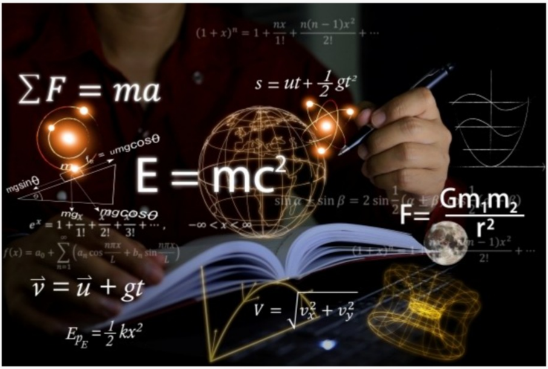
Collapse all

Physics, Part 1

ATTENTION

Grading at the end of the semester can take 7 school days!
Submit your **last assignment two weeks** before your school's semester ends.


$(1+x)^n = 1 + \frac{nx}{1!} + \frac{n(n-1)x^2}{2!} + \cdots$
$\sum F = ma$
$s = ut + \frac{1}{2}gt^2$
$f_k = \mu mg\cos\theta$
$mg\sin\theta$
$E = mc^2$
$\sin\alpha + \sin\beta = 2\sin\frac{1}{2}(\alpha+\beta)$
$F = \frac{Gm_1m_2}{r^2}$
mg_x
$mg\cos\theta$
$e^x = 1 + \frac{x}{1!} + \frac{x^2}{2!} + \frac{x^3}{3!} + \cdots,$
$-\infty < x < \infty$
$f(x) = a_0 + \sum_{n=1}^{\infty}\left(a_n\cos\frac{n\pi x}{L} + b_n\sin\frac{n\pi x}{L}\right)$
$\vec{v} = \vec{u} + gt$
$V = \sqrt{v_x^2 + v_y^2}$
$E_{P_E} = \frac{1}{2}kx^2$

The prerequisites for this course are: Algebra 1, Geometry, and Algebra 2 (co-requisite)

OR

Integrated Math 1, Integrated Math 2, and Integrated Math 3 (co-requisite)

How to Take This Course

Complete all the quizzes and the assignment in each unit. Once the quizzes for a unit are complete, you will have access to the unit test. We recommend you complete the unit assignment before you attempt the unit test; the assignment will help you prepare. You will have access to the final after you have been enrolled in the course for at least 30 days, all unit tests are completed, and your assignments are graded.

Allow 3-4 school days for an assignment to be graded. To understand the course grading, read the full course instructions.

- Course Instructions
- How This Course Works & Suggested Timeline
- Submitting Your Assignments
- List of Lab Supplies and Equipment

This is a laboratory science course; all assignments are mandatory. Each unit will have a lab investigation. You need to complete each lab as directed and submit your lab write-up.

You do NOT have to purchase a lab kit. Here is a **list of supplies and equipment** that you will need for the course. Note that some labs have a 'Virtual Lab Assistant' option for students who cannot get the required materials.

Ask The Teacher

Meet your teacher for this course and ask a question.

Need help with the course? We offer online tutoring; find more details about it here.

MANDATORY QUIZ

Completion

You are required to take this quiz before you start the course. To prepare, read the course instructions and the "submitting your assignments" document, watch the video on the how this course works page and review the suggested timeline.

Learning Objectives & Standards Met By This Course

Unit 1: Kinematics

In this unit, you will explore one-dimensional motion, including key differences between distance and displacement, speed and velocity, and average versus instantaneous rates. You will examine both positive and negative acceleration, as well as free fall. Finally, you will apply the kinematic equations to analyze and model the relationship between position and time.

Unit 1 Study Guide

This study guide will help you preview the concepts and guide your learning as each new skill or concept is introduced. Use this study guide as the foundation of your notes. You may use it on the unit quizzes, unit tests, and course final.

Click on the link above, and make a copy of the file; you can open the document in Google docs. If you prefer to print it, it is available as a PDF.

1.1 Distance and Displacement

Quiz 1.1

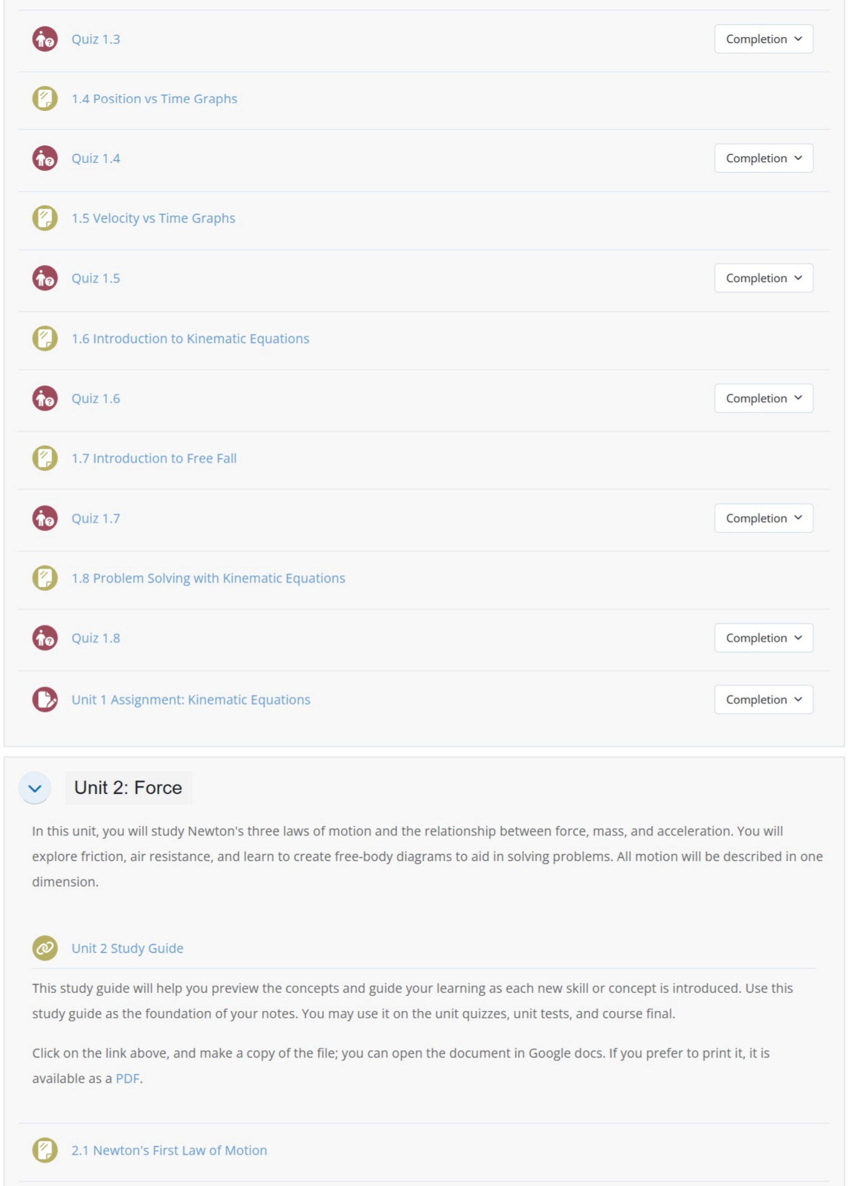
Completion

1.2 Speed and Velocity

Quiz 1.2

Completion

1.3 Acceleration



Quiz 1.3 — Completion

1.4 Position vs Time Graphs

Quiz 1.4 — Completion

1.5 Velocity vs Time Graphs

Quiz 1.5 — Completion

1.6 Introduction to Kinematic Equations

Quiz 1.6 — Completion

1.7 Introduction to Free Fall

Quiz 1.7 — Completion

1.8 Problem Solving with Kinematic Equations

Quiz 1.8 — Completion

Unit 1 Assignment: Kinematic Equations — Completion

Unit 2: Force

In this unit, you will study Newton's three laws of motion and the relationship between force, mass, and acceleration. You will explore friction, air resistance, and learn to create free-body diagrams to aid in solving problems. All motion will be described in one dimension.

Unit 2 Study Guide

This study guide will help you preview the concepts and guide your learning as each new skill or concept is introduced. Use this study guide as the foundation of your notes. You may use it on the unit quizzes, unit tests, and course final.

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2.1 Newton's First Law of Motion

Quiz 2.1 Completion

2.2 What is a Force?

Quiz 2.2 Completion

2.3 Free-Body Diagrams and Net Force

Quiz 2.3 Completion

2.4 Friction

Quiz 2.4 Completion

2.5 Newton's Second Law of Motion (F = ma)

Quiz 2.5 Completion

2.6 Finding Forces Using the Second Law

Quiz 2.6 Completion

2.7 Newton's Third Law of Motion

Quiz 2.7 Completion

Unit 2 Assignment: Newton's Laws Completion

Unit 3: Motion and Force in Two Dimensions

In this unit, you will deepen your understanding of vectors and learn how to resolve them into components. You will explore projectile motion and horizontal motion, then build on this knowledge to analyze forces applied at angles. You will calculate various types of forces, including normal force, friction, gravity, and the horizontal and vertical components of angled forces. The unit also covers forces in two dimensions, static equilibrium, and concludes with analyzing motion and forces on an inclined plane.

Unit 3 Study Guide

This study guide will help you preview the concepts and guide your learning as each new skill or concept is introduced. Use this study guide as the foundation of your notes. You may use it on the unit quizzes, unit tests, and course final.

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3.1 An Introduction to Vectors

Quiz 3.1 Completion

3.2 Vector Components and More Vector Addition

Quiz 3.2 Completion

3.3 What is Projectile Motion?

Quiz 3.3 Completion

3.4 Horizontal Projectiles

Quiz 3.4 Completion

3.5 Non-Horizontal Projectiles

Quiz 3.5 Completion

3.6 Forces in Two Dimensions and Static Equilibrium

Quiz 3.6 Completion

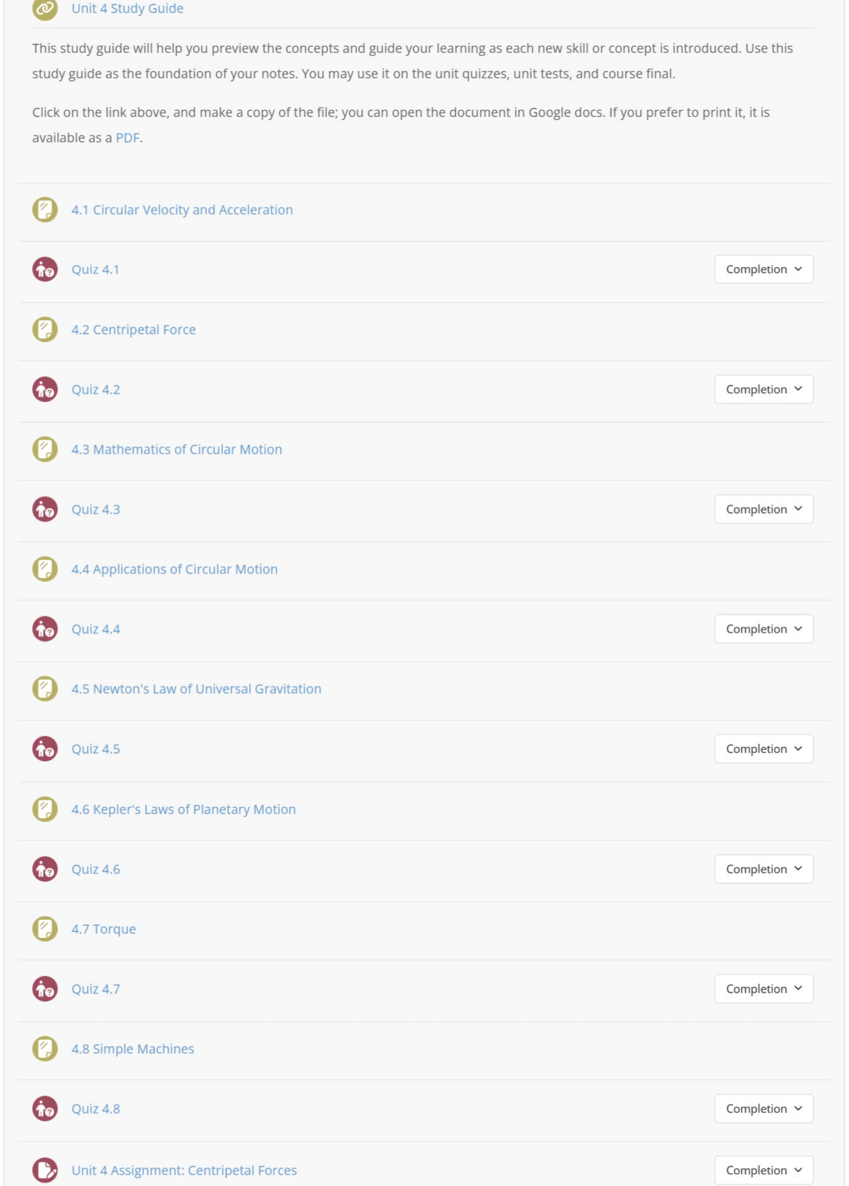
3.7 Newton's 2nd Law in Two Dimensions

Quiz 3.7 Completion

Unit 3 Assignment: Vectors and Projectile Motion Completion

Unit 4: Circular Motion & Gravitation

In this unit, you will explore circular motion and simple machines. You'll examine key concepts such as centripetal force, circular velocity, and acceleration, along with their real-world applications. The unit also introduces Newton's law of universal gravitation and Kepler's laws of planetary motion. Finally, you will investigate torque and the mechanics of simple machines.



Unit 4 Study Guide

This study guide will help you preview the concepts and guide your learning as each new skill or concept is introduced. Use this study guide as the foundation of your notes. You may use it on the unit quizzes, unit tests, and course final.

Click on the link above, and make a copy of the file; you can open the document in Google docs. If you prefer to print it, it is available as a PDF.

4.1 Circular Velocity and Acceleration	
Quiz 4.1	Completion ⌄
4.2 Centripetal Force	
Quiz 4.2	Completion ⌄
4.3 Mathematics of Circular Motion	
Quiz 4.3	Completion ⌄
4.4 Applications of Circular Motion	
Quiz 4.4	Completion ⌄
4.5 Newton's Law of Universal Gravitation	
Quiz 4.5	Completion ⌄
4.6 Kepler's Laws of Planetary Motion	
Quiz 4.6	Completion ⌄
4.7 Torque	
Quiz 4.7	Completion ⌄
4.8 Simple Machines	
Quiz 4.8	Completion ⌄
Unit 4 Assignment: Centripetal Forces	Completion ⌄

Unit 5: Work, Energy and Power

In this unit, you will explore the concepts of work, energy, and power. You'll learn how to define and calculate work, and how it relates to energy and power in physical systems. The unit covers various forms of energy, including potential, kinetic, chemical, thermal, and electrical. You will also examine the law of conservation of energy through transfers between potential and kinetic energy in both closed and open systems. Real-world applications, such as roller coasters, skiing, and braking a car, will help you see how physics plays a role in everyday experiences.

Unit 5 Study Guide

This study guide will help you preview the concepts and guide your learning as each new skill or concept is introduced. Use this study guide as the foundation of your notes. You may use it on the unit quizzes, unit tests, and course final.

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5.1 Work and Power

Quiz 5.1 — Completion ⌄

5.2 Mechanical Energy

Quiz 5.2 — Completion ⌄

5.3 Work/Energy Relationship

Quiz 5.3 — Completion ⌄

5.4 Conservation of Energy

Quiz 5.4 — Completion ⌄

5.5 Other Forms of Energy

Quiz 5.5 — Completion ⌄

Unit 5 Assignment: Energy in a Pendulum — Completion ⌄

Unit 6: Momentum

In this unit, you will explore momentum, impulse, collisions, and explosions. You'll examine how mass and velocity influence momentum and investigate the differences between elastic and inelastic collisions. You'll also apply the law of conservation of momentum and analyze whether kinetic energy is conserved in various collision scenarios. The unit concludes with an introduction to angular momentum.

Unit 6 Study Guide

This study guide will help you preview the concepts and guide your learning as each new skill or concept is introduced. Use this study guide as the foundation of your notes. You may use it on the unit quizzes, unit tests, and course final.

Click on the link above, and make a copy of the file; you can open the document in Google docs. If you prefer to print it, it is available as a PDF.

6.1 Momentum and Impulse

Quiz 6.1 Completion

6.2 Conservation of Momentum

Quiz 6.2 Completion

6.3 Elastic and Inelastic Collisions

Quiz 6.3 Completion

6.4 Conserving Momentum in Explosions

Quiz 6.4 Completion

6.5 Angular Momentum

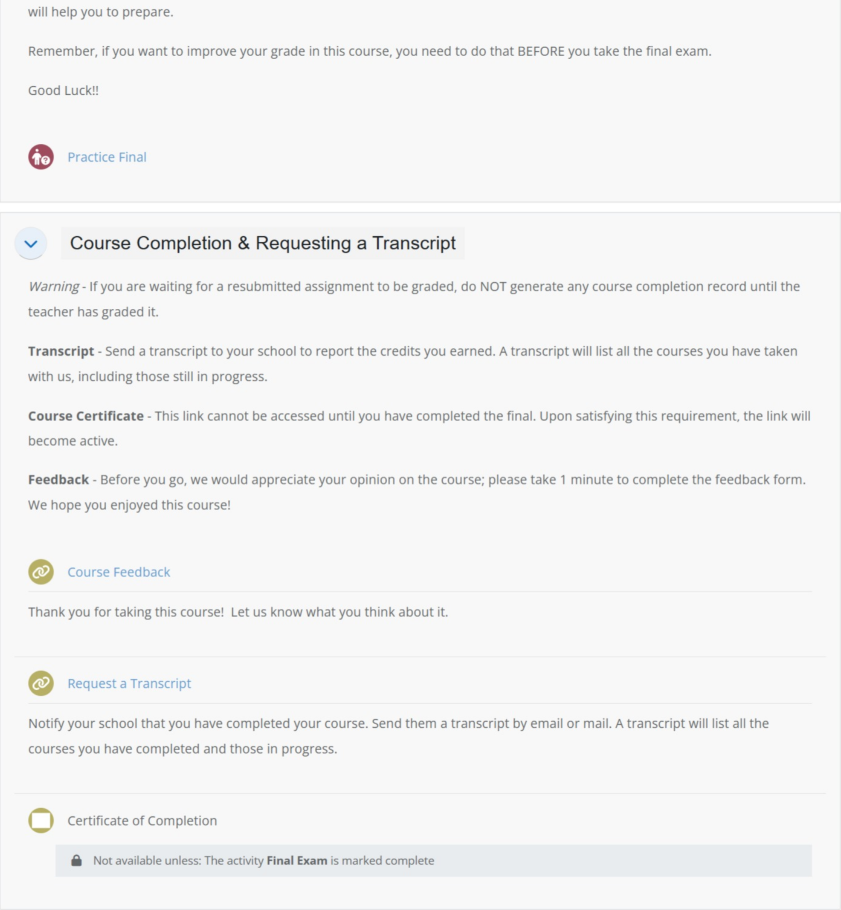
Quiz 6.5 Completion

Unit 6 Assignment: Momentum Completion

Final Exam

Once you have completed all of the unit tests and all of your assignments have been graded, the final exam will become visible.

Warning: You have only ONE attempt at the final. Are you ready to take the final? We highly recommend you take the practice final first, and if you are weak in any area, review the relevant course material again. You have unlimited attempts at the practice final; it



will help you to prepare.

Remember, if you want to improve your grade in this course, you need to do that BEFORE you take the final exam.

Good Luck!!

Practice Final

Course Completion & Requesting a Transcript

Warning - If you are waiting for a resubmitted assignment to be graded, do NOT generate any course completion record until the teacher has graded it.

Transcript - Send a transcript to your school to report the credits you earned. A transcript will list all the courses you have taken with us, including those still in progress.

Course Certificate - This link cannot be accessed until you have completed the final. Upon satisfying this requirement, the link will become active.

Feedback - Before you go, we would appreciate your opinion on the course; please take 1 minute to complete the feedback form. We hope you enjoyed this course!

Course Feedback

Thank you for taking this course! Let us know what you think about it.

Request a Transcript

Notify your school that you have completed your course. Send them a transcript by email or mail. A transcript will list all the courses you have completed and those in progress.

Certificate of Completion

🔒 Not available unless: The activity **Final Exam** is marked complete