Scientific Method
What are the steps in the Scientific Method? Be sure to review your activities on the scientific method! Be able to define and explain dependent and independent variables, experimental error, purpose of controls. Be able to formulate a hypothesis and explain how scientific data are presented.

Dimensional Analysis
Make sure to know scientific notation, dimensional analysis, and the metric system. You can anticipate several dimensional analysis problems on the exam. Remember the types of measurements you made with blocks. How do you measure and calculate area, surface area, volume, density, and mass? Be able to convert between metric units of measure.

The Biological Molecules
What are the four groups of biological molecules? What are monomers? What are polymers? How are polymers synthesized? How are they broken down into monomers? Be able to name the monomers and polymers of the four biological molecules. What are isomers? What is a molecular formula? What is a structural formula? How did we test for each when analyzing foods? What is an enzyme? What is the name of the enzyme studied in lab? How does temperature affect enzyme reaction rates? What is the equation for the enzyme reaction you performed? What was the source of enzyme? What gas was produced by the reaction? What were your predicted results? How did your results compare with your predictions? Make sure to review your worksheets from lab.

Cell Biology and the Microscope
You should know the parts of the microscope as well as understand magnification, diameter of field, brightness, resolution, and depth of field. Remember the relationships between magnification and light requirements. You looked at several slides including onion, Elodea, and your cheek cells. Why were dyes needed to see the cells? How do you approximate the size of each cell? What are the differences between prokaryotic and eukaryotic cells? What are examples of prokaryotic cells? Make sure to know the three shapes of bacteria as well as the shape and color of cyanobacteria (Oscillatoria). What are the organelles found in eukaryotic cells? Which could you see in the samples you viewed with the light microscope? Can you describe the function of each organelle? What are the differences between plant, animal, and bacterial cell structures?

Osmosis and Diffusion
What is diffusion? What is osmosis? What is dialysis? What is Brownian motion? How does temperature affect dialysis, diffusion, and osmosis? What is a selectively permeable membrane? What did we use in lab as a selectively permeable membrane? What do the terms hypertonic, hypotonic, and isotonic mean? How was the dialysis experiment set-up? What solutes were used? What solvents were used? Which solutes were able to cross the membrane? Which solutes could not cross the membrane and why? What were the experiments performed to test for starch and sugar? What did positive and negative results look like? How did you set up your potato experiment? What solutions did you use? Why did you use them? What were the predicted results? How did the predicted results compare to yours? What are possible sources of variation? What is plasmolysis? How do you induce plasmolysis in a plant cell? What organelle is responsible for the effects seen after plasmolysis? Do plant cells lyse? Why or why not?

Respiration and Photosynthesis
What are the general equations for cellular respiration and photosynthesis? Where does each process take place? What are the reactants and products for each pathway? What was being produced in the yeast experiment that you were measuring? Which sweeteners proved the most successful in terms of producing
the greatest amount of product? How did changing the temperature of the goldfish’s water change the rate of oxygen use? Why did the phenol red solution change from yellow to red when the elodea was put in and the test tube was put into bright light? What waste product of photosynthesis was measured by collecting bubbles in the test tube? Under what conditions is starch stored in a leaf? When would you not expect to see starch stored in a leaf?

**Cell Reproduction**

What are the phases of the cell cycle? What happens in each phase? What are the stages of mitosis? What are the stages of meiosis? What types of cells undergo meiosis? Pay particular attention to the terminology such as chromosome, chromatin, centromere, chromatid, haploid, diploid, “n”, and centromeres. How is mitosis in a plant cell different from mitosis in an animal cell? How is meiosis in a male and female different from each other? What is nondisjunction? What disorders are caused by nondisjunction? What is a karyotype?