AP Biology Summer Homework 2020-2021

Welcome to AP Biology!

In this course you will be designing and conducting your own experiments throughout the year on a wide variety of topics in biology. Science is the process of developing interesting questions and trying to figure out how to answer them--it requires creativity and hard work. Albert Einstein once said "I am enough of an artist to draw freely upon my imagination. Imagination is more important than knowledge."

Your summer assignment is to *do* science by designing and conducting an original scientific research project on a biological topic and question of your choice. This is an opportunity for you to combine your imagination with your background knowledge of biology. Please join the google Classroom for this class using code: 7tipro7 and follow the steps below. Due dates for each step are posted in classroom.

While the possibilities for this project are endless I recommend that you choose a topic and question that is interesting to you and is practical for you to complete at home during the summer. Please feel free to email me with any questions or ideas if you would like feedback before the due dates.

Good luck, enjoy your summer, and I look forward to hearing from you soon!
Mr. Baker

- Step 1: Research question and rationale.
    - In a scientific paper this is usually in a section called the Introduction.
    - This is where the scientist(s) justifies the research by explaining or providing background information to put their research into context.
    - For example, a question could be: Do increased levels of nitrogen in soil increase plant growth? Part of the rationale for this question could be background information on the number or percent of undernourished people worldwide (it's about 11% or almost 1 billion people) and how changes in agriculture (like increasing soil nutrients) could increase plant productivity and potentially decrease global undernourishment levels.

- Step 2: Materials and Methods.
    - This is the experimental design or specific description of how research was conducted.
    - Consists of a narrative description of the experimental design including all of the materials that were used, how the experiment or research was performed, and what and how data was collected.
    - Ideally another researcher could replicate your work based on your materials and methods section.

- Step 3: Conduct your research and collect your data.
    - Follow your Materials and Methods to conduct your research/experiment.
    - Most science involves trial and error. In many cases a small version of a project called a pilot study is conducted first in order to help determine what is going to work and what is not going to work. For your project you may need to modify your materials and methods as you go.

- Step 4: Analyze your data and prepare and submit your presentation.
    - 5 minute flipgrid presentation of google slides with camera on (meaning you are on the screen in the video with your slides). Here is a brief tutorial of one way to do this: https://www.youtube.com/watch?v=BUmHq40Fb-I
    - Include at least one slide for each of the following sections of your presentation. Each slide should consist of bullet points to go along with your more comprehensive verbal presentation.
        - Introduction
            - State your question and describe and discuss your rationale.
        - Materials and Methods
            - Include one or more pictures of your experiment/research
        - Results
            - If possible, present your data in both table and graph form.
        - Discussion
            - Try to answer these questions in your discussion:
                - What do your results suggest?
                - What can you speculate about the meaning of your results relative to the bigger picture or context you described in your introduction?
                - Were there sources of error that might have changed your data?
                - Do your results/research give you ideas of other research or questions?