**Honors Biology at HMTCA**

Fall 2016



***Description***

The option to earn “Honor Distinction” in Biology is available. This will require a significant commitment on the part of the student that involves research, reading, and effort in addition to the Biology coursework.

In order to earn “Honors Distinction”, a student must:

* receive a B or higher on the honors project
* have his/her topic approved by Mr. Capozzi before work begins
* make bi-weekly check-ins to demonstrate evidence of progress on the project
* complete the project as detailed below on or before **Monday, December 19th**.

*Regardless of which option or item you choose, you must also prepare a PowerPoint, Prezi, or poster presentation. You will deliver this presentation to a small panel of teachers and students as the final step in your honors project.*

Your final work will be evaluated on a pass/fail basis in accordance with the general guidelines provided below. In addition, a rubric will be provided to you that will be tailored to your honors project. Only work that is completed thoroughly and that addresses the specific requirements that are stated will receive a passing score.

***Honors Options***

**Option 1: Reading Analysis and Summarization (complete both items A and B):**

1. Read a non-fiction popular science book involving Biology, and write a book review similar to what you would see in the New York Times. The book review must be 500 words (2 pages, double spaced). You must have your book approved by Mr. Capozzi prior to completing this book review. Give a 5-8 minute presentation on the book’s key points and your main takeaways. (*A few books are listed at the end of this document, but you do not have to restrict yourself to this list)*
2. Choose a peer-reviewed research paper in Biology from the Biology section of the *National High School Journal Of Science*. It must be a paper about original research. Read the paper, and write a 700-800 word summary (3 pages, double spaced). Create a presentation from your paper. Your summary must be able to answer the following questions:
	1. What was studied?
	2. What was done?
	3. What was found?
	4. What did the results mean?
	5. Why is this research significant?

The Biology section of the *National High School Journal Of Science* can be found online at:

<http://nhsjs.com/category/biology/>

**Option 2: Research (choose one item):**

1. Contact a professor or scientist in Connecticut who is conducting original research in Biology. Interview him/her (in person) about their work and take a tour through their lab. Write a 800-1000 word summary (3½ – 4 pages, double spaced) that highlights the context and significance of their work: what they are doing, how they are doing it, what they have found (so far), and what their findings might mean. Include information about their personal history (e.g., how they got interested in the topic) and personality. Include direct quotations from the person you interviewed in your report, as well as reliable literature citations in your explanation of the science, context, and significance.
2. Contact a professional in Connecticut who works in a field related to Biology. Interview him/her (in person) about their work and take a tour through their place of work. Write a 800-1000 word summary (3½ – 4 pages, double spaced) that highlights the context and significance of their work: what they are doing, how they are doing it, why they do what they do, and what impact their work has on our community. Also, feel free to include tidbits about their personal history (e.g., how they got interested in the topic) and personality. Include direct quotations from the person you interviewed in your report, as well as reliable literature citations in your explanation of the science, context, and significance. (*A few professions are listed at the end of this document, but you do not have to restrict yourself to this list)*
3. Pick any topic related to biology that interests you. Narrow your interest in the selected topic until it can be covered with specific examples in a paper of 1200-1500 words (5-6 pages, double spaced). The paper should include data and/or biology research related to the topic, and might also include an analysis of the impacts of the issue upon yourself, your community, and upon society as a whole. Political, economic, and/or historical analysis may also be appropriate depending upon the topic. Every paper MUST contain some analysis or application of a biological concept. Guidelines for the research paper will be provided to you if you choose this option. *(A few global topics are provided at the end of this document to give you ideas, but you do not have to restrict yourself to this list)*

**Option 3: Engineering/Experimental Category (choose any one item):**

*\*\*Note: These experiments must be done at home, and you are responsible for obtaining any materials needed to complete the*

*item you select\*\**

1. Build a microscope that can be used with a smartphone. Conduct an experiment using the microscope. Be able to demonstrate your microscope and create a PowerPoint presentation that highlights at least three unique specimens you were able to examine using the microscope. Give a 1200-1500 word explanation (5 – 6 pages, double spaced) of how you built the microscope, and what you did in your experiment. In your paper, be sure to include a description of any and all changes you needed to make in your design, and why. Use reliable sources to give biological explanations of what you studied with the microscope.
2. Build a functional robotic biomimicry device. Be able to demonstrate your robot and explain how it mimics an organism found in nature. Write a 1200-1500 word explanation (5 – 6 pages, double spaced) that summarizes your research and includes biological explanations from reliable sources. Explain how a large-scale version of your robot would be a significant contribution to Biology. Your paper must also include a hand-drawn, schematic design of your robot.
3. Conduct an ecological survey. Choose an area in nature (a pond, a river, a small patch of woods, etc.) and record data on various long-term measurements like water quality, plant growth, soil erosion, and/or pollution accumulation. Create a video that shows you conducting your experiment over a period of at least four weeks. Write a 1200-1500 word explanation (5 – 6 pages, double spaced) that summarizes your research (what you did, how you did it, what you concluded) and includes biological explanations from reliable sources.
4. Create a functioning setup of one alternative method of plant cultivation. Alternative methods include hydroponics, aeroponics, and vertical farming. Create a video that shows you conducting your experiment over a period of at least two weeks. Write a 1200-1500 word explanation (5 – 6 pages, double spaced) paper that summarizes your research (what you did, how you did it, what you concluded) and includes biological explanations from reliable sources.
5. Conduct a study of animal behavior by using insects. Begin by researching various aspects of animal behavior that biologists have studied. Then conduct an experiment over a period of at least two weeks that either replicates another scientist’s work, or is an original experiment influenced by your research. Write a 1200-1500 word explanation (5 – 6 pages, double spaced) paper that summarizes your research (what you did, how you did it, what you concluded) and includes biological explanations from reliable sources.
6. Set up an experiment that allows you to study bird behavior. Create a video that shows you conducting your experiment over a period of at least two weeks. Write a 1200-1500 word explanation (5 – 6 pages, double spaced) paper that summarizes your research (what you did, how you did it, what you concluded) and includes biological explanations from reliable sources.
7. Have another idea about something you could build, or an experiment you could do at home? Are you interested in art, music, photography, or computer programming and would like to incorporate your interests into your project? Suggest it to Mr. Capozzi for approval.

**Additional Requirement: Assigned Readings with Summaries**

**Description**

For each unit we cover in class, you will be assigned one or more readings. These may be articles or other artifacts that require you to submit a written summary or an argumentative essay.

Rubrics will be provided for each reading.

**What Do I Need to Do?**

In summary, what is required to earn honors distinction?

1. Choose to complete either option 1, 2, or 3 listed above
2. Complete all additional readings and applicable work assigned by Mr. Capozzi
3. Independently schedule and complete bi-weekly meetings with Mr. Capozzi
4. Present your honors work to a small panel of teachers and peers

**Deadlines**

1. You must commit to Honors Biology by **Friday, September 16th**. This is done by turning in the form signed by both you and a parent by this date. It is not necessary for you to have chosen your project by this date.
2. You must choose a project and have it approved by Mr. Capozzi by **Friday, September 30th**.
3. You will be required to check-in with Mr. Capozzi once every 2 weeks to demonstrate evidence of progress towards completion of this Honors Contract. This is also the best time to receive necessary guidance in your project. Evidence of adequate progress include items such as:
* pictures of the current state of your engineering project
* an outline of your research paper
* a list of citations to use in your research paper
* a transcript from an interview
* written plans for your engineering project
* notes about the book you are reading
* etc.

The bi-weekly check-ins must occur by:

* Friday, October 7th
* Friday, October 21st
* Friday, November 4th
* Friday, November 18th
* Friday, December 2nd
* Friday, December 9th

**You are responsible for scheduling these meetings!**

Failure to demonstrate evidence of progress on a bi-weekly basis will be grounds for termination of consideration for “Honors Distinction”. Mr. Capozzi will not remind you about, nor will he schedule, an upcoming check-in. It will be YOUR RESPONSIBILITY to be proactive and fulfill your obligation.

1. The final deadline for turning in your project will be **Monday, December 19th**. Only work submitted by the deadline will be considered for “Honors Distinction”. All items must be completed by the deadline for “Honors Distinction” consideration. This is a hard deadline. NO EXTENSIONS WILL BE GRANTED TO THE DEADLINE. NO EXCEPTIONS.
2. After completion, you will present your project on a date to be determined.

**A Few Non-Fiction Popular Books on Biology**

A Primate’s Memoir: A Neuroscientist’s Unconventional Life Among the Baboons

by Robert Sapolsky

How to Build a Dinosaur: Extinction Doesn't Have to Be Forever

by Jack Horner and James Gorman

Life From an RNA World

 by Michael Yarus

March of the Microbes

 by John Ingraham

Microbe Hunters

by Paul deKruif

Musicophilia: Tales of Music and the Brain, Revised and Expanded Edition

by Oliver Sacks

Regenesis: How Synthetic Biology Will Reinvent Nature and Ourselves

 by George Church

Silent Spring

 by Rachel Carson

The Diversity of Life

by Edward O. Wilson

The Double Helix: A Personal Account of the Discovery of the Structure of DNA

by James Watson

The Hot Zone: A Terrifying True Story

by Richard Preston

The Immortal Life of Henrietta Lacks

by Rebecca Skloot.

The Secret Life of Lobsters

 by Trevor Corson

Why Evolution Is True

by Jerry Coyne

Wonderful Life: The Burgess Shale and the Nature of History

by Stephen Jay Gould

Your Inner Fish: : A Journey into the 3.5-Billion-Year History of the Human Body

 by Neil Shubin

**A Few Professions Related to Biology**

Arborists

Engineers in sustainable energy

Environmental protection

Epidemiologists

Fish and game wardens

Foresters

Health professionals

Organic farmers

Paleontologists

Veterinarians

Wildlife rehabilitation

Zoologists

**A Few Global Topics in Biology**

Agriculture

Biofuel

Biomedical engineering

Biomimicry

Biotechnology

Climate change

Ecology

Evolution

Food scarcity

Genetics

Genomics

Human origins

Immunization and infection

Loss of biodiversity

Neuroscience

Resource Management

Stem cell research

Synthetic biology

The genetics and ethics of “re-wilding”

Tissue engineering and regeneration

**Honors Biology Contract**

**Student Agreement and Signature:**

I have read the description of Honors Biology in its entirety and I agree to the following:

* I agree that I must receive a B or higher on the honors project to qualify for “Honors Distinction”.
* I agree that I must demonstrate adequate progress on this project every two weeks, as described above.
* I agree that I will need to obtain the materials required in order to complete the project if I select from the engineering/experimental category.
* I agree that the project must be completed by the deadline, Thursday, December 22nd, in order for my work to be considered for “Honors Distinction”. This means that I will not receive “Honors Distinction” if I complete only part, or even most, of the project by the deadline.
* I agree that NO EXTENSIONS WILL BE GRANTED and that there are NO EXCEPTIONS to this policy. I will not ask for deadline extensions to be given if I did not complete the work by the deadline.

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Student Name Student Signature Date

**Parent Agreement and Signature:**

I have read the description of Honors Biology in its entirety and I agree to the following:

* I agree that my child receive a B or higher on the honors project to qualify for “Honors Distinction”.
* I agree that my child will need to demonstrate adequate progress on this project on a bi-weekly basis, as described above.
* I agree that I may need to help my child obtain the materials required in order to complete the engineering/experimental project, if this is the project chosen.
* I agree that my child must complete the project in full by the deadline, Thursday, December 22nd, in order for my child’s work to be considered for “Honors Distinction”. This means that “Honors Distinction” will not be earned if only part, or even most, of the project is completed by the deadline.
* I agree that NO EXTENSIONS WILL BE GRANTED and that there are NO EXCEPTIONS to this policy. I will not ask for deadline extensions to be given if my child’s work is not completed by the deadline.

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Parent Name Parent Signature Date