

# Biology Summer Assignments

Welcome Mustangs!

The following summer assignments are to assist you in obtaining background information for topics we will be learning during 1<sup>st</sup> quarter, in Biology. Please have your **summer assignments completed by Wednesday, August 15<sup>th</sup>**. Your **1<sup>st</sup> Quiz will be on Friday, August 17<sup>th</sup>**.

Please follow the directions carefully, we expect that **each summer assignment will take approximately 1 hour** to complete.

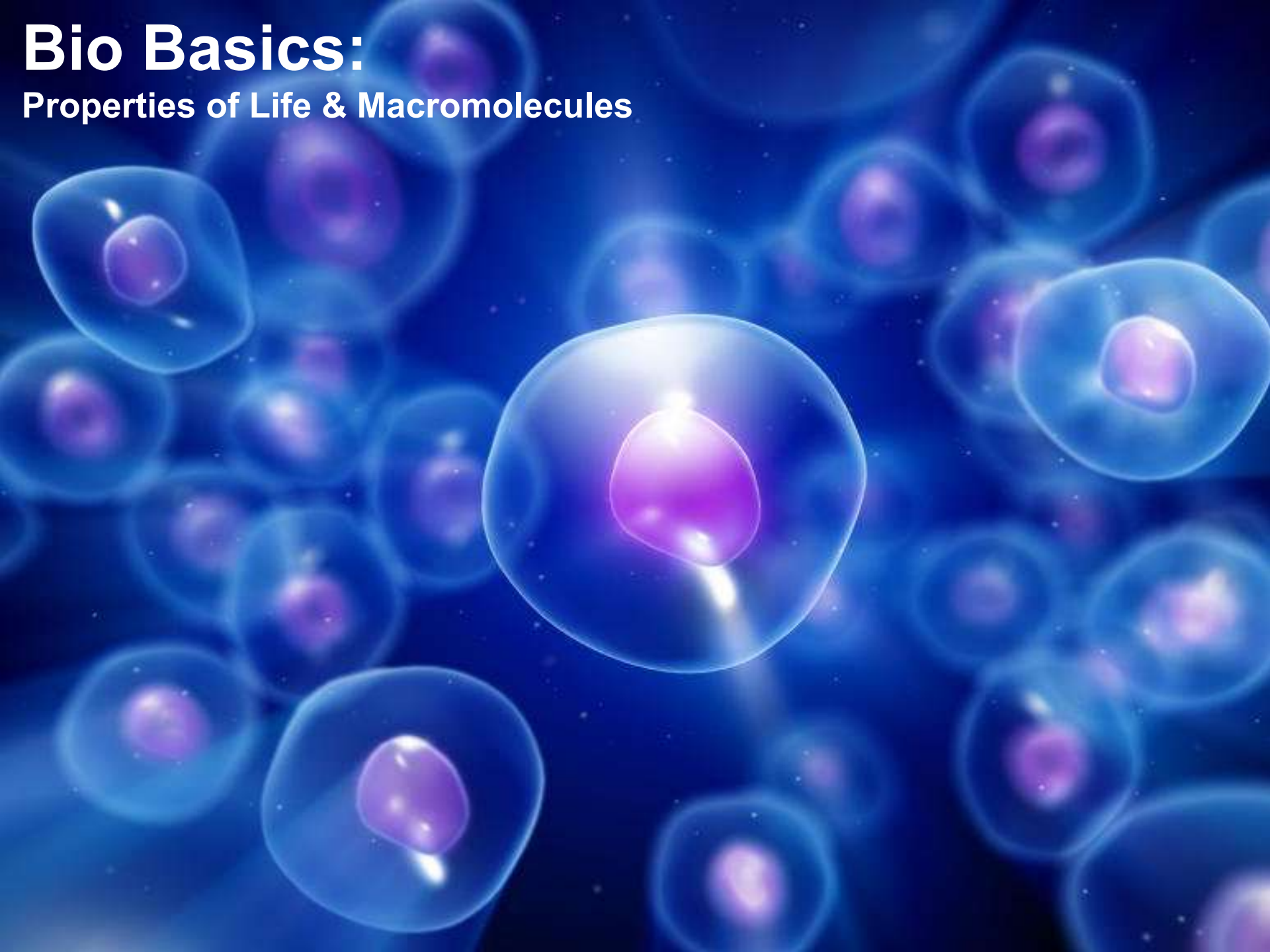
Sincerely,  
Your Biology Teachers

# Setting Up Your Science Binder

- Obtain a 1" or larger 3-ring binder.
- Obtain 10 section dividers and label them as follows:
  - Bio Basics
  - Ecology
  - Cell Structure
  - Cell Transport
  - Cellular Energy
  - Cell Division
  - DNA
  - RNA
  - Genetics
  - Evolution

# Bio Basics:

Properties of Life & Macromolecules



# Bio Basics Section Checklist:

- ☐ Please print the standards & learning scale for the Bio Basics Section to be used as the 1<sup>st</sup> page(s) in the Bio Basics Section of your notebook.
- ☐ Complete Assignment #1 on the Properties of Life. Please use the links below as resources to better understand the properties of life.

Characteristics of Life

<https://www.youtube.com/watch?v=cQPvXrV0GNA>

8 Characteristics of Life

<https://www.youtube.com/watch?v=fYBpsPDla4A>

- ☐ Complete Assignment #2 on the Macromolecules. Please use the link below as a resource to better understand macromolecules.

Cell Membranes

<http://www.bozemanscience.com/015-cell-membrane>

Biological Molecules

<http://www.bozemanscience.com/042-biological-molecules>

# Bio Basics Standards: Print this page!

- [SC.912.L.18.1](#) Describe the basic molecular structures and primary functions of the four major categories of biological macromolecules (2)
- [SC.912.L.18.2](#) Describe the important structural characteristics of monosaccharides, disaccharides, and polysaccharides and explain the functions of carbohydrates in living things (2)
- [SC.912.L.18.3](#) Describe the structures of fatty acids, triglycerides, phospholipids, and steroids. Explain the functions of lipids in living organisms. Identify some reactions that fatty acids undergo. Relate the structure and function of cell membranes (2)
- [SC.912.L.18.4](#) Describe the structures of proteins and amino acids. Explain the functions of proteins in living organisms. Identify some reactions that amino acids undergo. Relate the structure and function of enzymes (2)
- [SC.912.L.18.11](#) Explain the role of enzymes as catalysts that lower the activation energy of biochemical reactions. Identify factors, such as pH and temperature, and their effect on enzyme activity (2)
- [SC.912.L.18.12](#) Discuss the special properties of water that contribute to Earth's suitability as an environment for life: cohesive behavior, ability to moderate temperature, expansion upon freezing, and versatility as a solvent (2)
- [SC.912.L.15.6](#) Discuss distinguishing characteristics of the domains and kingdoms of living organisms (2)
- [SC.912.L.15.8](#) Describe the scientific explanations of the origin of life on Earth (2)
- [SC.912.N.1.1](#) Scientific Method
- [SC.912.N.1.2](#) Describe and explain what characterizes science and its methods.
- [SC.912.N.1.3](#) Recognize that the strength or usefulness of a scientific claim is evaluated through scientific argumentation, which depends on critical and logical thinking, and the active consideration of alternative scientific explanations to explain the data presented.
- [SC.912.N.1.6](#) Describe how scientific inferences are drawn from scientific observations and provide examples from the content being studied.

# Bio Basics Learning Scale: Print this page!

Score	Learning Progression
4	<p>I am able to:</p> <ul style="list-style-type: none"> <li>• Apply concepts from previous levels in a laboratory setting, using the scientific process.</li> <li>• Expand on the ideas presented in the previous level by relating the concepts to real world events and situations.</li> </ul>
3 (Target)	<p>A. Construct the basic structures of the 4 major macromolecules and summarize their primary functions.</p> <p>B. Compare the structural characteristics of mono, di and poly saccharides. Explain the function of carbohydrates in living things.</p> <p>C. Compare the structural characteristics of fatty acids triglycerides phospholipids and steroids. Explain the function of lipids in living things, especially the cell membrane.</p> <p>D. Compare the structural characteristics of proteins and amino acids. Explain the function of proteins and enzymes, in living organisms.</p> <p>E. Predict how the activation energy of biochemical reactions will be affected by enzyme activity. Predict how environmental factors (pH &amp; temp) will affect enzyme activity.</p> <p>F. Relate the special properties of water to its importance in Earth's suitability to maintain life.</p> <p>G. Categorize living organisms from the 3 Domains &amp; 6 Kingdoms by characteristics.</p> <p>H. Compare the different scientific explanations of the origin of life on Earth.</p> <p>I. Explain the method used in science to provide validity.</p> <p>J. Describe what characterizes science.</p> <p>K. Develop and defend a logical argument as to whether or not viruses are living organisms.</p> <p>L. Describe how observations lead to inferences and provide content examples of inferences.</p>
2	<p>A. State the functions of the 4 major macromolecules.</p> <p>B. Draw the various polymers of carbohydrates. List the function of carbohydrates in living things.</p> <p>C. Draw the various polymers of lipids. List the function of lipids in living organisms and within the cell membrane.</p> <p>D. Draw the structural characteristics of amino acids, the polymers of proteins. Describe how the structure of enzymes affect their function (lock &amp; key).</p> <p>E. Compare data on enzyme activity that alters activation energy in a reaction. Observe environmental factor's affect on enzyme activity.</p> <p>F. Match properties of water with vital functions to maintain life.</p> <p>G. Identify common characteristics of the 3 Domains &amp; 6 Kingdoms of Life.</p> <p>H. Summarize 3 different scientific explanations of the origin of life on Earth.</p> <p>I. Use Scientific Method to make observations, collect data and display the results by constructing a graph.</p> <p>J. Recognize the characteristics of science.</p> <p>K. Compare properties of a scientific claim to an alternative argument as to whether or not viruses are living organisms.</p>



# Assignment #1

## Properties of Life



SC.912.L.15.6 Discuss distinguishing characteristics of living organisms (2)

# Assignment #1 — put in Bio Basics Section of Notebook

## Characteristics of Life Chart –

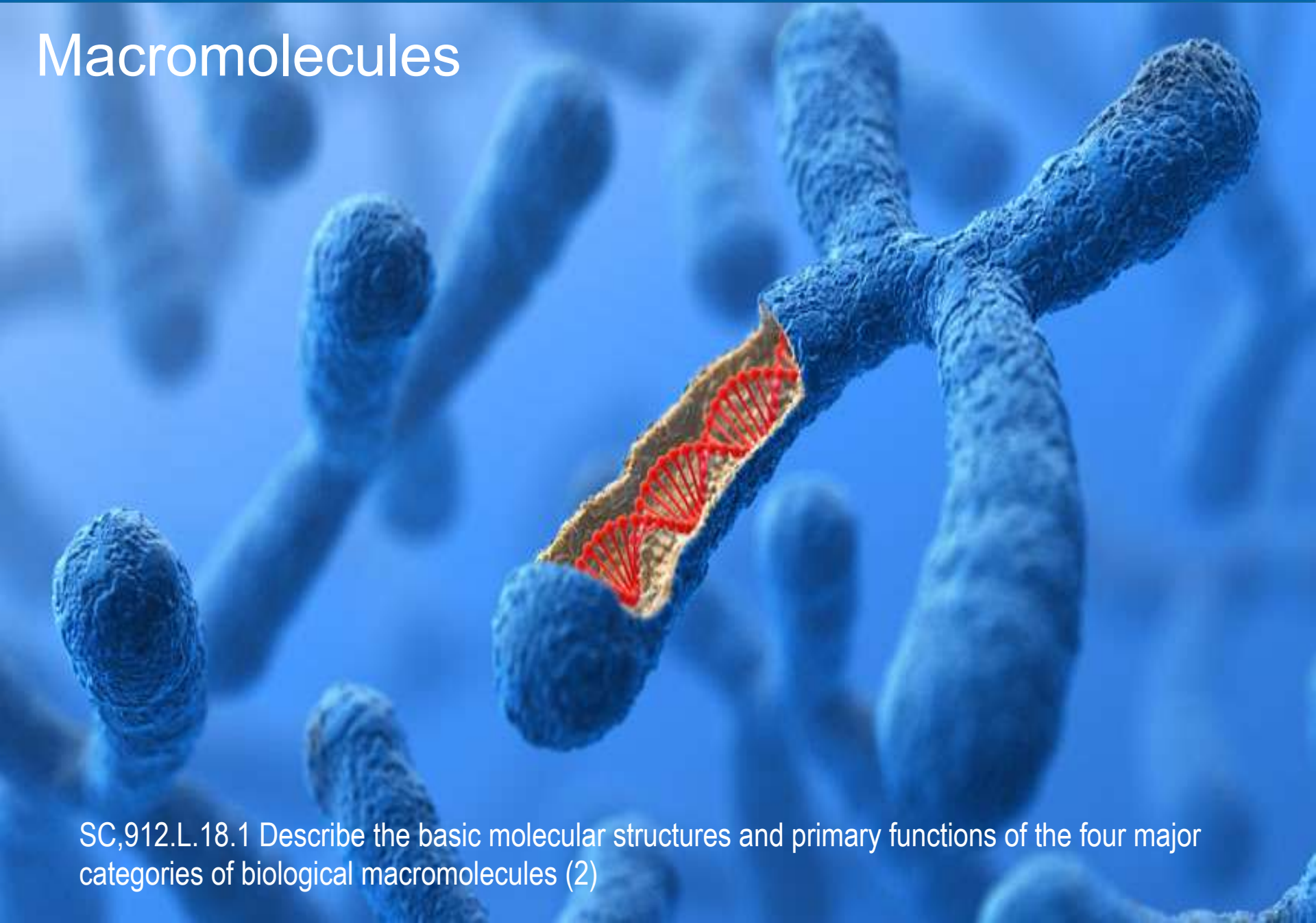
Copy this chart in your notebook & then complete it using the resource videos provided on the checklist slide.

All living things...	What does that mean?	Please do the following activity...	Answer in this column or on paper in your notebook.
have <b>CELLULAR ORGANIZATION</b>	Cells are the smallest form of life and organisms can be unicellular (one celled) or multicellular (many cells).	Construct the levels of organization for living things that begins with cells and ends with biosphere.	Cells→ Tissues→ Organs→ Organ Systems→ Organisms→ Populations→ Communities→ Ecosystems→ Biomes→ Biosphere
convert energy for <b>METABOLISM</b>	All organisms require a way to capture and convert energy to perform cellular reactions for life.	Identify the source of energy and tell what it is converted to for Autotrophs & Heterotrophs	Autotrophs:  Heterotrophs:
Can <b>RESPOND</b> to stimuli	Internal and external factors help organisms	Identify 2 ways organisms can respond to stimuli for each type of stimuli	Internal Stimuli: 1. 2. External Stimuli: 1. 2.
maintain <b>HOMEOSTASIS</b>	Maintaining a regulated balance within an organism.	Provide 3 examples of ways organisms maintain a balance in their internal environment.	1. 2. 3.
have a <b>UNIVERSAL GENETIC CODE (Heredity)</b>	All life has DNA, which carries a code or instructions for making living things. This code is the same for ALL life.	Prokaryotes and Eukaryotes the same code but are arranged in different shapes. Identify the shape of the DNA for Prokaryotes and Eukaryotes.	Prokaryotes:  Eukaryotes:
<b>REPRODUCE</b> either <b>sexually</b> or <b>asexually</b>	When an organism is able to create an offspring, or like organism of the same species.	Explain two types of reproduction.	Sexual:  Asexual:
<b>GROW &amp; DEVELOP</b> through a life cycle	The instructions for the growth & development of organisms is found within its DNA.	Chose any living organism and provide it's stages of growth and develop (life cycle stages)	Organism: Stages of Life:
<b>EVOLVE</b> through adaptations	The ability of a species of organism to survive as the result of a change in genetic information.	Identify what is meant by high fitness and low fitness of an organism.	High Fitness:  Low Fitness:



# Assignment #2

## Macromolecules

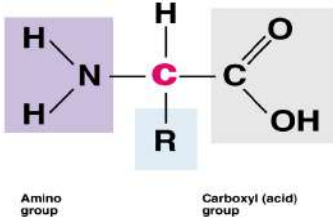


SC,912.L.18.1 Describe the basic molecular structures and primary functions of the four major categories of biological macromolecules (2)

# Assignment #2 — put in Bio Basics Section of Notebook

## Macromolecule Chart —

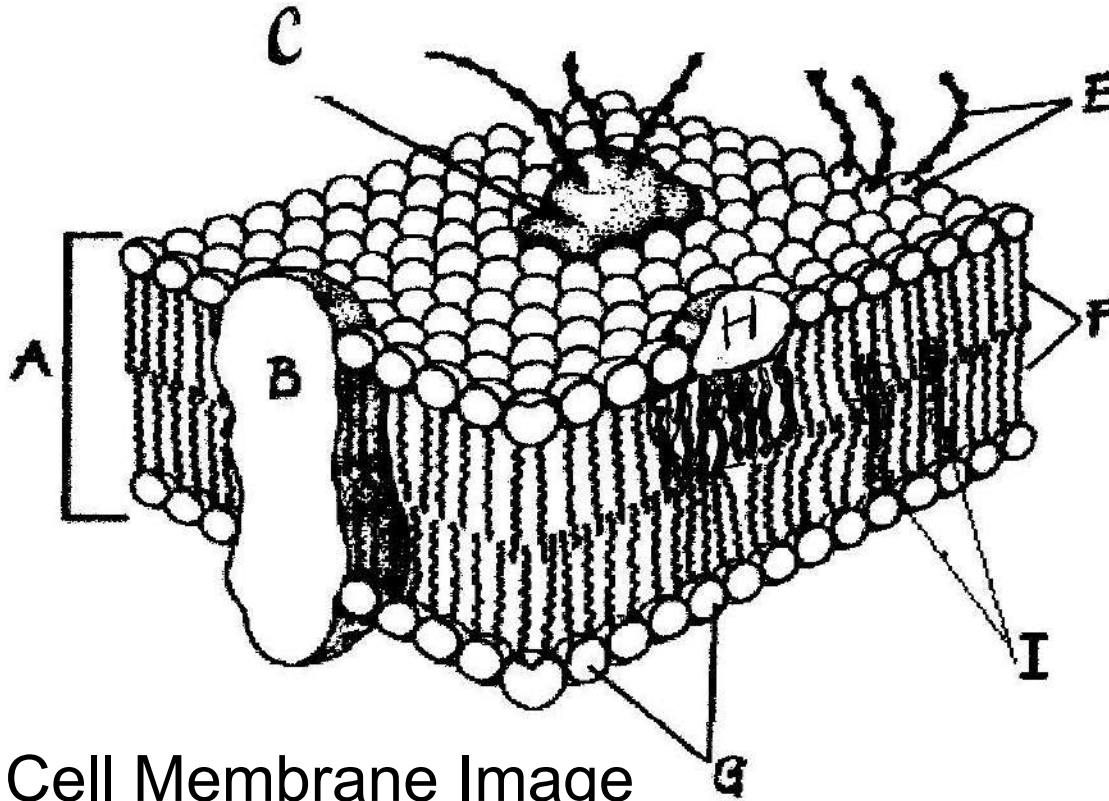
Copy or print this chart in your notebook & then use the resource videos provided on the checklist slide to complete it.

Macromolecule	Elements that make it up	Function or Job	Building Block (monomer)	Chemical Structure
Carbohydrates	Carbon, Hydrogen & Oxygen		Simple Sugars	
Lipids		Store Energy & Makes up Cell Membranes	Glycerol + Fatty Acid	
Proteins			Amino Acids	 <p>The diagram shows the general structure of an amino acid. A central carbon atom (alpha carbon) is bonded to four groups: a hydrogen atom (H) above, an amino group (NH2) to the left, a carboxyl group (COOH) to the right, and an R group below. The amino group is highlighted in a purple box and labeled 'Amino group'. The carboxyl group is highlighted in a grey box and labeled 'Carboxyl (acid) group'. The R group is highlighted in a blue box.</p>
Nucleic Acids		Store & Transmit Genetic Information	Nucleotides	

# Assignment #2 (Honors only) - put in Bio Basics Section of Notebook

## Macromolecule Coloring Worksheet –

Copy or print this slide in your notebook & then use the resource videos provided on the checklist slide to complete it.



Cell Membrane Image

Use these structures to color & label the cell membrane in the diagram.

- \_\_\_\_\_ Phospholipid bilayer (no color)
- \_\_\_\_\_ Transport or integral protein (pink)
- \_\_\_\_\_ Glycoprotein (yellow)
- \_\_\_\_\_ Carbohydrate (green)
- \_\_\_\_\_ Hydrophobic tails (orange)
- \_\_\_\_\_ Hydrophilic heads (red)
- \_\_\_\_\_ Membrane protein (purple)
- \_\_\_\_\_ Cholesterol (blue)

Match the cell membrane structure with its function using the correct letter from the diagram. An answer may be used more than once.

- \_\_\_\_\_ Attracts water
- \_\_\_\_\_ Repels water
- \_\_\_\_\_ Helps maintain flexibility
- \_\_\_\_\_ Makes up the bilayer (2 answers)
- \_\_\_\_\_ Involved in cell-to-cell recognition
- \_\_\_\_\_ Helps transport materials (such as glucose) across the cell membrane