

BIOL 1005 Action Center – Before Exam 1

Work together with your peers on these tasks, which are designed to help you organize some of the information that you have learned in the past four weeks. Try not to use your notes unless everyone in your group is at a loss; instead, see if you can figure out each problem based on what you know. Don't rush! The idea is to make sure you understand.

1. A Question of Scale

Directions: First, on a separate piece of paper, place the terms on the left in order from smallest to largest. Then assign each item on the right to the appropriate level of scale.

| Terms to place in order | Terms to match with the appropriate scale |
|-------------------------|--|
| Atom | DNA |
| Cell | Enzyme |
| Community | Brain, spinal cord, and nerves |
| Ecosystem | Cells that work together to form a muscle |
| Electron | Oxygen |
| Molecule | Heart |
| Neutron | Chloroplast |
| Organ | ATP |
| Organ system | You |
| Organelle | All of the people in this room |
| Organism | All of the people and spiders in this room |
| Population | All of the people, spiders, and oxygen in this room |
| Tissue | What you scraped off the inside of your cheek during lab in week 3 |
| | Golgi apparatus |
| | All of the American elm trees in Norman |
| | You and the bacteria in your large intestine |
| | Your large intestine |
| | Glucose |

2. Make a Chart

Directions: On a separate piece of paper, make a chart that lists the four major types of organic molecules in cells. For each entry in the chart, give an example of the molecule; list the elements that occur in the molecule; describe its chemical structure or sketch its shape; differentiate between the monomer and polymer; list one or more sample functions; and name a food that contains the molecule.

3. Make a Cell

Directions: On a separate piece of paper, draw a big cell and fill it up with everything you can think of that relates to the structure and function of cells. Include sketches of molecules (like DNA and phospholipids and water and ATP) and the organelles you're responsible for learning, plus examples of how those organelles interact.

4. Design an Experiment

Directions: On a separate piece of paper, design an experiment to test the following hypothesis: *If high temperatures denature proteins, then cooking should kill the bacteria in ground beef.* Include a control plus the independent/dependent/standardized variables.

5. Connect the Metabolic Dots

Directions: On a separate piece of paper, trace the path of carbon atoms and energy from the nonliving environment, through plants, into animals, and back into the environment. Use the following terms in your answer: *ATP, energy, atoms, sunlight, photosynthesis, CO₂, glucose, starch, respiration, O₂, enzymes, digestion, chloroplasts, mitochondria.*

6. Word Sort or Concept Map

Directions: On a separate piece of paper, place the following terms from lecture into categories – note that there may be ways to organize them into “categories within categories.” Alternatively, you may choose to make a mega concept map using these terms.

| | | | |
|---------------|-----------------------|--------------|-----------------|
| ATP | Fat | Carbon | Hydrophobic |
| Molecule | Photosynthesis | Atom | Hydrolysis |
| Carbohydrate | Ionic | Nucleotide | Nucleic acid |
| Mitochondrion | Electron | Phospholipid | Proton |
| Cell | Protein | Covalent | Polar |
| Nucleus | Cellulose | Steroid | Glucose |
| Ribosome | Dehydration synthesis | Amino acid | Respiration |
| Membrane | Nitrogen | Neutron | Lipid |
| Nonpolar | Oxygen | Inorganic | Glycogen |
| Hydrogen | Enzyme | Hydrophilic | Small intestine |
| Water | Vitamin | Organic | |

7. Practice with Bonds

Directions: On a separate piece of paper, sketch these molecules: NaCl, CH₄, and H₂O. These atomic numbers may be useful: H = 1; C = 6; N = 7; O = 8; Na = 11; Cl = 17.

- In each case, “zoom in” to show the protons, neutrons, and electrons of each atom.
- Where appropriate, show which electrons are shared between atoms.
- Where appropriate, define and label covalent bonds and ionic bonds.
- For covalent bonds, show which are polar and which are nonpolar, including areas of partial positive and partial negative charges.
- Define hydrogen bonds and show how/why they might form.

