Cell Molecules: Unit 1 NOTES

KEY IDEA: You really are what you _____

All living things contain the same 4 Carbon-based molecules:

- The Biomolecules are called _____.
  - All Polymers are made up of _____, or "building blocks". (BB)
  - They are all **built** with the same process: Dehydration Synthesis (_____)

Pattern →

- All are **broken down** by the same process: _____:

Pattern →

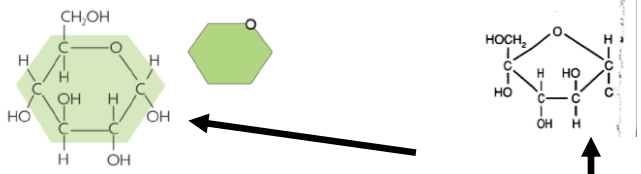
Lets Review: Condensation or Hydrolysis?

1. 4.
2. 5.
3. 6.

**********THE 4 BIOMOLECULES**********

1. _____ BUILDING BLOCK (one sugar subunit or **monomer**)=_____

- Shape = _____



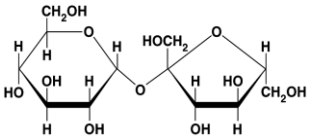
- 2 common **monosaccharide** examples:

1) All carbohydrates in the diet are digested until they are absorbed into the blood as _____
2) The simple sugar found in fruit is _____

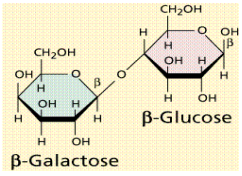
- Disaccharide- ____ linked sugar molecules

- 2 common **disaccharide** examples:

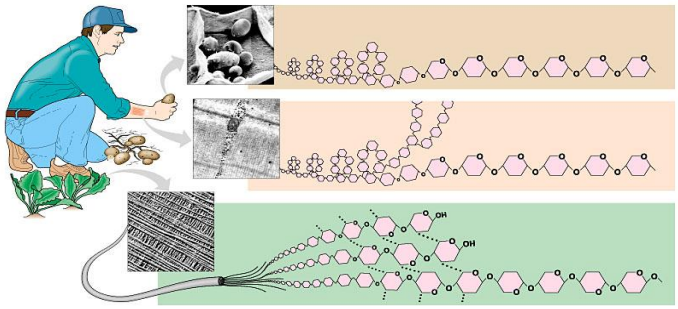
1. Table sugar is called _____



2. The simple sugar in milk is called _____



- _____- many linked sugars
- 3 common polysaccharide examples



- 1) In potatoes = _____
- 2) In muscle = _____
- 3) In plant cell walls = _____

Important things to know about Carbs:

- Many sugars usually end in "_____"
  - Examples: Glucose, sucrose, lactose, fructose, cellulose
- Polysaccharides have various **functions**

_____ – long-term **Energy** storage in PLANTS

_____ – long-term **Energy** storage in HUMANS (liver and muscles)

_____ – PLANT **building material** found in cell walls (indigestible by humans = _____)

_____ – ANIMAL **building material** used for protective coverings (crayfish, shrimp, beetles)



- Easy to use form of _____ for cells
- What do all the carbohydrate-containing foods above have in common?

_____

What do these carbs have in common?

- Color = _____
- Glycemic Index = _____
- Health = _____ ……




Blood _____ spikes → Blood _____ spikes → Blood _____ plummets → triggers _____→ Overeating → Obesity → **3 Major Health Risks**:

1) _____ (Insulin ↑ artery inflammation and plaque buildup)
2) _____(↑↓↑↓ Insulin → Insulin resistance & ↑blood glucose levels)
3) _____(Insulin triggers other hormones that ↑cell division and block cell death)

Why does HFCS **concern** nutrition experts?

- Fructose blocks the burning of _____
- Fructose stimulates production of liver ____ which → ↑Insulin _____
- Fructose stimulates _____

"**Superstar**" Carbohydrate foods include:

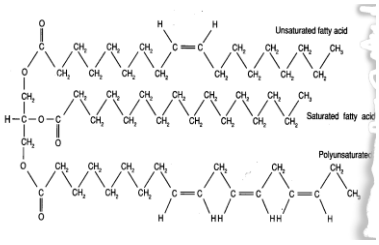
_____, _____, _____

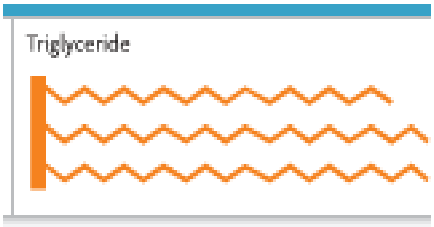
These foods are full of natural chemicals which help us by:

1) .🡻 _____
2) _____ harmful "free radical" molecules that constantly harm cells
3) .🡹_____ system
4) .🡻Body _____

2._____ BUILDING BLOCK = _____

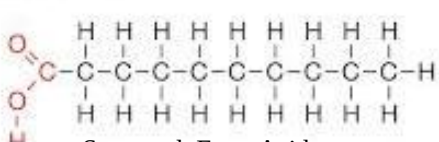
Looks like a Capital "_____". pattern



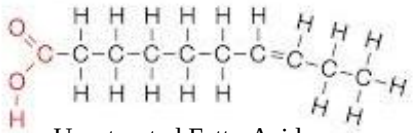


- NOT soluble in water (_____)
- 3 main types of Lipids
  1) _____
  2) _____
  3) _____

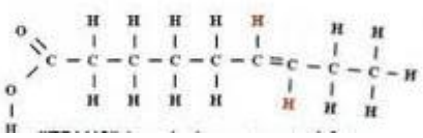
- Foods HIGH in Lipids = _____
- Lipids have various **Functions** in cells:
  - Fats – _____
  - Phospholipids –_____
  - Steroids – _____
  - Pigments – _____
- Notice any difference between these **Fatty Acids**?



Saturated Fatty Acid



Unsaturated Fatty Acid



Trans Fatty Acid

- **Saturated** fat- _____at room temperature (like butter, lard, solid fat in red meat)
  - Health = _____ → linked to _____ buildup in arteries

- Here's how the "_____" **Saturated** fats cause cardiovascular trouble:

1) Stimulate production of the _____ "bad" cholesterol
2) Cripple the _____ "good" cholesterol leading to artery wall inflammation
3) Block appetite-suppressing brain hormones which leads to 3 days of _____.

- **Unsaturated** fat- liquid at room temperature (like plant oils)
  - Health _____ → less risk for cholesterol buildup

- **Trans** Fat – found in some oils used for frying
  - Health _____ → linked to

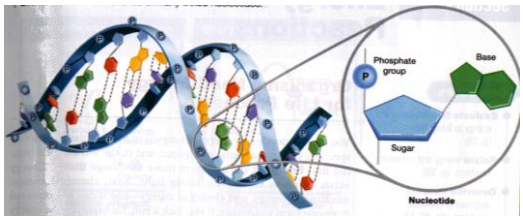



1) _____
2) _____
3) _____

- **Foods that are likely to have trans fats: _____**
- Lipid Health Guidelines: Look for "good" fats


1) Consume _____ fats
   - Sources: _____
2) Get plenty of _____ fats to help your heart health and brain function
   - Sources: _____
   -

3._____ BUILDING BLOCK = _____



Parts of a Nucleotide:

_____
_____
_____

Examples:_____

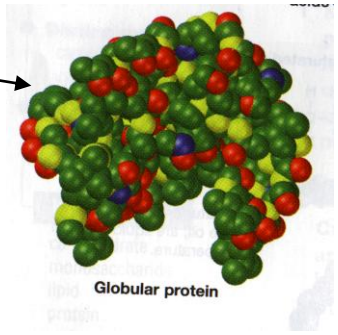
Function: store _____ information

4._____BUILDING BLOCK = _____

There are ____ different types of Amino Acids

- 10 are Essential → must be _____ in diet for health
- 10 are Nonessential → can be _____ by the body

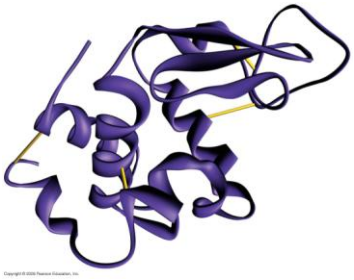
- Many times, they fold up into weird 3D _____ shapes



- AA + AA = _____peptide
- AA + AA + AA + AA= _____peptide
- Sources of protein:
  - _____

- Examples:

_____ – building material in skin, ligaments, tendons, bones



_____ – carries Oxygen in the blood

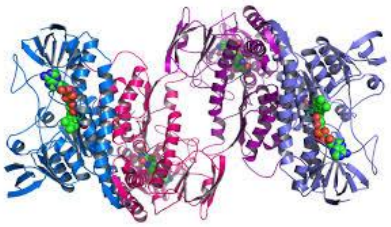
_____ – helps Glucose into cells

_____ – fight infections and diseases

Various protein fibers form _____ tissue and help blood _____

_____ – speed up chemical reactions in the body

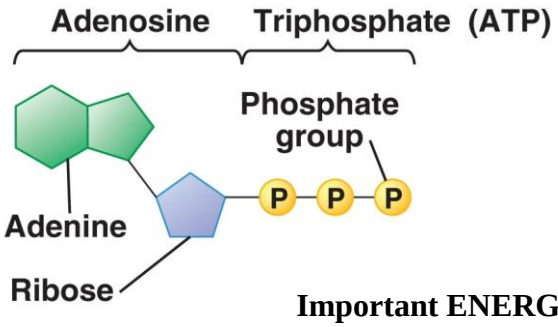
Biomolecule	Monomer "BB"
Carbohydrate	
Lipid	
Nucleic Acid	
Protein	



**********End of Unit 1 Notes **********

Energy & Enzymes: Unit 2 NOTES

_____ BUILDING BLOCK = _____



Important ENERGY bond is here

- Chemical Energy is stored in <u>covalent</u> bonds between _____ groups
  - When the bond breaks, _____
- FUNCTION
  - _____
  - _____

Cells need _____ to Function

- Energy: _____
- Energy comes in different _____:

Ex

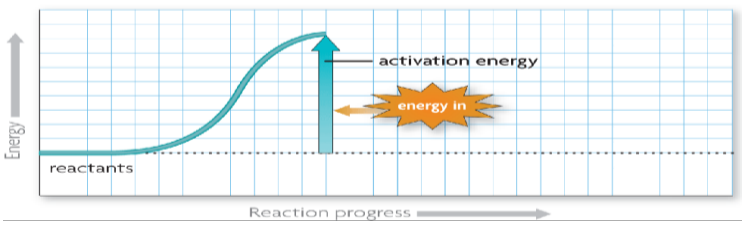
- LAW OF CONSERVATION OF ENERGY:
  - Energy cannot be <u>created</u> or <u>destroyed</u> only _____

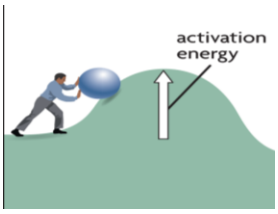
- Energy can be _____ (in bonds) or _____ (breaking bonds) by chemical reactions
  - Chemical reaction: reactants → products
    Ex. NaCl → Na+ + Cl-
  - Reactants = _____
  - Products = _____
- **Let's Review: In a chemical reaction:**
  - _____is added to "jumpstart" the reaction
  - Bonds are broken and _____ interact
  - Atoms _____
  - New bonds form and _____ result

Prefix Preview:
Identify the Latin "root word" that matches each prefix

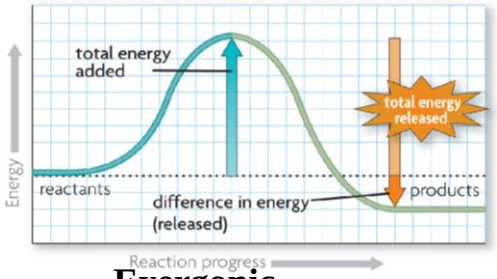
Prefix	Greek "Root Word"
OUT	
IN	

- Chemical reactions will NOT start until some **energy** is _____ by the reactants.
- This energy is called the _____
- When enough Activation Energy is absorbed to _____the chemical bonds in the reactants, a reaction will begin
- Activation Energy is like a "**spark**" that _____ a chemical reaction

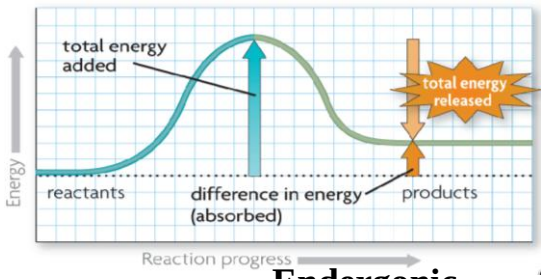




- Chemical reactions either _____ or _____ energy
  - An **Exergonic** reaction _____ more energy than it absorbs
    - Everyday EXAMPLES:
  - An **Endergonic** reaction _____ more energy than it **releases**.
    - Everyday EXAMPLES:



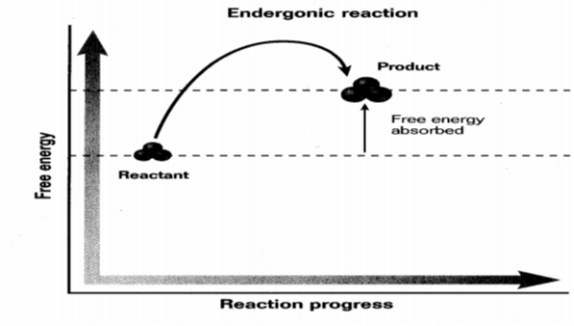
Exergonic



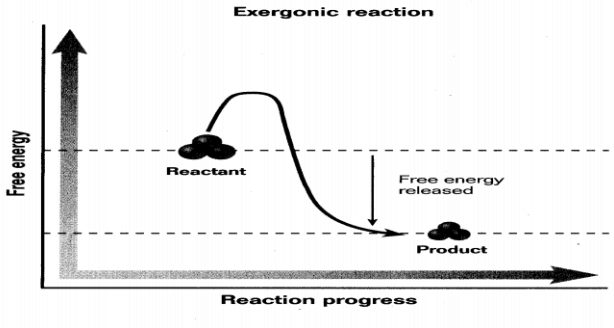
Endergonic

A Closer Look at the 2 Reaction Types

- **Endergonic**: energy is absorbed _____.
  - sunlight energy (IN) + $6CO_2 + 6H_2O \rightarrow C_6H_{12}O_6 + 6O_2$

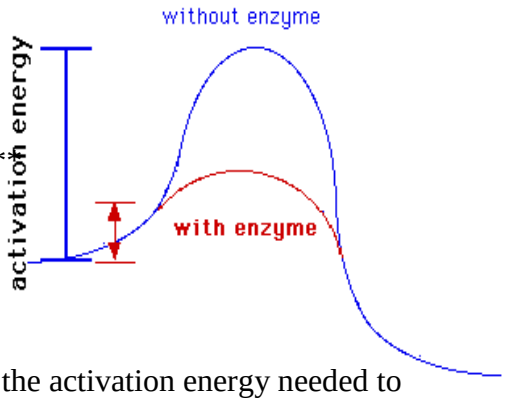


- **Exergonic**: energy is released _____.
  - burn wood → $CO_2 + H_2O$ + Heat E (OUT) + light E (OUT)



Let's Review: Which process (Exergonic or Endergonic) is most similar to each action below:

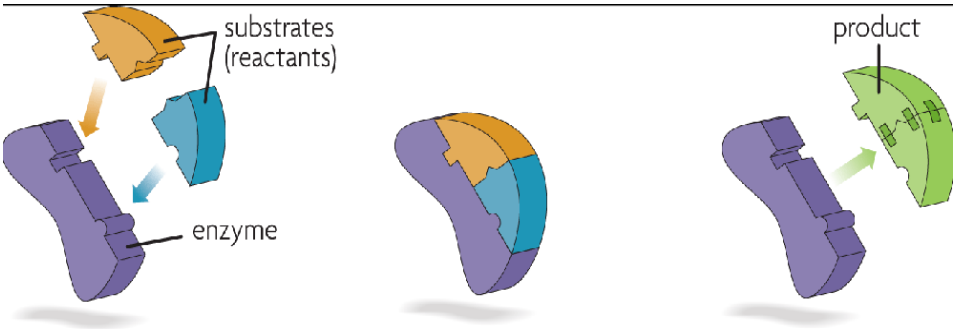
1. 4.
2. 5.
3. 6.



**********ENZYMES **********

- Made of _____
- End in "_____".
  - Catalase, lactase, sucrase, lipase
- FUNCTION _____a chemical reaction by _____ the activation energy needed to start the reaction → (biological catalyst)
- Enzymes act like _____ inside of cells
- This means they not only speed up the rate of chemical reactions, but they also allow reactions in a cell to **get started more easily** (**i.e.,** _____ _____)
- Enzymes are _____: they only react with ONE kind of substrate
- The _____fits into the enzyme's uniquely shaped _____(folds and pockets on the enzyme surface)

- Enzymes are _____ …one enzyme can perform the same job over and over again, millions of times, without being consumed in the process
- Enzymes work somewhat like a _____
- After the substrates temporarily bind to the enzyme, the enzyme helps the substrates react together as it slightly _____

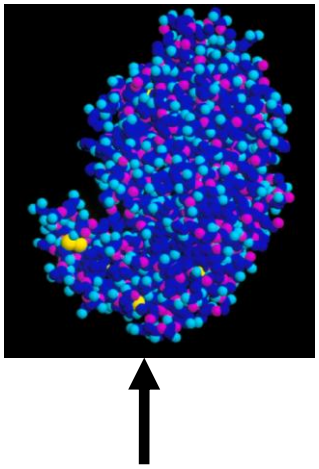


Some things cause cell reactions to **SPEED UP**

- _____ the cell temperature …. to a point !!!
- _____ the number of enzymes in the cell
- _____ the amount of substrate in the cell

Some things cause cell reactions to **SLOW DOWN**

- _____the cell temperature
- Lower the number of _____in the cell
- Lower the amount of _____in the cell
- Add _____ to the cell environment
- Change the ____ of the cell environment



- Enzymes only work when they fold up using their H-bonds into the _____
- Various things in a cell can interfere with the _____ of an enzyme and can cause it to stop working
- Example 1: _____temperatures can **denature** an enzyme causing it not to function.
- Example 2: Changing the cell's _____(acid or base) can **denature** an enzyme
- Example 3: Some pesticides and _____can **denature** enzymes … **Penicillin** blocks an enzyme that germs use