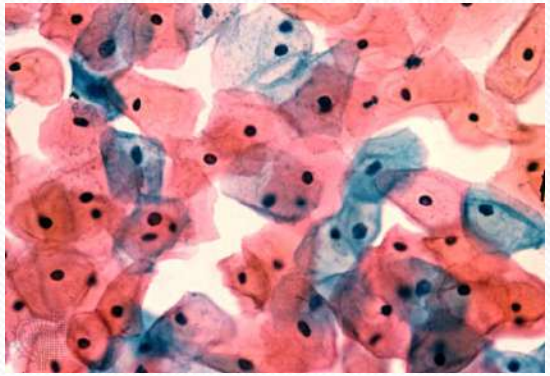
Living Things Respond to their Environment

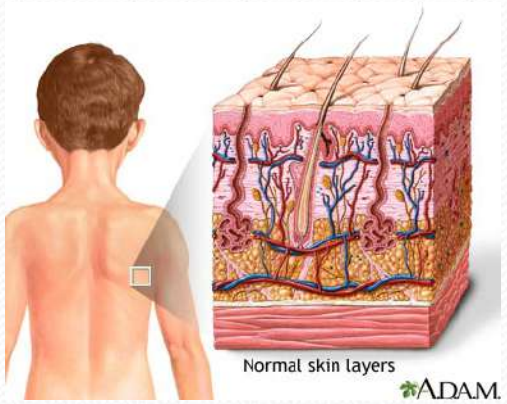
Stimulus	Response
You forget to use a potholder, and touch the hot handle of a pan on the stove.	
Your parents turn on a light in the morning to wake you.	
Your dog sees a cat.	
A fly lands on a venus flytrap.	
Mrs. Stevenson comes into the classroom.	

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. <u>Respond to changes in the environment:</u>

- 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

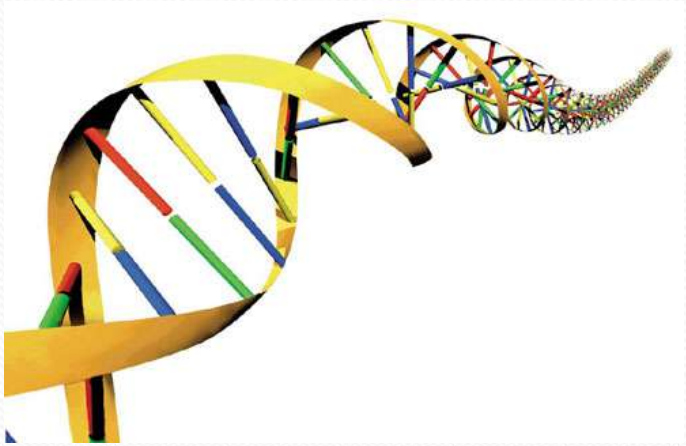
Characteristics of Living Things

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

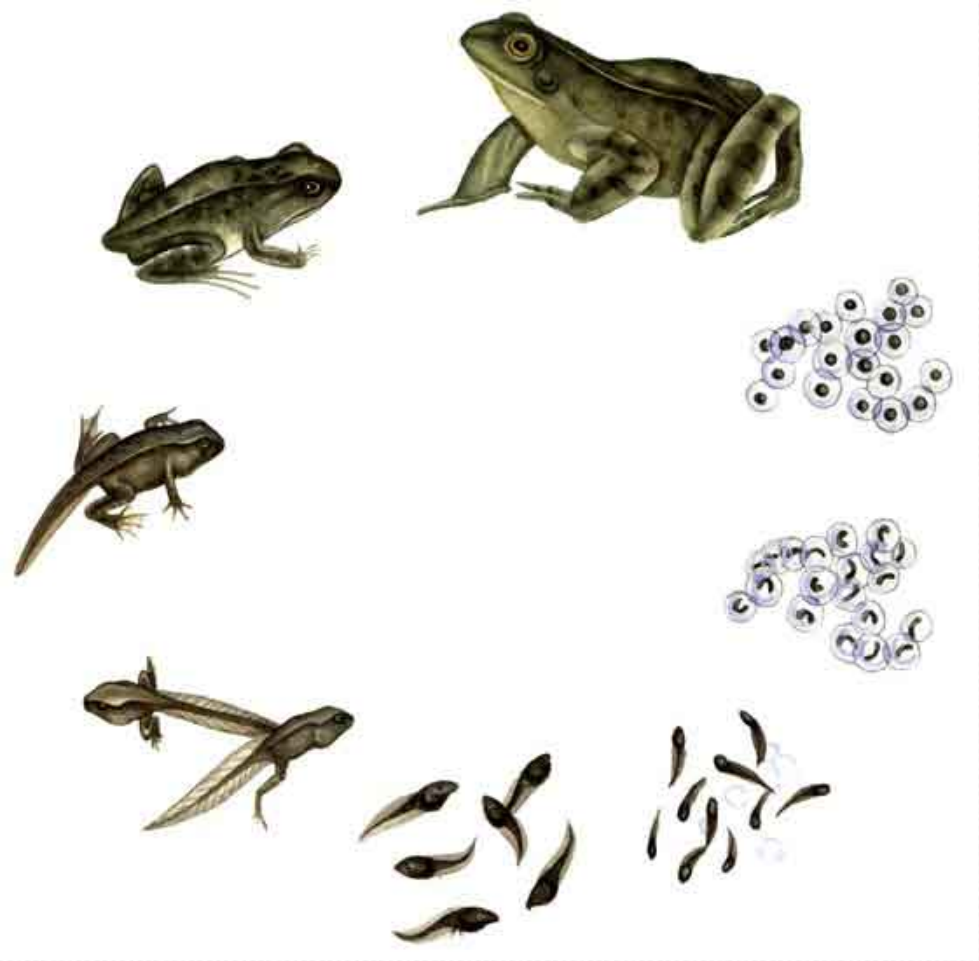


Characteristics of Living Things

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	

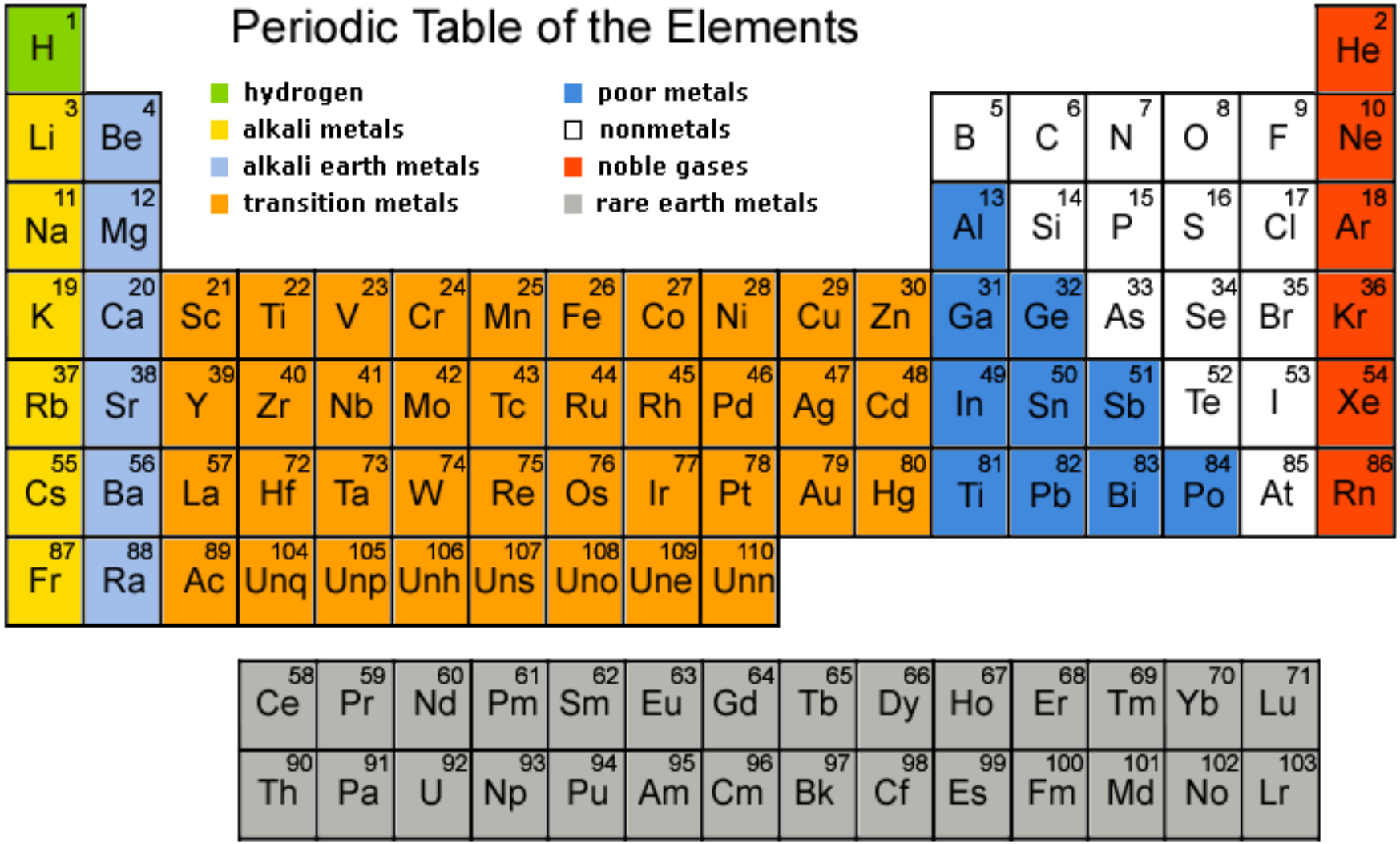
Vitamin A 0%	• Vitamin C 45%
Calcium 2%	• Iron 6%
Thiamin 8%	• Riboflavin 2%
Niacin 8%	• Vitamin B_6 10%
Folate 6%	• Phosphorous 6%
Zinc 2%	• Magnesium 6%

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

Chemistry of Life

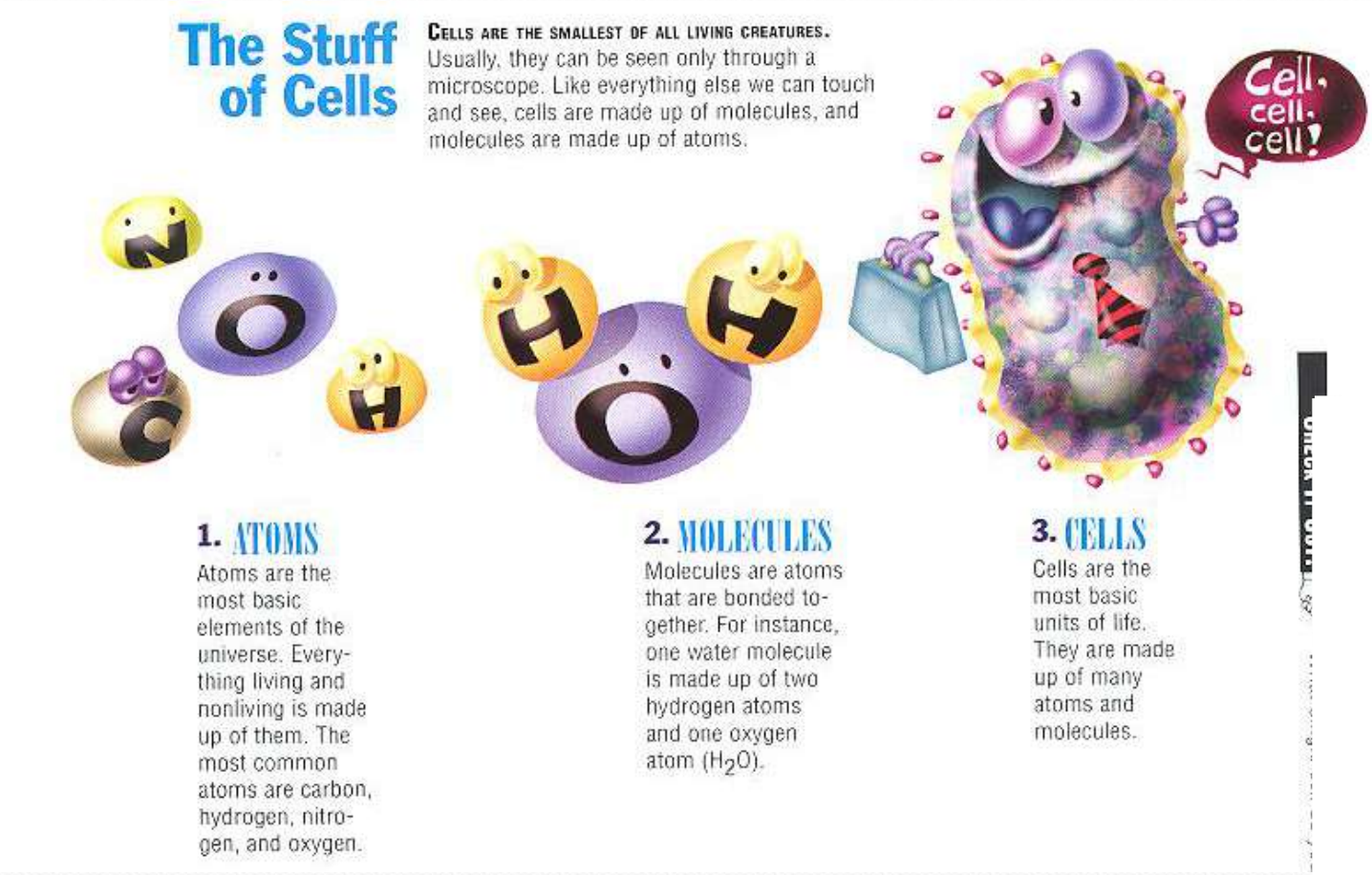
- All matter (living & nonliving) is made of elements.
  - The basic unit of an element is the atom.
- Elements found in living things include (CHNOPS):
  - Carbon
  - Hydrogen
  - Nitrogen
  - Oxygen
  - Phosphorus
  - Sulphur

Periodic Table of the Elements



What do elements have to do with cells?

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



The Compounds of Life

- Living things are made of organic & inorganic compounds.

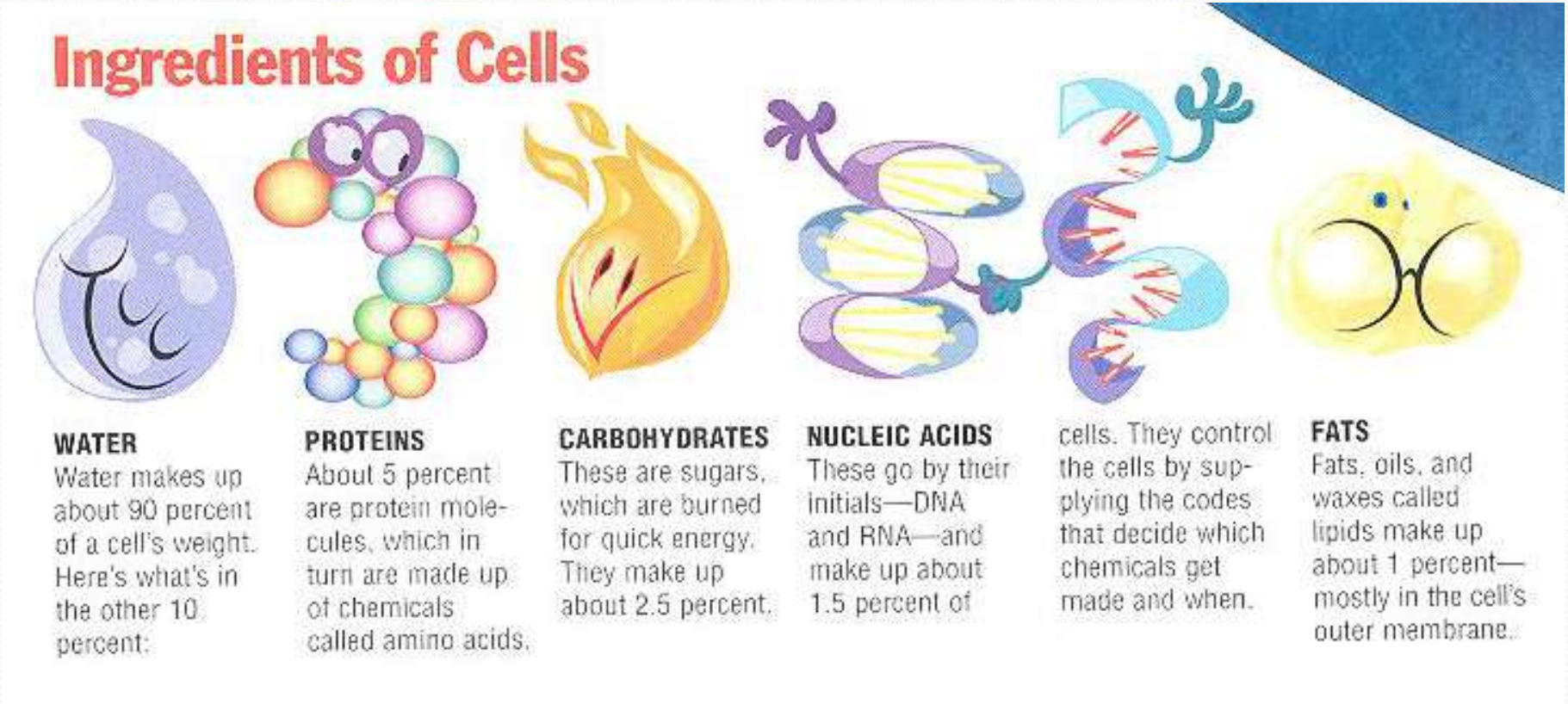
  - Organic:
    - Proteins
    - Carbohydrates
    - Lipids (fats)
    - Nucleic acids

  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

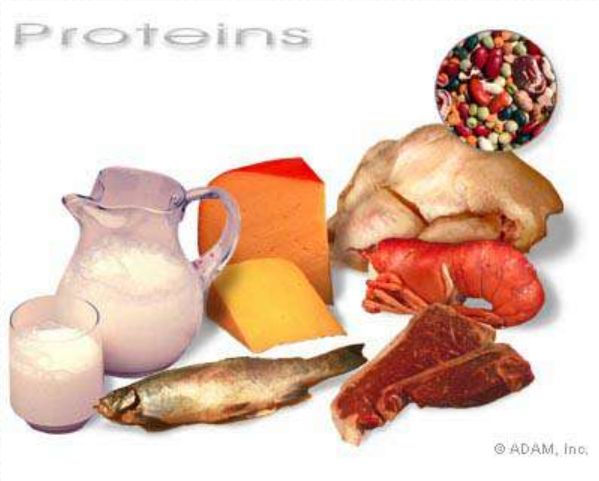
So…

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



Proteins

- Proteins are large molecules made of smaller molecules called amino acids.

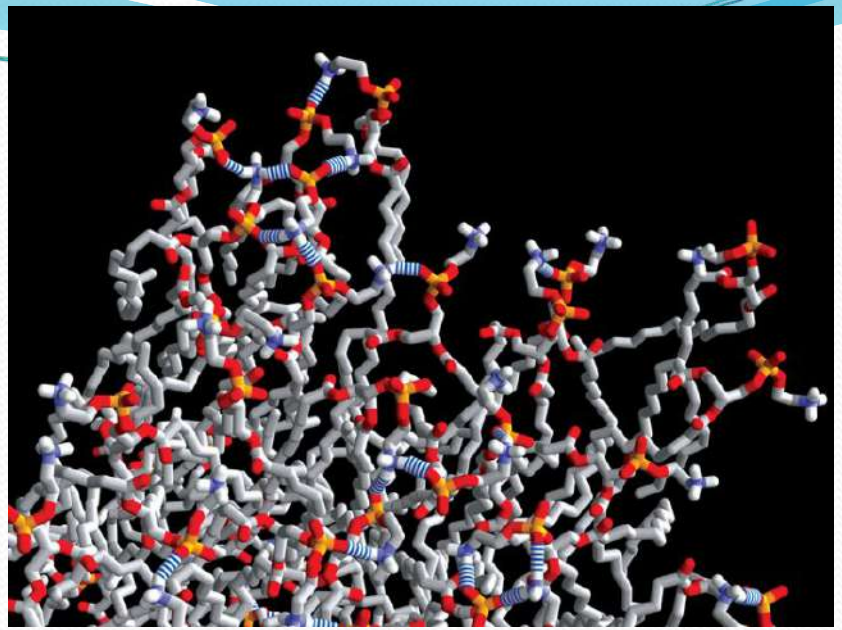


- Made of:
  - Carbon, hydrogen, nitrogen
- Foods high in protein:
  - Meat, eggs, fish, nuts & beans
- Used for:
  - Building structures
  - Growth & repair
- Enzymes – types of proteins that speed up chemical reactions in living things.
  - Ex: saliva

Carbohydrates

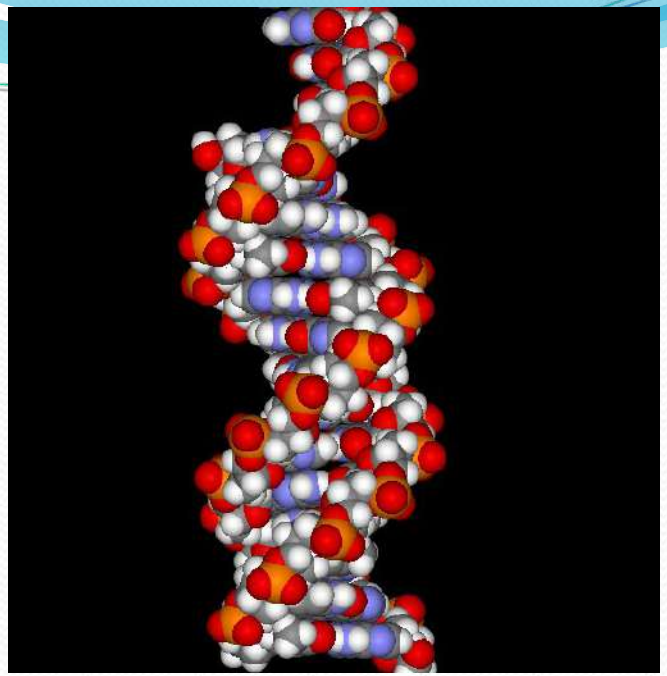
- Made of:
  - Carbon
  - Hydrogen
  - Oxygen
- Ex: sugars & starches
- Food:
  - Fruits & veggies & grains
- Used for:
  - Provides energy
- Found in the cell wall (cellulose) & cell membrane

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)