

## Physics NGSS Syllabus

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### Intro:

Howdy! My name is Scott Barrentine, and I teach Physics NGSS at Franklin High School. Beaverton has been employing this “Patterns Physics” curriculum with increasing success for over five years now, and I am very passionate about the way **this curriculum trains students to think critically and learn how to be a scientist.**

### The Mission:

**This Physics NGSS class is about production, not ingestion.** Every day, students will be asked to practice skills that are crucial to success both in Physics and life in general. **Physics can only be learned by doing**, not by listening or copying notes or re-reading material. **Because of my high expectations for engaged work during class, I do not assign traditional homework** - but if the work isn't being done in class, then it will have to be made up during tutorial, Physics Support Time (Wednesdays from 3:15-4:15), or at home.

### Next Generation Science Standards (NGSS):

The NGSS part of Physics NGSS stands for “Next Generation Science Standards,” which have been adopted by most of the United States. These standards are statements of skills that students should gain, for example:

**HS-PS2-1: [Students can] analyze data to support the claim that Newton’s second law of motion describes the mathematical relationship among (between) the net force on a macroscopic object, its mass, and its acceleration.**

Because the philosophy of the NGSS is to build skills, grading looks a little different than it does in traditional classes. I use the Proficiency Model (explained below) because it better aligns with my goals for student work.

### Proficiency Model:

The proficiency model has four main elements that separate it from traditional grading: multiple opportunities, the grading categories and scale, and how we determine final grades.

#### A. Multiple Opportunities

- a. Because we are building skills, not regurgitating information, many students may begin the year with low grades that reflect my expectations for the end of the unit/semester. **I hope I can encourage students to show resilience and grit as they learn those skills and earn an improved grade** - only their semester grade goes on their transcript.

- b. **All grades can be improved by proving that skill on another independent assignment.** In traditional scoring, an F can be difficult to change because the grades are averaged, but in my gradebook, **the most important grade is the most recent one.**
  - c. Many additional **opportunities will be built into what we're doing**, so students will not always have to complete a makeup assignment
  - d. Note: I only have a few alternate activities for each standard, so you can't just keep trying forever.
- B. Grading Categories - **The Gradebook will be organized into 4 Science Skills, instead of the traditional Homework/Quizzes/Projects/Tests.** We will still have all of those, but they will be sorted by the skill they are connected to - sometimes a test, lab, or project will assess multiple skills:

**Design:** Setting up experiments and using engineering design  
**"I can set up, conduct, and explain scientific investigations and the engineering process"**  
**Graded via:** Lab Set-up and Engineering Projects

**Explain:** Scientific Content and Knowledge  
**"I can use scientific language, math, and models to demonstrate my knowledge and solve problems"**  
**Graded via:** Quizzes and Tests

**Analyze:** Analyzing Data and Arguing from Evidence  
**"I can organize data and cite it as evidence to make scientifically-supported claims"**  
**Graded via:** Lab Conclusions and Claim-Evidence-Reasoning activities

**Reflect:** The Impacts of Using Science and Engineering  
**"I can explain how science and engineering are applied to address specific problems or issues"**  
**Graded via:** Reflections, quizzes, and current events

- C. Grades are more simple in Proficiency Grading; there are only 4:
- a. HP - 4 - **Highly Proficient**, you're a wizard at this
  - b. P - 3 - **Proficient**, you understand how to do this
  - c. CP - 2 - **Close to Proficient**, you are near the expected understanding
  - d. D - 1 - **Developing**, I like this language because it reflects the way I want students to approach this class, with a [growth mindset rather than a fixed one.](#)
- D. **Final Grades** - I will calculate your final grade using the average of all the categories:
- a. 3.5+ earns an A
  - b. 3-3.4 average earns a B
  - c. 2.5-2.9 average earns a C

I appreciate you reading this far into the syllabus! This remains a work in progress, so please check back at [physicspdx.com/syllabus](http://physicspdx.com/syllabus) any time you'd like to check on this class.

### Honors

Physics NGSS students have the opportunity to earn honors credit for this class by choosing the more appropriate challenge for themselves and completing independent projects. Learn more at [physicspdx.com/honors](http://physicspdx.com/honors)

Honors students will earn a special designation on their official transcript so that colleges can see that they pursued a higher level of science education. The honors projects are NOT simply extra work - I want them to be meaningful opportunities to explore the depth of physics.

Some opportunities will ask students to explore the incredible depth of science and Physics, while others will ask students to practice general skills, like making videos that help other students or completing an assignment to try out one of our electives.

The other key to honors work is choice - students can choose from the opportunities listed at [physicspx.com/honors](http://physicspx.com/honors) and fulfill their 10 point requirement in a variety of ways.

**This syllabus is a work in progress** - please check the link you followed here at any time to see an updated version. I encourage you to let me know if you have any questions.