

Honors Physics: Third Nine Weeks Project

Current Events in Physics

The Project:

The third nine weeks' project is a research project that will take you into the heart of current research into particle physics - a fascinating and promising branch of study in the field.

This project will have **three** major components

- Article Reviews (3 Reviews)
- Research Paper (4 Pages)
- Class Debates (Each person will participate on one debate team and one jury)

Timeline:

Each part of the project should aid in your overall understanding of particle physics and prepare you for the next component.

- **4th Period: Friday, January 30th** – First article review due
- **5th Period: Tuesday, January 27th** – First article review due
- **Wednesday, February 11th** – Remaining two article reviews due
- **Thursday, March 12th** - Research paper due
- **Thursday, March 26th** (Day before Spring Break) - Class debates

Topic - The Higgs Boson and Its Place in the Standard Model

This missing particle has been predicted, sought after, and now recently verified giving a great deal of credibility to the Standard Model and the field of particle physics. The knowledge of its existence has opened the door to many other ideas and predicted particles.

Article Component:

As you begin your research, you will find many scientific articles relating to the study of the Higgs Boson. For **three (3)** of these articles, you will be writing a review based on its contents. The articles chosen must be recent. (Written in the last 6 years, so nothing older than 2009. However, most articles will have been written within the last 3-4 years.) Try to vary the contents of your articles. This will help your research in the long run.

Suggestions for Finding Appropriate Articles to Review

- News Sources (CNN, ABC News, NBC News, New York Times, etc...)
- Scholarly Journals (Scientific American, Nature, etc...)

***Blogs and Editorials must be approved by Mrs. Whittaker prior to use.**

Questions to Consider:

****You do not need to answer all of these, use them as suggestions to guide your research.***

- Who was the first to hypothesize its existence?
- What are particle accelerators and what is their function in the search for the Higgs Boson and other particles?
- Who or which organizations have been looking for it?
- Who discovered it and when? Have the results of its existence been conclusive?
- Does the existence of this particle change our understanding of physics? And if so, how?
- Does the existence of this particle have the potential to affect our everyday life?
- What is supersymmetry and how does that relate to the discovery of the Higgs?
- What is dark matter and dark energy? How does the Higgs relate to these?

Paper Component:

- In your paper, please address the following specifically:
What is the Higgs Boson/Higgs Field?
What is the Standard Model?
- From there, the remainder of your paper is free to take a variety of directions based on your research from the article reviews. Look at the 'Questions to Consider' for more suggestions.
- The grading for the rest of your paper will be based on your thesis. Please highlight or boldface your thesis so I can evaluate your paper based on your individual content.
- Paper must be four (4) complete pages. Papers that have one sentence on the fourth page will be considered short.
- Paper should be typed, double-spaced, font no larger than 12-point, and in an MLA format with in-text citations and a works cited page.
 - Papers turned in without in-text citations and/or a works cited page will be considered plagiarized.
- There should be a **minimum** of 5 sources used. Articles used in your reviews may serve as three of the five.
- Wikipedia may not be used as a source.

Debate Component

Based on your research into the predicted existence and discovery of the Higgs Boson, you will be participating in a class debate.

- Two debates will take place during class.
- Each student will participate once as a member of a pro or negating team of a resolution and once as a jury member.
- Teams will be decided closer to the date of the debate.
- **Resolution One:** Based on the recent break-throughs in particle physics, such as finding the Higgs Boson, more US government money should be dedicated to research in the field of particle physics.
- **Resolution Two:** After finding the Higgs Boson, the Standard Model now has enough credibility to become a required component of public education in physics.

For Each Article Review, Include the Following:

1. Article

Print each article and attach it to your review. The article must be at least one full page and relevant to your topic. **Do Not** adjust the font to make the article one page.

2. Citation 1-2 sentences

Provide a correct MLA citation for the article at the top of the page.

3. Major Findings 1-2 paragraphs

Summarize the article in your own words. Explain what are the most important discoveries in the article, who made them, and other important information. Do not simply outline the article.

4. Reflection 1-2 paragraphs

****This is the most important section. Devote the majority of your time and effort to these paragraphs. In your own words, explain:***

- Why do the contents of this article matter?
- What do the contents of the article contribute to the world of science?
- How do the contents of this article affect our society?
- Did this article lead to any further research or experimentation?
- Who might be against the findings and/or statements presented? What might be a counter-argument?
- How does this article contribute to your understanding of the topic?