

Welcome to Honors Biology

Honors biology is an intensive, in-depth study of the natural world around us. This course is intended for freshman and sophomore students who have an interest in science and/or a desire to pursue a scientific field of study in college. Honors Biology is a hands-on course, involving laboratory investigations. The pace of the course will be **fast**. Students are expected to be self-motivated and must be able to work independently.

The following is your summer assignment. This assignment will be due the first day of school and you will have a test on this material the first Friday back to school, therefore you should make a copy of your work BEFORE handing it in so you have the material to study.

Good Luck and if you have any questions, please contact either Mrs. Pires or Mr. Dagounis at Tpires@rpsd.org or ddagounis@rpsd.org.

Enjoy the summer and see you in September,

Mrs. Pires & Mr. Dagounis

Part 1: The scientific method

Use the following links to obtain the information needed to complete the assignment listed below. Complete all work for Parts 1 and 2 on a separate sheet of paper. Work must be legible and in complete sentences.

Suggested link to help you with assignment, use any link to help you answer the following items.

<http://www.dummies.com/how-to/content/designing-experiments-using-the-scientific-method.html>

1. List the steps to the scientific method.
2. Define the following terms:
 - a. Controlled experiment
 - b. hypothesis
 - c. Independent or manipulated variables
 - d. Dependent or responding variable
 - e. Control variables
 - f. Control groups
3. Beatrice usually blows her nose using *Kleenex* tissues, but her mucus keeps leaking through the tissue. Create a controlled experiment for Beatrice which would allow her to determine if there is a better, stronger brand of tissue.
 - a. Write out the steps or procedures Beatrice should follow.
 - b. What would Beatrice's hypothesis be?
 - c. Identify the parts of a controlled experiment listed in question 2 above (c-f)
4. Now that you know how to create a controlled experiment and you have written out the steps of a procedure, hypothesis and a controlled experiment for Beatrice. Come up with an experiment of your own. Formulate your hypothesis, procedure and how you would create your controlled experiment. Make sure this is an experiment that you will be able to conduct on your own.

(When you get back to school we will be performing your experiments to collect data so make sure you think out your experiment and write it up correctly using your information that you have gathered).

- Make sure your experiment is feasible to conduct in the HS science lab.
- Make sure your lab will not cost you more than \$5 to complete.
- Your lab can not involve any animals.
- Your lab must be able to be completed in one day.

After you conduct your lab, you will write up a lab report which will be **graded**.

Part 2- Chemistry (if any links below do not work, research the internet to answer the following questions.)

You will need a periodic table to answer the questions below: A periodic table can be found at:

<http://www.webelements.com/>

Use the links to the following two slide shows to obtain the information needed to complete the assignment below.

<http://www.slideshare.net/JuliePen/the-periodic-table-chemical-bonds>

<http://www.slideshare.net/dumouchelle/how-to-draw-bohr-diagrams-slideshare>

1. Define **-Element**
2. Find the atomic mass for each of the following elements:
 - a. Sodium (Na)
 - b. Nitrogen (N)
 - c. Iron (Fe)
3. Find the atomic number for each of the elements below.
 - a. Helium (He)
 - b. Bromine (Br)
 - c. Phosphorus (P)
4. Explain the difference between the atomic number and the atomic mass of an atom.
5. What are valence electrons? Explain why they determine how an element will bond?
6. Complete the table below;

Sub-atomic particle	Location (inside or outside of the nucleus)	Charge	Mass (amu)	Symbol
electron				
Proton				
neutron				

7. Find the number of protons neutrons and electrons for each of the atoms listed below.)
 - a. Hydrogen (H)
 - b. Sulfur (S)
 - c. Lithium (Li)
 - d. Beryllium

8. Draw the atomic structure(Bohr model) for each of the elements listed below:
 - a. Helium (He)
 - b. Carbon (C)
 - c. Sodium (Na)

9. Define **–Compound**
10. Explain the difference between covalent bonds and ionic bonds
11. Why is water an important compound? What properties of water make it very significant to biology?
Why do living things require water? (what does water do for living things?)

Part 3: The Cell

For this section you will need to research the parts of the cell, there are plenty of excellent videos on the internet to help you find the following information.

1. Explain the difference between a eukaryotic cell and a prokaryotic cell. Which type of cell are you made up of?
2. What are the difference between an animal cell and a plant cell?
3. Complete the table on the next page

Cell Organelle	Cell type: Animal, Plant or Both	Function	Picture and/or Description
Cell (Plasma) Membrane			
Cell Wall			
Cytoplasm			
Rough Endoplasmic Reticulum			

Smooth Endoplasmic reticulum			
Ribosome			
Golgi Apparatus (bodies)			
Lysosomes			
Nucleus			
Vacuole			
Mitochondria			
Chloroplast			
Centriole			
Cytoskeleton			

The Cell Theory:

Introduction

If someone were to tell you that people once believed that maggots came from rotting meat or that rats came from damp roofs, you would quickly write the person off as being very weird. However, this IS what many people thought until about 250 years ago. These beliefs were based upon an idea called "spontaneous generation." Why did people accept this absurd idea? How was this idea finally put to rest? It's up to you to find out! During your research, you will learn about the scientists who helped to pave the way to the development of the Cell Theory and to the rejection of spontaneous generation.

The Process:

PART A - RESEARCH

The list of scientists that you should highlight in your research are as follows:

Scientist	Year	Contribution to Cell Theory
1) Zacharias Jansen		
2) Anton van Leeuwenhoek		
3) Robert Hooke		
4) Matthias Schleiden		
5) Theodor Schwann		
6) Rudolf Virchow		
7) Louis Pasteur		

As you conduct research with regards to these scientists, ask yourself the following questions:

- * How did this scientist contribute to the cell theory? (Keep in mind that many of these guys did all sorts of cool things. Make sure the information that you provide here is related to the cell theory.)
- * When did this scientist make his contribution to the cell theory?
- * How did this scientist's invention, idea, or experiment help lead to the rejection of spontaneous generation?

You may use these links as reference (Feel free to look up and use any other links to answer the following questions these are just suggested links to help you with this assignment):

<http://www.ucmp.berkeley.edu/history/leeuwenhoek.html>

http://www.ehow.co.uk/facts_6902046_zacharias-janssen_s-cell-theory.html

http://www.merke.ch/biografien/biologen_en/schwann.php

<http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2603088/>

http://www.accessexcellence.org/RC/AB/BC/Louis_Pasteur.php

<http://www.smithlifescience.com/celltheory.htm>

Part B: Define:

Theory of Spontaneous Generation:

Theory of Biogenesis:

The Cell Theory (Three parts) :

Additional Information:

The sources/links that are listed with the summer assignments are only recommendations, you may use any reliable source to help you with your assignment.

Do not wait for the last few days of summer to complete this assignment. Spread the work out over the summer and review just before school starts.

If you need help during the summer, you can email me.

*Have a safe and enjoyable summer. I look forward to meeting you in
September.*