

Welcome to the *Chemistry Of Life Lab Module* Worksheet.

Instructions for Chemistry of Life CD ROM ("COL"):

1. To enter program
 - Double click on Biology Icon
 - Double click on the Chemistry of Life Icon
 - Click on Underlined Section Title
2. Upon entering each module, first read the tutorial in the upper left corner. Interact with each screen as outlined below. Answer the questions as directed on a separate piece of paper.

UNIT ONE: Go to Atoms and Molecules Overview

Atomic Structure

- Page 1 Click on Nucleus, Proton, Neutron, & Electron - define each.
Answer the 4 questions under More Info
- Page 2 Click inside 1st shell and 2nd shell
Answer first 3 questions under More Info
- Page 3 Roll mouse over the elements
Answer 2nd question
What are the Abig 4 elements@?
- Page 4 Add 2 neutrons. What happened to Carbon as you add each neutron?
Click on AShow radioactive decay@.

Ions

- Page 1 Click on Ionize
What does the ionization of Lithium and Fluorine form?
Define ion, cation, and anion.
- Page 2 Click on Ionize.
What occurs with ionization?
What is an ion and how is it formed.
What happens when you restore neutrality?

Molecules

- Page 1 Define the term valence.
Click on different models and formulas.
Why are there different ways to show the same molecule?
Explain the difference between a structural and molecular formula.

Kinds of Bonds

Page 1 Click on each kind of bond. Define each.
Which bond helps organize biological structures?

Covalent Bonds

Page 1 Click on box in example. Explain what is occurring between the 2 carbons.
Answer questions in More Info.

Page 2 Answer bottom section.

Page 3 Add an atom 5 times. What happened?
Answer both questions in More Info.

Page 4 Click on each electron shell diagram.

Page 5 Click on bonds B N-C, C-C, and C-O.
Answer questions in More Info.

Page 6 Click on different bond buttons. Which of the bonds are rigid?

Page 7 Define a polar covalent bond.
Go to question 2 in More Info. Click on the box in the example, click on pause 10 times and answer the question.
Do you suppose most covalent bonds are polar or nonpolar? Why?

Electronegativity

Page 1 What is the most electronegative element of the Big 4.

Page 2 Do the polarity test.

Ionic Bonds

Polar Attractions

Page 1 Answer all the questions in More Info.

Page 2 Answer first question in More Info.

Page 3 Form Hydrogen Bonds - move mouse over each atom and when you have a finger click on the atom.

Welcome to the *Chemistry Lab Module* Worksheet.

Instructions for Chemistry of Life CD ROM ("COL"):

1. To enter program
 - Double click on Biology Icon
 - Double click on the Chemistry of Life Icon
 - Click on Underlined Section Title
2. Upon entering each module, first read the tutorial in the upper left corner. Interact with each screen as outlined below. Answer the questions as directed on a separate piece of paper.

UNIT TWO: Go to Water Overview

The Water Molecule
solutions

- Page 1 Click on the buttons to see the definitions. What is the difference between solvent and solute?
- Page 2 Find the molecular weight of glucose. Round to 2 decimal places.
- Page 3 Find the number of grams in the example. Round to 2 decimal places.
- Page 4 Find the number of moles in the example. Round to 2 decimal places.
- Page 5 Click on step 1,2,3.

Welcome to the *Chemistry Lab Module* Worksheet.

Instructions for Chemistry of Life CD ROM ("COL"):

1. To enter program

Double click on Biology Icon

Double click on the Chemistry of Life Icon

Click on AUnderlined Section Title@

2. Upon entering each module, first read the tutorial in the upper left corner. Interact with each screen as outlined below. Answer the questions as directed on a separate piece of paper.

UNIT THREE: Acids, Bases, & pH

Water and Acidity

Page 1 Click on the Add Acid button.

Page 2 Click on a water molecule and answer the question in More Info.

Page 3 Click on a water molecule.

Acids

Page 1 Click on the dropper. What are acids?

Page 2 Click on the 3 types of acids. Why does the strong acid not have any HCl molecules?

Bases

Page 1 Click on the dropper. What are bases?

Page 2 Click on all 4 bases to see the definitions. Why are there no NaOH molecules intact in the example?

pH

Page 1 What is the pH scale?

Page 2 Answer question 2 in More Info.

Page 3 Answer the question in More Info.

Buffers

Page 1 Answer question 1 in More Info.

Page 2 What is the difference between adding an acid or base to water and adding them to water with a buffer?

Page 3 Answer the question in More Info.

Page 4 Click the dropper repeatedly.

Welcome to the *Chemistry Lab Module* Worksheet.

Instructions for Chemistry of Life CD ROM ("COL"):

1. To enter program
 - Double click on Biology Icon
 - Double click on the Chemistry of Life Icon
 - Click on AUnderlined Section Title@
2. Upon entering each module, first read the tutorial in the upper left corner. Interact with each screen as outlined below. Answer the questions as directed on a separate piece of paper.

UNIT FOUR: Organic Molecules

General Structure

Page 1 Click the 2 buttons. What is a carbon skeleton?

Carbon Skeletons

Page 1 Click on the button at the bottom of the page. Answer all the questions in More Info.

Functional Groups

Page 1 Roll your mouse over the molecules to see the functional groups. What atoms does the amino group consist of?

Page 2 Answer questions 1 & 3 in More Info.

Page 3 Answer both questions in More Info.

Page 4 Read the answer to the question in More Info. What are molecules with carboxyl groups called?

Page 5 Read the answer to the question in More Info. In the example, what makes ammonium hydroxide?

Page 6 Read the answer to the question in More Info. What are thiols?

Page 7 Answer the question in More Info.

Isomers

Page 1 What are isomers?

Polymers

Page 1 What are polymers?

Page 2 What are protein polymers made from?

Welcome to the *Chemistry Lab Module* Worksheet.

Instructions for Chemistry of Life CD ROM ("COL"):

1. To enter program
 - Double click on Biology Icon
 - Double click on the Chemistry of Life Icon
 - Click on AUnderlined Section Title@
2. Upon entering each module, first read the tutorial in the upper left corner. Interact with each screen as outlined below. Answer the questions as directed on a separate piece of paper.

UNIT FIVE: Carbohydrates

Functions of Carbohydrates

Page 1 Answer question 3 in More Info.

Monosaccharides

Page 1 Answer all 6 true-false questions at the bottom of the page.

Page 2 Answer question in More Info.

Page 3 Click on the buttons of the monosaccharides. What is the primary fuel in nearly all organisms?

Disaccharides

Page 1 What 2 monosaccharides make sucrose, lactose, and maltose?

Polysaccharides

Page 1 Which forms of glucose does starch, glycogen, and cellulose use to form?

Page 2 Where is glycogen found?

Welcome to the *Chemistry Lab Module* Worksheet.

Instructions for Chemistry of Life CD ROM ("COL"):

1. To enter program

- Double click on Biology Icon
- Double click on the Chemistry of Life Icon
- Click on Underlined Section Title

2. Upon entering each module, first read the tutorial in the upper left corner. Interact with each screen as outlined below. Answer the questions as directed on a separate piece of paper.

UNIT SIX: Lipids

Lipids

Functions of Lipids

Page 1 What are some examples of lipids?
In animals, what purpose do fat deposits serve?

Fats

Page 1 Why do fats not mix with water?

Page 2 How many fatty acid tails do all fats have?

Page 3 What are triglycerides?

Page 4 What makes fats different?

Page 5 Answer question 1 in More Info.

Page 6 Why are some fats solid at room temperature?

Page 7 What does hydrogenation do to the unsaturated fats?

Phospholipids

Page 1 What holds membranes together?

Page 2 What is the difference between fats and phospholipids?

Page 3 What are phospholipids that contain glycerol?

Page 4 Answer the questions and check your answer.

Page 5 Answer the question in More Info.

Page 6 Answer question 1 in More Info.

Page 7 Answer the question in More Info.

Steroids

Page 1 What are some of the functions of steroids?

Page 2 How many rings does a steroid skeleton consist of?

Welcome to the *Chemistry Lab Module* Worksheet.

Instructions for Chemistry of Life CD ROM ("COL"):

1. To enter program
 - Double click on Biology Icon
 - Double click on the Chemistry of Life Icon
 - Click on Underlined Section Title
2. Upon entering each module, first read the tutorial in the upper left corner. Interact with each screen as outlined below. Answer the questions as directed on a separate piece of paper.

UNIT SEVEN: Proteins

Functions of Protein

Page 1 What does a defensive protein do?

Models of Protein

Page 1 What is a polymer?

Levels of Structure

Page 1 What are the four levels of protein structure?

Primary Structure

Page 1 What is the protein's primary structure?

Page 2 What are amino acid residues?

Page 3 What is the difference between amino acid residues and free unattached amino acids?

Page 4 Answer the question in More Info.

Page 5 Answer question 2 in More Info.
What are the 4 categories of amino acids?

Secondary Structure

Page 1 What are the 2 kinds of foldings in the secondary structure?

Page 2 What causes an alpha helix to occur?

Page 3 How do proteins lie in a pleated sheet?

Tertiary Structure

Page 1 What are the 3 forces that maintain tertiary folding?

Page 2 How does water keep protein folded?

Page 3 Why does water have a major effect on tertiary structure?

Page 4 Why is tertiary structure delicate?

Page 5 What stabilizes tertiary folding?

Page 6 Why does a change in pH reshape a protein and affect its action?

Page 7 Answer the question in More Info.

Page 8 What is a disulfide bridge made from?

Quaternary Structure

Page 1 When does a quaternary structure occur?

Page 2 How does water stabilize some quaternary structures?

Page 3 Answer the question in More Info?