

Washtenaw Community College Comprehensive Report

PHS 100 Physical Science for Educators Effective Term: Fall 2025

Course Cover

College: Math, Science and Engineering Tech

Division: Math, Science and Engineering Tech

Department: Physical Sciences

Discipline: Physical Sciences

Course Number: 100

Org Number: 12300

Full Course Title: Physical Science for Educators

Transcript Title: Physical Science for Educators

Is Consultation with other department(s) required: No

Publish in the Following: College Catalog , Time Schedule , Web Page

Reason for Submission: New Course

Change Information:

Rationale: New course to align with changes in Next Generation Science Standards and the State of Michigan Standards for Science Education for the preparation of PK-6 teachers.

Proposed Start Semester: Fall 2025

Course Description: In this course, students will deepen their understanding of scientific concepts through hands-on and collaborative learning experiences with scientific inquiry across various physical science disciplines, including chemistry, earth and space science, engineering, environmental science, and physics. Students will engage in multiple learning experiences to support their ability to plan, implement, and assess science instruction. This lab science course is designed for future elementary educators (grades PK-6).

Course Credit Hours

Variable hours: No

Credits: 4

Lecture Hours: Instructor: 45 **Student:** 45

Lab: Instructor: 45 **Student:** 45

Clinical: Instructor: 0 **Student:** 0

Total Contact Hours: Instructor: 90 **Student:** 90

Repeatable for Credit: NO

Grading Methods: Letter Grades

Audit

Are lectures, labs, or clinicals offered as separate sections?: NO (same sections)

College-Level Reading and Writing

College-level Reading & Writing

College-Level Math

No Level Required

Requisites

General Education

Request Course Transfer

Proposed For:

Eastern Michigan University
 Ferris State University
 Grand Valley State University
 Michigan State University
 Oakland University
 University of Detroit - Mercy
 University of Michigan
 Wayne State University
 Western Michigan University
 Central Michigan University

Student Learning Outcomes

1. Demonstrate knowledge of the principles and concepts associated with physical science, including chemistry, earth and space science, engineering, environmental science, and physics.

Assessment 1

Assessment Tool: Outcome-related quiz questions

Assessment Date: Fall 2028

Assessment Cycle: Every Three Years

Course section(s)/other population: All

Number students to be assessed: All

How the assessment will be scored: Answer key

Standard of success to be used for this assessment: 75% of students will score 73% or higher.

Who will score and analyze the data: Departmental faculty

2. Develop and assess PK-6 lesson plans, implementing the principles and concepts of physical science, including chemistry, earth and space science, engineering, environmental science, and physics.

Assessment 1

Assessment Tool: Outcome-related lesson plans

Assessment Date: Fall 2028

Assessment Cycle: Every Three Years

Course section(s)/other population: All

Number students to be assessed: All

How the assessment will be scored: Departmentally-developed rubric

Standard of success to be used for this assessment: 75% of students will score 73% or higher.

Who will score and analyze the data: Departmental faculty

Assessment 2

Assessment Tool: Teaching Portfolio

Assessment Date: Fall 2018

Assessment Cycle: Every Three Years

Course section(s)/other population: All

Number students to be assessed: All

How the assessment will be scored: Departmentally-developed rubric

Standard of success to be used for this assessment: 75% of students will score 73% or higher.

Who will score and analyze the data: Departmental faculty

3. Develop and teach a PK-6 lesson plan, implementing one or more of the principles and concepts of physical science, including chemistry, earth and space science, engineering, environmental science, and physics.

Assessment 1

Assessment Tool: Outcome-related lesson presentation

Assessment Date: Fall 2028

Assessment Cycle: Every Three Years

Course section(s)/other population: All

Number students to be assessed: All

How the assessment will be scored: Departmentally-developed rubric

Standard of success to be used for this assessment: 75% of students will score 73% or higher.

Who will score and analyze the data: Departmental faculty

4. Apply appropriate principles and concepts of physical science subjects, including chemistry, earth and space science, engineering, environmental science, and physics to solve problems, or to construct or interpret maps, charts, diagrams, or graphs.

Assessment 1

Assessment Tool: Outcome related lab Activities

Assessment Date: Fall 2028

Assessment Cycle: Every Three Years

Course section(s)/other population: All

Number students to be assessed: All

How the assessment will be scored: Answer key

Standard of success to be used for this assessment: 75% of students will score 73% or higher.

Who will score and analyze the data: Departmental faculty

Course Objectives

1. Explain the steps of the scientific method and their significance in conducting scientific research (NGSS: Science and Engineering Practices - SEP 3: Planning and Carrying Out Investigations; State of Michigan PK-6 Standards for Science Education: P.1.C; National Academies Framework for Science Education: SEP1: Asking questions and defining problems).
2. Create a lesson plan that applies the principles of the scientific method appropriate for elementary-age children (NGSS: SEP 3: Planning and Carrying Out Investigations; State of Michigan PK-6 Standards for Science Education: P.1.I, S.1; National Academies Framework for Science Education: SEP8: Obtaining, evaluating, and communicating information).
3. Summarize basic chemistry principles, including the structure and properties of matter, atoms, elements, compounds, formulas, types of chemical interactions, and the periodic table (NGSS: K-MS-PS1-1, MS-PS1-2; State of Michigan PK-6 Standards for Science Education: S.2; National Academies Framework for Science Education: PS1.A: Structure and properties of matter).
4. Create a lesson plan that applies and uses the scientific method for one or more of the principles and concepts of physical science, including chemistry, earth and space science, engineering, environmental science, and physics chemistry appropriate for elementary-age children physics (Depending on focus, may include: NGSS: K-MS-PS1-1, K-MS-PS3-1, K-MS-ESS3-3; State of Michigan PK-6 Standards for Science Education: P.1.C, P.1.I, S.1-S.8; National Academies Framework for Science Education: SEP8: Obtaining, evaluating, and communicating information).
5. Explain core mechanics concepts: motion, energy, rotational motion, states of matter, and fluid dynamics (NGSS: K-MS-PS2-2,5; State of Michigan PK-6 Standards for Science Education: P.1.C, P.1.I, S.1-S.6; National Academies Framework for Science Education: PS2.A: Forces and motion, PS3.A: Definitions of energy, PS1.A: Structure and properties of matter).
6. Identify key concepts of heat, including temperature scales and heat transfer (NGSS: K-MS-PS3,4; State of Michigan PK-6 Standards for Science Education: P.1.C, P.1.I, S.1-S.6; National Academies Framework for Science Education: PS3.B: Conservation of energy and energy transfer).
7. Summarize wave components, including wave types and sound propagation (NGSS: K-MS-PS4-1,2; State of Michigan PK-6 Standards for Science Education: P.1.C, P.1.I, S.1-S.6; National Academies Framework for Science Education: PS4.A: Wave properties).
8. Classify fundamental components of electricity, such as static charge and basic circuitry (NGSS: K-MS-PS3-2,3; State of Michigan PK-6 Standards for Science Education: P.1.C, P.1.I, S.1-S.6; National Academies Framework for Science Education: PS2.B: Types of interactions, PS3.D: Energy in chemical processes and everyday life).

9. Describe transformers and the principles of magnetism (NGSS: K-MS-PS2-3; State of Michigan PK-6 Standards for Science Education: P.1.C, P.1.I, S.1-S.6; National Academies Framework for Science Education: PS2.B: Types of interactions).
10. Create a lesson plan that applies the principles of physics appropriate for elementary-age children (NGSS: K-MS-PS2-1,2; State of Michigan PK-6 Standards for Science Education: P.1.C, P.1.I, S.7 & S.8; National Academies Framework for Science Education: SEP8: Obtaining, evaluating, and communicating information).
11. Explain the ecological impacts of anthropogenic environmental concerns like microplastics and climate change (NGSS: K-MS-ESS3-3; State of Michigan PK-6 Standards for Science Education: S.3, S.5; National Academies Framework for Science Education: ESS3.C: Human impacts on Earth systems, ESS3.D: Global climate change).
12. Summarize Earth systems, including the geosphere, hydrosphere, cryosphere, and atmosphere, and explain how they are interconnected (NGSS: K-MS-ESS2-1,4; State of Michigan PK-6 Standards for Science Education: S.4; National Academies Framework for Science Education: ESS2.A: Earth materials and systems).
13. Explain key geological principles like plate tectonics, weathering, erosion, and the rock cycle (NGSS: K-MS-ESS2-2,3; State of Michigan PK-6 Standards for Science Education: S.4; National Academies Framework for Science Education: ESS2.B: Plate tectonics and large-scale system interactions).
14. Explain how absolute and relative dating principles are used to decipher geologic time and interpret Earth history (NGSS: K-MS-ESS1-4; State of Michigan PK-6 Standards for Science Education: S.4; National Academies Framework for Science Education: ESS1.C: The history of planet Earth).
15. Summarize the water cycle, and identify key components of Earth's hydrosphere, including oceans, groundwater, ice, and surface water (NGSS: K-MS-ESS2-2,4; State of Michigan PK-6 Standards for Science Education: S.4; National Academies Framework for Science Education: ESS2.C: The roles of water in Earth's surface processes).
16. Apply basic meteorological principles to identify basic weather phenomena and to understand differences between weather and climate (NGSS: K-MS-ESS2-1,2,6; State of Michigan PK-6 Standards for Science Education: S.4; National Academies Framework for Science Education: ESS2.D: Weather and climate).
17. Explain the origin and functions of the universe, stars, solar system, moon, and other celestial bodies (NGSS: K-MS-ESS1-1,2; State of Michigan PK-6 Standards for Science Education: S.6; National Academies Framework for Science Education: ESS1.A: The universe and its stars, ESS1.B: Earth and the solar system).
18. Summarize terms such as forces, motion, and gravity and explain how they apply to space science (NGSS: K-MS-PS2-1,2; State of Michigan PK-6 Standards for Science Education: S.6; National Academies Framework for Science Education: PS2.A: Forces and motion).
19. Develop and teach a lesson plan, implementing one or more of the principles and concepts of physical science, including chemistry, earth and space science, engineering, environmental science, and physics (Depending on focus, may include: NGSS: K-MS-PS1-1, K-MS-PS3-1, K-MS-ESS3-3; State of Michigan PK-6 Standards for Science Education: P.1.C, P.1.I, S.1-S.8; National Academies Framework for Science Education: SEP8: Obtaining, evaluating, and communicating information).
20. Create a teaching and lesson portfolio that will include many topics taught throughout the course (NGSS: K-MS-ETS1, and depending on focus, may include: K-MS-PS1-1, K-MS-PS3-1, K-MS-ESS3-3; State of Michigan PK-6 Standards for Science Education: P.1.C, P.1.I, S.1-S.8; National Academies Framework for Science Education: SEP8: Obtaining, evaluating, and communicating information).

New Resources for Course

Course Textbooks/Resources

Textbooks

Holt McDougal. *Sciencesaurus*, 1 ed. Holt McDougal, 2013, ISBN: 978-054405840.

Manuals

Periodicals

Software

Equipment/Facilities

Level I classroom

Data projector/computer

<u>Reviewer</u>	<u>Action</u>	<u>Date</u>
Faculty Preparer: <i>Suzanne Albach</i>	<i>Faculty Preparer</i>	<i>Oct 31, 2024</i>
Department Chair/Area Director: <i>Suzanne Albach</i>	<i>Recommend Approval</i>	<i>Oct 31, 2024</i>
Dean: <i>Tracy Schwab</i>	<i>Recommend Approval</i>	<i>Oct 31, 2024</i>
Curriculum Committee Chair: <i>Randy Van Wagnen</i>	<i>Recommend Approval</i>	<i>Mar 05, 2025</i>
Assessment Committee Chair: <i>Jessica Hale</i>	<i>Recommend Approval</i>	<i>Mar 11, 2025</i>
Vice President for Instruction: <i>Brandon Tucker</i>	<i>Approve</i>	<i>Mar 13, 2025</i>