

PHYSICAL SCIENCE SYLLABUS

COURSE OVERVIEW



Physical Science is the study of the nature and structure of matter and the characteristics of energy. Physical Science A begins with the exploration of the scientific method and how matter is measured. Students then delve deeper into the study of matter by investigating its properties and the forms in which it exists. Different states of matter are discussed as well as its ability to occur as elements, compounds, and mixtures. With this knowledge, students learn about the basic unit of a chemical element, the atom, including the history of its development. The course then describes the arrangement of elements in the periodic table, characteristics that different groups of elements have, and trends that can be observed along the rows and columns of the periodic table. The last part of the course encompasses why chemical reactions occur, how elements combine with each other, and properties of chemicals such as acids and bases, and organic compounds. The course also introduces students to laboratory principles and practices.

Physical Science is the study of the nature and structure of matter and the characteristics of energy. Physical Science B begins with the study of energy in its different forms, its ability to convert from one form to another, and the different ways in which energy travels. Students then delve deeper into different forms of energy, starting with the study of light as an electromagnetic wave and learning about many other kinds of electromagnetic waves. Following this, they will move into sound energy and explore what causes sound and how it is transmitted. Students will continue their exploration of energy by investigating electricity, including different types of electric circuits and ways in which electricity can be generated. Along with this, they will learn about heat,

how it relates to energy, and the ways in which heat is transferred from one object to another. The study of motion and forces comes next and will cover measuring motion, friction, and gravity and its influence on matter. In the final unit of the course, students will explore the scientific meaning of the word work and learn how machines make work easier.

Completion of both semesters of this course provides a solid foundation for continuing study of chemistry and physics.

COURSE PREREQUISITES

None

COURSE LENGTH

1 Semester (part B is another semester)

REQUIRED TEXT

None

PRINTABLE LESSONS

At the end of each Unit Overview you will find a link to a printable pdf that contains all of the lesson text for that unit.

COURSE LEARNING OUTCOMES



BIG IDEAS

- Students will explore what physical science encompasses.
- Students will gain the ability to conduct inquiry using the scientific method and perform experiments.
- Students will learn how to make accurate measurements using the metric system and make conversions among metric units.
- Students will be able to express numbers in scientific notation.
- Students will construct and use models and simulations to illustrate and explain phenomena.
- Students will investigate the basic properties of matter.
- Students will learn about the states of matter.
- Students will examine elements, compounds, and mixtures.
- Students will study modern and historic models of atomic structure.
- Students will explore how the periodic table is organized and understand relationships between groups of elements.
- Students will be able to describe how different types of elements bond with each other and make predictions of whether an atom is likely to form bonds.
- Students will study chemical changes and how they relate to the Law of Conservation of Energy.
- Students will investigate different types of chemical compounds, including ionic and covalent compounds; acids, bases and salts; and organic compounds.
- Students will meet all the above objectives using real-world examples and make connections across content and subject areas.
- Changes occur when energy is transferred from one place to another.
- Waves transfer energy from place to place without transferring matter.
- Electromagnetic waves are made of changing electric and magnetic fields.
- Light waves can be absorbed, reflected, and transmitted by matter.
- Sound waves are compressional waves produced by something that vibrates.
- Electricity results from tiny charged particles, and there is a relationship between electricity and magnetism.
- Heat can be transferred between objects in different ways.

- An object's motion changes if the forces acting on the object are unbalanced.
- A machine makes doing a job easier.

SCIENTIFIC INQUIRY



This course is designed to help students use scientific inquiry to come to understand the natural world, and to learn about scientific concepts. Labs and activities are presented in a way to allow students to develop knowledge and understandings through interacting with their environment, asking questions, and seeking ways to answer those questions.

Scientific inquiry is a powerful way of understanding science content. Students learn how to ask questions and use evidence to answer them. In the process of learning the strategies of scientific inquiry, students learn to conduct an investigation and collect evidence from a variety of sources, develop an explanation from the data, and communicate and defend their conclusions.

Scientific Inquiry based learning allows students to design and perform experiments. Students should maintain an open and questioning mind to pose their own questions about objects, events, processes, and results.

Students will have the opportunity to plan and conduct their own experiments, and come to their own conclusions as they read, observe, compare, describe, infer, and draw conclusions. It is important for students to understand that labs in this course are designed to allow the students to explore concepts and design their own experimentation.

Students should not expect all labs to be like a recipe where they just follow the direction and complete the lab. Students should be engaged in the labs and use them as a means of exploring the concepts presented in the lessons.

ASSIGNMENT DESCRIPTIONS

- **Packets** - Science Packets are used to help students organize their learning for each unit. They provide students with graphic organizers, guided notes, and other activities to support their understanding of the concepts presented in the lessons and labs. Packets can also serve as a study tool.
- **Labs** - Labs in this course are a combination of virtual and physical labs. You will receive a lab kit for most of the materials required in the physical labs. Labs are designed to allow students the opportunity to explore scientific concepts through experimentation and scientific inquiry. Students will pose their own questions about objects, events, processes, and results. They will plan and conduct their own experiments, and come to their own conclusions as they read, observe, compare, describe, infer, and draw conclusions. Some labs will provide students with step by step directions, but many will allow the students to develop their own procedures based on their questions and exploration.
- **Quizzes** - Quizzes give students an opportunity to practice skills learned in a lesson and apply concepts to real world situations in preparation for the Unit Test. Students should expect to apply knowledge of concepts and labs to questions in the quizzes.
- **Concept Checks** - Concept Checks are intended as self-assessments for students to determine where their strengths and weaknesses are in their understanding of the unit concepts. Concept Checks will also serve as a way for students to communicate to their instructors about questions they may have about the unit.
- **Unit Tests** - At the end of each unit students will take a Unit Test that will consist of a variety of questions types (multiple choice, short-answer, fill in the blank). These questions will be pulled from a questions bank and will be similar to questions seen in the Skills Practice assignments. Unit Tests will serve as a measurement of students understanding of the concepts from the unit and their ability to apply and transfer these understandings.

LAB KITS & SUPPLIES

Students will engage in virtual and physical labs throughout the course. Students will need the following materials and logins to complete the labs.

LAB KIT

You will need to order your lab kit by completing the form (link below). The kit will be shipped directly to your home and should take about 4-5 days to arrive. If you have any questions please contact your instructor.

<https://www.cmasas.org/lab-kit-request-form>

Lab Kit Inventory List (.pdf)

ADDITIONAL SUPPLIES

In addition to the supplies provided in the lab kit, students will also need to supply additional materials to complete the physical labs in the course. These are noted in a table at the beginning of each lab.

Extra Supply List (.pdf)

VIRTUAL LABS & LAB ALTERNATIVES

If you are living outside the United States you will need to speak to your instructor about virtual lab alternatives. These are done through Explore Learning (Gizmos). You will need to request login information from your instructor. To login please do the following:

- Click the link provided in the lab instructions.
- Enter your teachers username. This will be provided with your login information.
- Choose your class, then select your name and select your product (Gizmos).
- Enter your password.
- You should then see a list of all the virtual labs available for your course. Each lab will list the name of the Gizmo you will need to complete for that lab assignment.

GRADING POLICY



High scores will be taken for each assignment and quiz. Students are expected to complete each assignment at Mastery level (80%) or higher.

Grades will be calculated as follows:

Scores in each category will be added together and divided by total possible points for that category and then multiplied by the weight of the category.

CATEGORY WEIGHTS

- Labs = 40%
- Unit Tests = 20%
- Quizzes = 20%
- Packets = 10%
- Concept Checks = 10%

GRADE SCALE:

Percentage	Letter Grade	GPA
95 - 100	A	4.0
90 - 94.9	A-	3.7

87 - 89.9	B+	3.3
83 - 86.9	B	3.0
80 - 82.9	B-	2.7

TECHNICAL REQUIREMENTS



PREREQUISITE SKILLS

Before you begin, you should be able to:

- Complete basic operations with a word processing software.
- Complete basic operations with presentation software.
- Perform online research using various search engines.
- Communicate through email.

CONTACT TECHNICAL SUPPORT

1. Check the [technical support webpage](#) to see if your issue is listed.
2. If your technical issue is not addressed on the technical support page then fill out a [support ticket](#).

CMASAS HONOR CODE



CMASAS is a virtual community where we want all who join our school to feel valued. As a member of our community you have a responsibility to help build this type of environment by following our school's honor code. The honor code is outlined in the Parent-Student Handbook but we have provided a brief overview below.

- **Global citizenship:** Students are responsible for good behavior in our virtual hallways, just as they are in a classroom or a school hallway. Always use a computer in a way that shows consideration and respect. You are not to use obscene, profane, threatening, or disrespectful language. CMASAS expects students to adhere to the local and country laws applicable to them.
- **Act with academic integrity:** Integrity and authenticity of student work is something that we take very seriously at CMASAS. Do not cut, copy, or plagiarize internet content or the work of your online classmates.
- **Be mindful of copyrights:** Just as copying someone's writing is considered plagiarizing, so is the act of using someone else's photo, comic, joke, or quote without giving proper credit to its creator or author.
- **Be kind:** Communicate in a respectful and kind way, keeping comments and subject matter in posts appropriate.

- **Don't troll:** Avoid hijacking conversation threads for personal gain or steering conversation toward off-topic subjects or personal attacks toward another user.
- **Be sensitive to privacy:** Always limit your audience to a need-to-know basis.
- **Limit the spread of spam:** Spam is the equivalent of junk mail that clogs email inboxes and offers little professional or personal value while potentially opening up the users to hacking.
- **Use proper spelling and grammar:** Communicate with others using proper spelling and grammar. Save acronyms, web jargon, and shorthand for its prospective audience if it must be used at all.
- **Exercise self-control and open mindedness:** All students should exercise self-control, think before speaking, and look for value in the opinions of others.
- **Be respectful:** CMASAS requires that all comments made and opposing viewpoints expressed be done in nonconfrontational and respectful manner.
- **Consider consequences and protect yourself:** Think about the social consequences of any publicly accessible online community forum or other program you interact with.
- **Follow school policies:** All students must follow CMASAS school policies listed at the end of the Parent-Student Handbook.

ACADEMIC INTEGRITY

Academic integrity is founded upon and encompasses the following five values: **honesty, trust, fairness, respect, and responsibility**. Supporting and affirming these values is essential to promoting and maintaining a high level of academic integrity. Each member of the academic community must stand accountable for his or her actions. As a result, a community develops in which students learn the responsibilities of citizenship and how to contribute honorably to their professions.

The first responsibility for academic integrity lies with individual students and faculty members of this community. A violation of academic integrity is an act harmful to all other students, faculty, and the school. Deceit and misrepresentations are incompatible with the fundamental activity of this academic institution and shall not be tolerated. Members of the CMASAS community are expected to foster in their own work the spirit of academic honesty and not to tolerate its abuse by others. This Academic Integrity Policy encompasses the duration of the student's enrollment with CMASAS.

Students are expected to practice responsible and honest behavior. Acts of academic dishonesty will not be tolerated at CMASAS and typical offenses are listed but not limited to the following:

- Copying material from other sources and claiming it as your own without citation.
- Soliciting answers from other students, online forums, or search engines.
- Intentional falsification or invention of date, citation, or other authority in an academic exercise.
- Taking someone else's work or ideas as your own, with or without their consent, by incorporating it into your work without full acknowledgment.
- Theft or alteration of materials.