Welcome to Honors Biology! Since you are enrolled in Honors Biology for the 2016-2017 school year, this summer assignment is geared towards teaching you important skills for your independent project. It is NOT designed to have you automatically pick your topic for your science project. Parents and student please read everything as you work on this assignment. For any questions, please email Ms. Jenn Choumil, the science fair coordinator at McLean High School, at jvchoumil@fcps.edu.

The assignment is separated into three parts and will serve as your first grade for Honors Biology. It is due on the 1st day of biology class to your assigned teacher and is to be completed INDIVIDUALLY. You can go to the Mclean High School Homepage under the Summer Assignment link to download this assignment and click on the links (instead of typing them into the browser). The McLean High School Science Fair Handbook is also located in the same section and will be needed as a resource for Part Three of this assignment. If you have questions, there will be evening help sessions as follows:

| Evening help sessions: 6:00pm – 7:00pm in room y202 at Mclean High School: |
| Monday June 13th, 2016 |
| Monday August 29th, 2016 |

**Part One: Determining Source’s Reliability**

In this section you are going to compare 3 different types of sources: a peer-reviewed scientific journal article, an article from a scientific magazine, and a website.

1. Open the following link: http://www.cdc.gov/des/consumers/research/understanding_deciding.html. Then, answer the two questions:
   a. What does it mean when you are asked to find a “reliable” article or source?
   b. Name an organization listed on that website they say would be a reliable source to use.

2. Open the following link: http://library.sdsu.edu/reference/research/peer-reviewed-articles. Then answer the three questions below.
   a. What is a peer-reviewed article?
   b. Why is it important to use peer-reviewed articles in your research?
   c. Out of Scholarly Journals, Popular Magazines and Trade Publications, which one of the three would be best to use for your research for your science project? Why?
3. The three links below are for different articles from three different resources. Open the links to read the articles. Then, put the three articles in order from most reliable to least reliable, state why you chose the way you did, and give an example from the reading on the websites to prove your decision.

- **Journal of Epidemiology**:  

- **Nature News**:  

- **NYDailynews.com**:  

**MOST Reliable:**

**SOMEWHAT Reliable:**

**LEAST Reliable:**

4. Open the following link:  

a. Yes, this is Wikipedia. Even Wikipedia says they are not 100% reliable. Read it over, why did they hint to this? Do you think you’ll be able to use Wikipedia in your research for your science project?

There are other websites that are considered unreliable. The list below includes sources that will NOT be allowed to be used as sources for your research project because they are unreliable:

<table>
<thead>
<tr>
<th>Source Type</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wikipedia.com</td>
<td>any blog sites</td>
</tr>
<tr>
<td>Ask.com</td>
<td>personal site/forums</td>
</tr>
<tr>
<td>About.com</td>
<td>*encyclopedia.com</td>
</tr>
<tr>
<td>Sciencebuddies.org</td>
<td>*worldbookonline.com</td>
</tr>
<tr>
<td>*encyclopedia.com</td>
<td>*encyclopedia.com</td>
</tr>
<tr>
<td>*worldbookonline.com</td>
<td>*encyclopedia.com</td>
</tr>
<tr>
<td>personal site/forums</td>
<td>*encyclopedia.com</td>
</tr>
<tr>
<td>opinion or biased sites</td>
<td>*encyclopedia.com</td>
</tr>
<tr>
<td>self-published websites</td>
<td>*encyclopedia.com</td>
</tr>
<tr>
<td>editorials</td>
<td>*encyclopedia.com</td>
</tr>
</tbody>
</table>

*Legitimate encyclopedias may be used as a source AFTER the required source number has been met.*
Part Two: ISEF Rules
In this section you are going to become familiar with the rules for independent science projects. You will be answering questions that might not pertain to a particular idea for your project, however, you must know all the rules, regulations and restrictions for the project. We at McLean High School do not make the rules/regulations. We must follow the International Science and Engineering Fair (ISEF) organization’s recommendations.

Open the following link: https://member.societyforscience.org/document.doc?id=634. This is a pdf of a Power Point that provides an overview of some of the rules set by ISEF. Using this document, answer the questions below.

1. What does an adult sponsor do? Who usually serves as the adult sponsor?

2. What is the main difference between an adult sponsor and a qualified scientist?

3. Go to the section: Forms Required for All Projects. What 4 forms are required for ALL projects (not including 1C)? Place them in the order that they should be submitted (hint, it is the order of the Power Point!).
   a. 
   b. 
   c. 
   d. 

4. Why would you need a form 1C?

9th grade students will NOT be conducting any sensitive projects during their Freshmen year of high school. This includes human subject studies, non-human vertebrate studies, mold/fungus/bacteria studies requiring a BSL-2 laboratory, blood studies, human/animal tissue studies, hazardous chemical and/or devices studies, tobacco studies, prescription drug studies, firearms/explosives studies, and radiation studies. These projects require a year of work with the scientific method in addition to additional paperwork and committee reviews that overshadow the scientific process.

The questions below are to make you aware of what sensitive projects are so that you will be better prepared to complete Part 3 of this assignment. There are some exceptions, which some of the questions address, to the above restrictions. If the idea requires anything further, you will need to wait until you are
a sophomore, junior, or senior to complete these types of projects. With that being said, it is good to know what you can expect once you have had one year of the scientific method in high school.

5. Go to the section: Human Subjects.
   a. What is considered a human subject study?

   b. There are some exemptions of human subject studies which 9th graders are eligible to consider for a project idea. What are the four types of studies that don’t require any further approval other than that of your teacher?

Note: If you scroll through the slides that follow after question 5b, you will see why anything other than the exemptions listed above are not eligible for 9th grade students. It involves more of a background in the scientific method, extra paperwork, and extra time!

   a. What is considered a vertebrate animal?

   b. How can a vertebrate behavioral project be exempt from further committee approval (other than that of your teacher) which makes it a possible project idea for you as a 9th grade student?

Note: Again, if you scroll through the slides that follow after question 6b, you will see why anything other than the exemptions listed above are not eligible for 9th grade students. It involves more of a background in the scientific method, extra paperwork, and extra time!

7. Go to the section: Potentially Hazardous Biological Agents (PHBA).
   a. What is considered a potentially hazardous biological agent?
b. A Risk Assessment form (Form 3) is required of all PHBA projects. What is it and what does it involve?

c. BSL stands for Biosafety Level. There are different BSL labs. What type of BSL lab is the high school?

d. What are some PHBA studies that are exempt from further committee approval (other than that of your teacher) which makes it a possible project idea for you as a 9th grade student?

e. What are some tissues that are exempt from further committee approval (other than that of your teacher) which makes it a possible project idea for you as a 9th grade student?

Note: Once again, if you scroll through the slides on PHBA, you will see why anything other than the exemptions listed above are not eligible for 9th grade students. It involves more of a background in the scientific method, extra paperwork, and extra time!
Part Three: Project Ideas

In this section you are going to start to brainstorm project ideas.

- Open up the McLean High School Science Fair Handbook (in the Summer Assignment Section of the McLean HS home page) to page 9 “Step 2: Choosing A Topic”. Read over the pages in this section taking note of any topics that interest you.
- Read the following article “How to Select a Science Fair Project Topic” by opening the following link: http://www.cyberbee.com/science/prep_sites.html. Do not complete the forms in the “science fair forms” link, but it wouldn’t hurt to look at them to give you some ideas.

Now that you have gotten some background information, complete the information below for TWO ideas for your science fair project. Remember, when it comes time to formally picking a topic in September, you can, but are not obligated to, submit these ideas for consideration - after the library day given in the first few weeks of school, you may decide to go in a different direction. However, thoroughly completing the below information will put you a step ahead! **Keep in mind that just because you picked a topic and found articles over the summer, it does not mean you will automatically get to use either of them for your project during the year. It must be approved by your teacher and follow all International Science and Engineering Fair Guidelines before moving forward.**

Be sure the ideas listed below:

- test the cause and effect of a scientific principle – either something new or a known principle tested in a creative or unique way
- are age appropriate.
- are something you can afford $$$.
- include materials YOU can buy and are legal for you to buy.
- are not a copy-and-paste procedure of an idea done many other times – make
- is a scientific principle that you are really interested in or will enjoy working with as you will be spending many weeks, not just one weekend, working on this project!

Project ideas that should NOT be listed below, as they won’t be accepted, include:

- Different colors of light or types of light and plant growth (red and blue work best).
- Nothing with Mentos and soda (no, really)
- Anything involving teeth and acids
- No homemade volcanoes
- Different types of water and plant growth (no significant difference)
- Fruit ripening experiments (warmer enclosed areas ripen faster)
- Worms affecting plant growth (they help a lot).
- Music and plant growth (no conclusive evidence).
- Anything that is blown up
- Anything that uses controlled substances (alcohol or tobacco)
- NO vertebrate/human projects where you handle the animal or human or alter its habitat
- Anything you build “just to build.”
- Nothing involving tasting, blood pressure, surveys, memory, behavior, choice, breathing rate (you can’t test on humans. Period).
- Anything working with mold/bacteria or that might GROW mold/bacteria must be done in the classroom and NOT at home. You then must coordinate with your teacher to come in and record data every few days.

For more help with topic ideas, visit the following websites:

- Sparticl - [http://www.sparticl.org/](http://www.sparticl.org/)
- Science News - [https://www.sciencenews.org/](https://www.sciencenews.org/)
- Science News for Students - [https://student.societyforscience.org/sciencenews-students](https://student.societyforscience.org/sciencenews-students)
- Other sources at the end of the McLean High School Science Fair handbook
A. **PROBLEM** to be examined (what are you trying to solve?)

B. What **TESTABLE** question can be asked about this problem to conduct your research on?

C. What is your **HYPOTHESIS**? (Format: If….then…because….)

D. **VARIABLES**
   - What is your **DEPENDENT** variable (the result you will be measuring)?
   - How will you MEASURE the dependent variable (what tool will you use?)
   - What is your **INDEPENDENT** variable (the one you’re changing)?
   - How will you MEASURE the independent variable?
   - What are your constant/controlled variables?
   - What is your control group experiment where ALL variables remain the same?

E. **EXPERIMENTATION/TOOLS**
   - What tools/instruments might you need?
     - How much will your materials cost?
     - Can you GET your materials? (Consider: Will they ship to you?, Are they in season?, Do they stop carrying these items during certain times of the year?, Can you drive to get them or will you have to order them online?, etc.)
     - Will you have to complete this at school under your teacher’s supervision, or can you do this at home or at another location?
F. REFERENCES

Find TWO articles about the topic question above. The articles must be from a peer-reviewed scientific journal or article (i.e. it has a scientific title, an abstract, introduction, data & conclusion). Remember, sites like Wikipedia, any online encyclopedias or “ehow” are not allowed. Some sites that may help you find a good scientific article (but are not mandatory to use) are;

* **Peer-Reviewed Journal Articles**
  
  * **Journal for Biology** [http://jbiol.com/](http://jbiol.com/) (you can use any of the FREE articles they have)
  * Public Library of Science [http://www.plosbiology.org](http://www.plosbiology.org)

* **Science Magazine**
  
  * Society for Science and the Public [http://www.scienecenews.org](http://www.scienecenews.org)
  * American Association for the Advancement of Science [http://news.sciencemag.org](http://news.sciencemag.org)

Fill out the information below.

1. **Resource #1**
   
   * Article Name:
   * Author:
   * Source:
   * THREE pieces of scientific information about the topic from the article:

2. **Resource #2**
   
   * Article Name:
   * Author:
   * Source:
   * THREE pieces of scientific information about the topic from the article:
A. PROBLEM to be examined (what are you trying to solve?)

B. What TESTABLE question can be asked about this problem to conduct your research on?

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**Peer-Reviewed Journal Articles**

- Journal for Biology [http://jbiol.com/](http://jbiol.com/) (you can use any of the FREE articles they have)
- Public Library of Science [http://www.plosbiology.org](http://www.plosbiology.org)

**Science Magazine**

- Society for Science and the Public [http://www.sciencenews.org](http://www.sciencenews.org)
- American Association for the Advancement of Science [http://news.sciencemag.org](http://news.sciencemag.org)

Fill out the information below.

3. Resource #1

   - Article Name:
   - Author:
   - Source:
   - THREE pieces of scientific information about the topic from the article:

4. Resource #2

   - Article Name:
   - Author:
   - Source:
   - THREE pieces of scientific information about the topic from the article: