

Summer Research and Preparation for Honors College Preparatory Biology

Success in a life science course requires a basic understanding of physical sciences and math concepts. In addition, students are required to be able to use Internet (educational and government sites) and Library resources to obtain information. As a basis, students will be required to follow the outline and use such resources as they prepare for Honors College Preparatory Biology.

Review basic chemistry

Elements

Mass & matter

Protons, electrons, & neutrons, & isotopes

Bonding

Ionic

Covalent

Hydrogen Bonds

Become familiar with the elements on the Periodic Table of Elements found in living organisms. (Carbon – C, Nitrogen – N, Oxygen – O, and Hydrogen – H).

Know the scientific method and what occurs at each level.

Observation

Question

Hypothesis

Experiment

Data

Graphing data

Setting up graphs, charts, and spreadsheets with given

data.

Extrapolating & interpolating from data.

Equipment

Test tubes

Beakers

Graduated cylinders

Thermometers

Flasks

pH meters/testers

Know how to follow experimental procedure and recognize variables

Dependent variables

Independent variables

Control group

Know the common units of measurement for the English and Metric system and one conversion factor for length, mass, & volume.

Common conversion measurements (*conversion factors*) to memorize

2.54 centimeters/ 1.0 inch
454 grams/1.0 pound (lb)
1 liter = 33.8 fluid ounces

Common temperatures to know

100 °C = boiling point of water Metric system
212 °F = boiling point of water English system
0°C – Freezing point of water – Metric system
32 °C. Freezing point of water – English system.

Common units to know

100 centimeters/meter (centi – 100) or 1 cm = 1/100 of a meter
1,000 millimeters/meter (milli – 1000) or 1 mm = 1/1,000 of a meter
1,000,000 micrometers/meter (micro – million) or 1 μm = 1/1,000,000 of a meter
1,000,000,000 nanometers/meter (nano – billion)

12 inches/foot
5,280 feet/ mile

Command with the use of basic mathematical principles

Fractions
Percents
Ratios and/or fractions

Sample problems - Show the steps to solving each problem:

An example:

A bacterium moves at 10 microns (micrometers) per second. How fast is it travelling in millimeters/second?

*10 micrometers/1 second x 1 meter/1,000,000 micrometers x 1,000 millimeters/1 meter
= 0.01 millimeters/second*

1. Convert 11 kilometers to miles.

2. A student observes a paramecium using a compound light microscope and measures its length at 1.5 micrometers. Convert to nanometers, millimeters, centimeters, & inches.
3. How many pounds is the human brain if the mass is 1.3 kilograms?
4. If 1 quart = 32 fluid ounces, how many fluid ounces are in 2 gallons?
5. 2 gallons are equivalent to how many liters?
6. A paper bag contains four items that are identical except for color (red, green, indigo, and yellow). What are the chances of picking a green item? What are the chances of picking the green item twice in a row?