

# SUMMER ASSIGNMENT 2021

## HONORS BIOLOGY

The following assignment should be completed and brought to school on the first full day of school in August. Most of this is meant to be a review of science principles that you have learned in middle school. Some of it will be new material, and you will learn more about this information when you return in August. Please be **neat** with your work and as thorough as possible. Use complete sentences in all of your answers, and be as **detailed** as possible.

Please do not feel overwhelmed by this. There are just some notes to take, a few scenarios to complete, and several sheets of background knowledge that will not have an assignment attached to them. It seems like a lot of information, but try not to do it all at once. It is meant to be spread out throughout the summer.

The following is a list that should be included in this packet. Some of the materials are just for reference, and others are for you to complete. Please follow the instructions carefully.

### Materials

1. Power point – Review of scientific method
2. Power point – Characteristics of Life
3. Note taking sheet for Characteristics of life
4. List of Biological levels of Organization
5. Types of Graphs information sheet
6. Elements and their Symbols
7. Experimental Design vocabulary words
8. Experimental Design scenarios
9. Carbon Compounds power point

## DIRECTIONS

1. Power point Notes - Open the power point titled "Review of The scientific method" and take careful notes from each slide using your own paper. You may organize your notes in whatever way you find easiest to retain the information. Questions about the scientific method will be on your first test, within the first few weeks of school.
2. Power point – Open the power point titled "The characteristics of Life." Use the Notes worksheet to take notes from this power point.
3. Characteristics of life notes sheet. This is the one with the pictures and boxes, you just need to fill in with detail using the above power point.
4. Biological Levels of Organization. This is a reference sheet for you to read and learn. You should be able to list the levels in order, as well as understand the levels as they relate to each other.
5. Graphing and Histograms. This is also a reference sheet. Please familiarize yourself with each type of graph so if you are presented with data, you will know which type of graph to use to represent that particular set of data. I am confident you have done these types of graphs in the past.
6. Elements and their symbols – This is a list of the element names and their symbols that you will be quizzed over when we get to our 2<sup>nd</sup> chapter. Current students thought it would be helpful to have this list in the summer to begin learning the names of the elements and the symbols that represent each element.
7. Experimental Design Vocabulary words – This is a reference for you to review the vocab from experimental design. This sheet will help you answer the experimental design scenarios that follow.
8. Experimental Design Scenario's and Questions – Please read each scenario and answer the questions that follow.
9. Power point – Open the power point titled "Carbon Compounds" and take detailed notes from it using your own paper.

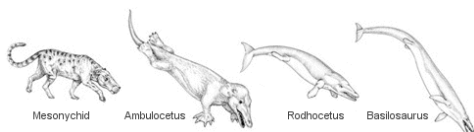
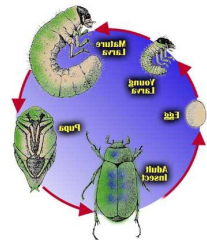
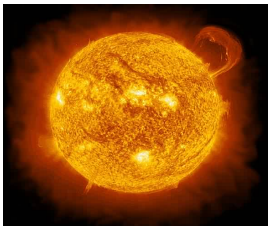
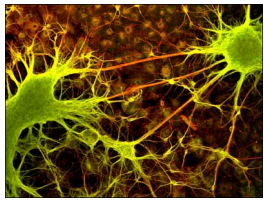
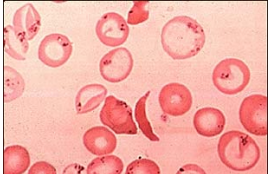


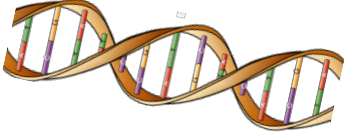
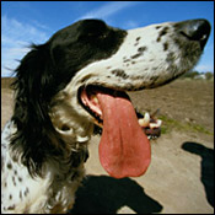
## BIOLOGICAL LEVELS OF ORGANIZATION

- **ATOM** (Protons, neutrons, electrons) --- smallest part of an element
- **MOLECULE** --- Smallest part of a compound with unique properties
- **MACROMOLECULE** (Carbohydrates, lipids, proteins, nucleic acids) --- polymers of biological molecules
- **CELL** --- smallest unit of any living thing --- **LIFE BEGINS!**
- **TISSUE** --- group of similar cells performing a job or function
- **ORGAN** --- Tissues organized into brain, heart, lungs, stomach, etc.
- **SYSTEM** --- Organs working together (Circulatory, digestive, etc.)
- **ORGANISM** --- Individual living thing (person, dog, plant, etc.)
- **POPULATION** --- group of one kind of organism (species) in an area that can interbreed & make fertile offspring --- (cardinals at the bird feeder)
- **COMMUNITY** --- Several populations of organisms in an area --- (animals in the zoo)
- **ECOSYSTEM** --- All the living (biotic) and nonliving (abiotic) parts of an environment --- (Tropical rain forest, grassland, etc.)
- **BIOME** --- Large areas of the world with similar climates and organisms
- **BIOSPHERE** --- All the living and nonliving things on Earth

# CHARACTERISTICS OF LIVING THINGS

## Power point on Characteristics of Life

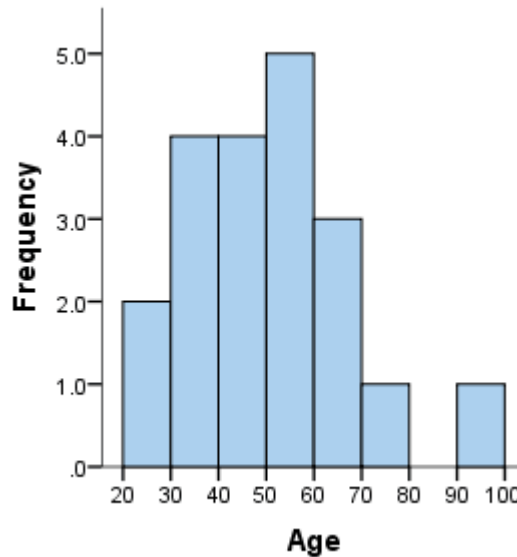




# Histogram

1. A graphical representation, similar to a bar chart in structure, that organizes a group of data points into user-specified ranges. The histogram condenses a data series (continuous data) into an easily interpreted visual by taking many data points and grouping them into logical ranges or bins. (A bar graph showing a range).

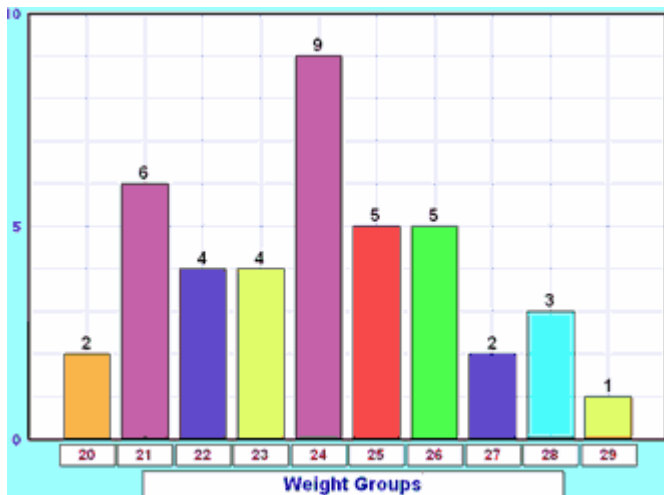
To construct a histogram from a continuous variable you first need to split the data into intervals, called **bins**. In the example above, **age** has been split into bins, with each bin representing a 10-year period starting at 20 years. Each bin contains the number of occurrences of scores in the data set that are contained within that bin. The frequencies in each bin have been tabulated along with the scores that contributed to the frequency in each bin.



# BAR GRAPH

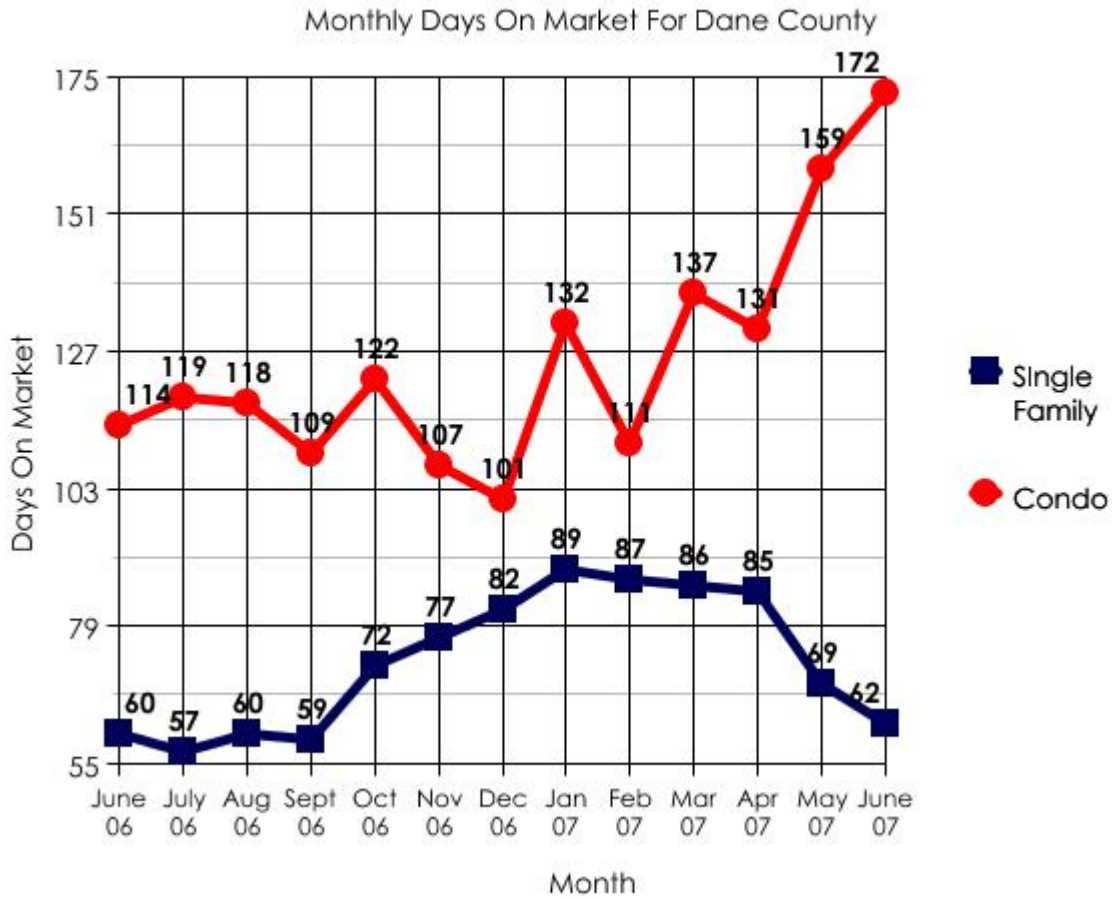
A graph consisting of parallel, usually vertical bars or rectangles with lengths proportional to the frequency with which specified quantities occur in a set of data. Also called *bar chart*.

- Visually compare amounts or frequency of occurrence
- Compare items
- Experimental group on x-axis
- y-axis frequency or occurrence



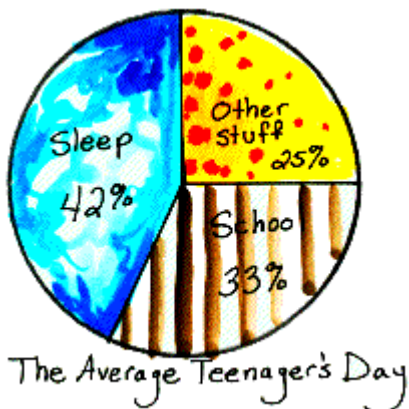
## Line Graph

- Changes over time
- Relationship of two qualities
- Used to predict beyond measured points (called extrapolate)



## Pie Graph or Chart

- Show parts of a whole, show %



## Elements Names and Symbols

H hydrogen	S sulfur	Br bromine
He helium	Cl chlorine	Kr krypton
Li lithium	Ar argon	Ag silver (argentum)
Be beryllium	K potassium (Kalium)	Au gold (aurum)
B boron	Ca calcium	Sn tin (stannum)
C carbon	Ti titanium	I iodine
N nitrogen	Cr chromium	Xe xenon
O oxygen	Mn manganese	Ba barium
F fluorine	Fe iron (ferrum)	Pt platinum
Ne neon	Co cobalt	Hg mercury (hydragyrum)
Na sodium (natrium)	Ni nickel	Pb lead (plumbum)

You do not need to learn the Latin names in Parentheses.



## Experimental Design Vocabulary Words

1. **Independent Variable**- the part of the experiment varied or manipulated by the experimenter. (Manipulating)
2. **Dependent Variable**- the part of the experiment that Responds to the independent variable, or changes because of the IV. This response is what you measure.
3. **Constant**- part of the experiment that remains the same for all groups throughout the experiment.
4. **Control Group**- standard of comparison. The group that is in it's natural state that we compare everything back to
5. **Experimental Group**- The group or groups being manipulated.
5. **Hypothesis**- educated guess or prediction. Usually If, then statement
6. **Qualitative Observation**- use words to describe something's appearance such as color or texture
7. **Quantitative Observation**- use numbers to describe information about an object such as mass, length, or volume.
8. **Inference**- is an attempt to explain or interpret observations or to identify the cause of what was observed.
9. **Question**- you are trying to answer this with your experiment

## EXPERIMENTAL DESIGN

### Scenario 1: Compost and Bean Plants

After studying about recycling, members of John's class investigated the effect of various recycled products on plant growth of bean plants. Because decomposition is necessary for the release of nutrients, the group hypothesized that older grass compost would produce taller bean plants. Three flats of bean plants (25 plants per flat) were grown for five days. The plants were then fertilized as follows: One flat was fertilized with 450 grams of three month old compost. A second flat was fertilized with 450 grams of six month old compost. The remaining flat was not fertilized with compost. The plants received the same amount of sunlight and water each day. They were all exposed to the same temperature. At the end of thirty days, the group recorded the height of the plants in centimeters.

ANSWER THE FOLLOWING QUESTIONS IN COMPLETE SENTENCES.

1. What is the control group?
2. What is the experimental group?
3. What is the manipulated (independent) variable?
4. What is the responding (dependent) variable?
5. What are the constants?

## Scenario 2: Metals and Rusting Iron

Allen read in the newspaper that a utility company was burying lead next to iron pipes to prevent rusting. In Chemistry class, he had learned about the reactivity of metals and hypothesized that less rusting would occur with metals that are more active. He placed the following into four separate beakers of water: The first beaker contained one iron nail. The second beaker contained one iron nail wrapped with an aluminum strip. The third beaker contained one iron nail wrapped with a magnesium strip. The fourth beaker contained one iron nail wrapped with a lead strip. He used the same amount of water, equal amounts (mass) of the metals, and the same type of iron nails. At the end of five days he rated the amount of rusting as small, moderate, or large. He also recorded the color of the water.

ANSWER THE FOLLOWING QUESTIONS IN COMPLETE SENTENCES.

1. What is the control group?
2. What is the experimental group?
3. What is the manipulated (independent) variable?
4. What is the responding (dependent) variable?
5. What are the constants?

