

PHYSICAL SCIENCE, SEMESTER B

COURSE OVERVIEW

Physical Science offers a focused curriculum designed around the understanding of foundational physical science concepts, including the nature of matter, energy, and forces, as well as the application of scientific and engineering practices.

Course topics include energy, forces, electromagnetism, waves, matter, chemical reactions, and nuclear reactions. Teacher-scored labs encourage students to apply the scientific method.

Students discover new concepts through guided instruction and confirm their understanding in an interactive, feedback-rich environment. Scientific inquiry skills are embedded in the direct instruction, wherein students learn to ask scientific questions, form and test hypotheses, and use logic and evidence to draw conclusions about the concepts.

A variety of activities encourage students to think scientifically. Labs and projects reinforce critical thinking, writing, and communication skills and help students develop a deeper understanding of the nature of science and engineering. Virtual labs allow students to engage in investigations that would otherwise require long periods of observation at remote locations and to explore simulations that scientists use to test predictions. In discussion activities, students compare their lab results and exchange ideas about their investigations. Practice and explore activities provide additional opportunities for students to apply learned concepts and practice their writing and scientific reasoning skills.

This course is built to state standards.

[Lab materials needed for this course](#)

COURSE COMPONENTS AND GRADING RUBRIC

The table gives a breakdown of the weight for each component in the course. Weight represents the percentage of the total score coming from each activity.

Course Components	Count	Weight
Pretest. <i>A pretest is an optional assessment, typically designed for credit recovery. If a student shows mastery of a lesson objective, the student may be automatically exempted from the upcoming activities associated with the mastered objective. Each passing pretest grade is entered into the gradebook.</i>	4	0%

Course Components	Count	Weight
Practice. A practice activity provides instruction similar to that found in a study so that students can practice or review skills necessary to complete their assignment with mastery.	3	10%
Discussion. A discussion activity is an opportunity for students to collaborate with their peers. This activity gives students the opportunity to practice speaking and listening in a clear and logical manner and to receive feedback from peers.	1	5%
Explore. An explore activity gives students the opportunity to conduct research, evaluate source materials, and synthesize information.	2	5%
Project. A project is a hands-on investigation that extends over several weeks.	2	10%
Lab. A lab is a hands-on investigatory activity that can be completed in a couple of class periods. It can include virtual labs, modeling exercises, and engineering design activities.	1	0%
Mastery Test. A mastery test is a computer-scored lesson-level summative assessment.	18	40%
Posttest. A posttest appears at the end of each unit.	4	20%
End-of-Semester Test. An end-of-semester test (EOS) appears at the end of each course.	1	10%
Total	36	100%

*Teachers may manually adjust these weights if desired, per district grading requirements.

UNIT 1: WAVES

Lesson and Duration	Description
Pretest: Waves 40 minutes	Complete the pretest (optional).
Waves: Unit Overview 1 minute	Read the unit overview.
LESSON 1 Wave Properties and Interactions: Lesson Overview 5 minutes	Read the lesson objectives.
Wave Properties: Study 1 hour	Learn about properties that all waves share.

Lesson and Duration	Description
Wave Properties: Mastery Test <i>20 minutes</i>	Take a quiz to assess your understanding of the material.
Wave Interactions: Study <i>1 hour</i>	Learn what happens when waves interact with matter and other waves.
Wave Interactions: Mastery Test <i>20 minutes</i>	Take a quiz to assess your understanding of the material.
LESSON 2 Electromagnetic Waves: Lesson Overview <i>5 minutes</i>	Read the lesson objectives.
Electromagnetic Radiation: Study <i>1 hour</i>	Learn about electromagnetic radiation.
Electromagnetic Radiation: Mastery Test <i>20 minutes</i>	Take a quiz to assess your understanding of the material.
Explore: Electromagnetic Radiation <i>3 hours</i>	Research claims about electromagnetic radiation.
Wave-Particle Duality: Study <i>1 hour</i>	Learn about the dual nature of light waves.
Wave-Particle Duality: Mastery Test <i>20 minutes</i>	Take a quiz to assess your understanding of the material.
Practice: Wave-Particle Duality <i>40 minutes</i>	Answer open-response questions to assess your understanding of the material.
LESSON 3 Applications of Waves: Lesson Overview <i>5 minutes</i>	Read the lesson objectives.
Introduction to Wave Technology: Study <i>1 hour</i>	Learn about types of technology that make use of waves.

Lesson and Duration	Description
Introduction to Wave Technology: Mastery Test <i>20 minutes</i>	Take a quiz to assess your understanding of the material.
Digital Technology: Study <i>1 hour</i>	Learn the differences between digital and analog technologies.
Digital Technology: Mastery Test <i>20 minutes</i>	Take a quiz to assess your understanding of the material.
Practice: Applications of Waves <i>40 minutes</i>	Answer open-response questions to assess your understanding of the material.
UNIT 1 WRAP-UP Waves: Review <i>30 minutes</i>	Review what you have learned in this unit.
Posttest: Waves <i>30 minutes</i>	Take a computer-scored test to assess what you have learned in this unit.

UNIT 2: STRUCTURE AND PROPERTIES OF MATTER

Lesson and Duration	Description
Pretest: Structure and Properties of Matter <i>40 minutes</i>	Complete the pretest (optional).
Structure and Properties of Matter: Unit Overview <i>1 minute</i>	Read the unit overview.
LESSON 1 Structure of Matter: Lesson Overview <i>5 minutes</i>	Read the lesson objectives.
Types of Matter: Study <i>1 hour</i>	Learn about the structure of matter.
Types of Matter: Mastery Test <i>20 minutes</i>	Take a quiz to assess your understanding of the material.

Lesson and Duration	Description
The Periodic Table: Study <i>1 hour</i>	Learn how the periodic table is used to organize elements.
The Periodic Table: Mastery Test <i>20 minutes</i>	Take a quiz to assess your understanding of the material.
Chemical Bonds: Study <i>1 hour</i>	Learn the different ways that atoms and ions can form bonds.
Chemical Bonds: Mastery Test <i>20 minutes</i>	Take a quiz to assess your understanding of the material.
LESSON 2 Properties of Matter: Lesson Overview <i>5 minutes</i>	Read the lesson objectives.
Properties of Matter, Part 1: Study <i>1 hour</i>	Learn about physical and chemical properties of matter.
Properties of Matter, Part 1: Mastery Test <i>20 minutes</i>	Take a quiz to assess your understanding of the material.
Explore: Properties of Matter <i>3 hours</i>	Analyze, evaluate, and critique scientific explanations regarding the functioning of designed materials.
Lab: Properties of Matter, Part 2 <i>3 hours</i>	Plan and conduct an investigation to infer the strength of electrical forces between particles that make up various substances.
Properties of Matter, Part 2: Mastery Test <i>25 minutes</i>	Take a quiz to assess your understanding of the material.
Prepare to Discuss: Properties of Matter <i>5 minutes</i>	Prepare for a discussion.
Discuss: Properties of Matter <i>20 minutes</i>	Discuss your lab results.

Lesson and Duration	Description
UNIT 2 WRAP-UP Structure and Properties of Matter: Review <i>30 minutes</i>	Review what you have learned in this unit.
Posttest: Structure and Properties of Matter <i>30 minutes</i>	Take a computer-scored test to assess what you have learned in this unit.

UNIT 3: CHEMICAL REACTIONS

Lesson and Duration	Description
Pretest: Chemical Reactions <i>40 minutes</i>	Complete the pretest (optional).
Chemical Reactions: Unit Overview <i>1 minute</i>	Read the unit overview.
LESSON 1 Describing Chemical Reactions: Lesson Overview <i>5 minutes</i>	Read the lesson objectives.
Chemical Equations: Study <i>1 hour</i>	Learn how to write and interpret chemical equations.
Chemical Equations: Mastery Test <i>20 minutes</i>	Take a quiz to assess your understanding of the material.
Types of Chemical Reactions: Study <i>1 hour</i>	Learn about different types of chemical reactions.
Types of Chemical Reactions: Mastery Test <i>20 minutes</i>	Take a quiz to assess your understanding of the material.
Practice: Describing Chemical Reactions <i>40 minutes</i>	Answer open-response questions to assess your understanding of the material.

Lesson and Duration	Description
LESSON 2 Factors Affecting Chemical Reactions: Lesson Overview <i>5 minutes</i>	Read the lesson objectives.
Energy of Chemical Reactions: Study <i>1 hour</i>	Learn about endothermic and exothermic chemical reactions.
Energy of Chemical Reactions: Mastery Test <i>20 minutes</i>	Take a quiz to assess your understanding of the material.
Project: Bond Energies <i>4 hours</i>	Develop a model to illustrate that a chemical reaction system's release or absorption of energy depends upon the changes in total bond energy.
Reaction Rates: Study <i>1 hour</i>	Learn the factors that affect the rate of a chemical reaction.
Reaction Rates: Mastery Test <i>20 minutes</i>	Take a quiz to assess your understanding of the material.
Dynamic Equilibrium: Study <i>1 hour</i>	Learn about chemical reactions that are reversible.
Dynamic Equilibrium: Mastery Test <i>20 minutes</i>	Take a quiz to assess your understanding of the material.
UNIT 3 WRAP-UP Chemical Reactions: Review <i>30 minutes</i>	Review what you have learned in this unit.
Posttest: Chemical Reactions <i>30 minutes</i>	Take a computer-scored test to assess what you have learned in this unit.

UNIT 4: NUCLEAR REACTIONS

Lesson and Duration	Description
Pretest: Nuclear Reactions <i>40 minutes</i>	Complete the pretest (optional).

Lesson and Duration	Description
Nuclear Reactions: Unit Overview <i>1 minute</i>	Read the unit overview.
LESSON 1 Fission, Fusion, and Radioactive Decay: Lesson Overview <i>5 minutes</i>	Read the lesson objectives.
Fission and Fusion: Study <i>1 hour</i>	Learn about the processes of fission and fusion.
Fission and Fusion: Mastery Test <i>20 minutes</i>	Take a quiz to assess your understanding of the material.
Radioactive Decay: Study <i>1 hour</i>	Learn about the process of radioactive decay.
Radioactive Decay: Mastery Test <i>20 minutes</i>	Take a quiz to assess your understanding of the material.
LESSON 2 Modeling Nuclear Reactions: Lesson Overview <i>5 minutes</i>	Read the lesson objectives.
Project: Modeling Nuclear Reactions <i>4 hours</i>	Model nuclear reactions.
UNIT 4 WRAP-UP Nuclear Reactions: Review <i>30 minutes</i>	Review what you have learned in this unit.
Posttest: Nuclear Reactions <i>30 minutes</i>	Take a computer-scored test to assess what you have learned in this unit.

SEMESTER WRAP-UP

Lesson and Duration	Description
Semester Review: Review <i>30 minutes</i>	Review what you have learned in this semester.

Lesson and Duration	Description
End-of-Semester Test: Semester Exam <i>40 minutes</i>	Take a computer-scored exam to demonstrate your mastery of concepts and skills covered in this semester.