



# PHYSICS 12

TEACHER: Mr. Basil Williams

ROOM: 109

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TEXTBOOK: BC Physics 12

## COURSE OBJECTIVE

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Physics 12 deepens students' understanding of the principles that govern motion, forces, fields, energy, and momentum. Through inquiry-based learning, experimentation, and problem-solving. Also, this course will emphasize curricular competencies of reasoning, problem-solving, and communication.

### **Students will:**

- Apply the scientific method to analyze phenomena.
- Develop critical and analytical skills through modeling and data analysis.
- Communicate using scientific language, mathematics, and diagrams.
- Explore both theoretical concepts and real-world applications of physics.
- Engage in inquiry-based learning and laboratory investigations.
- Develop scientific reasoning, quantitative analysis, and data interpretation skills.
- Apply physics concepts to real-world problems and technologies.
- Communicate ideas using clear mathematical, graphical, and written forms.

### **Big Ideas (BC Curriculum):**

- Forces influence the motion of objects.
- Energy is conserved, and its transformation is understood through systems.
- Momentum is conserved within closed systems.
- Fields describe interactions at a distance.
- The theory of relativity helps us understand time, space, and energy.
- Wave phenomena explain many natural and technological processes.

## SUPPLEMENTARY RESOURCES

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Book: *Physics of the Impossible* – Michio Kaku

Book: *Six Easy Pieces* – Richard Feynman

Book: *How Not to Be Wrong: The Power of Mathematical Thinking* – Jordan Ellenberg

Book: *Astrophysics for People in a Hurry* – Neil deGrasse Tyson



## COURSE CONTENT

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Unit 0: Scientific Method & Problem-Solving Strategies

Unit 1: Vectors and Static Equilibrium

Unit 2: Kinematics in One and Two Dimensions

Unit 3: Momentum and Energy I

Unit 4: Momentum and Energy II

Unit 5: Special Relativity

Unit 6: Circular Motion and Gravitation

Unit 7: Electrostatics

Unit 8: Magnetic Forces

Unit 9: Electromagnetic Induction

Unit 10: Waves and Optics (*Light, Sound, Interference, Diffraction, EM Spectrum*)

Final Exam Preparation & Review

## SUPPLIES

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2-inch 3-RING binder with lined paper

Pencils, eraser, Ruler\*, Protractor\*, Compass (OR \*Complete Geometry set)

Scientific or Graphing Calculator (Recommended models: TI-83/84)

## MARK BREAKDOWN

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### Classwork 20%

Includes readings, activities, and workbook assignments.

### Labs and Quizzes and Tests 25%

Includes lab investigations and quizzes following each unit.

### Tests 10%

Includes lab investigations and quizzes following each unit.

### Mid and Term Finals 20%

Cumulative tests covering multiple units.

### Final Project 5%

Includes term-based and final projects designed to apply learning.

### Final Exam 20%

A comprehensive exam covering the entire course.



## Assessment Philosophy

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The assessments are designed to promote growth, measure understanding, and reflect the diverse skills needed in scientific learning. Students will be assessed through a variety of formats, including classwork, laboratory investigations, quizzes, projects, and exams. Emphasis on problem-solving encourage persistence, creativity, and the use of multiple strategies, and a growth mindset.

Classwork, practice problems, and in-class activities provide regular feedback and opportunities to improve.

Quizzes and tests measure student achievement of learning standards and the application of knowledge and inquiry skills.

Laboratory investigations emphasize accurate measurement, effective data analysis, and clear communication of results.

Final Project allows students to demonstrate their ability to communicate scientific ideas, make real-world connections, and reflect on the role of physics in society.

Midterm, term finals, final exams measure mastery of concepts and readiness for post-secondary studies.

The overall goal of assessment is not only to evaluate student achievement but also to help students reflect on their progress, build confidence in applying physics concepts, and prepare for future scientific learning.