Perris Union High School District
Course of Study

A. COURSE INFORMATION

Course Title:
(limited to 34 characters with spaces in Infinite Campus)

Science 9

- [ ] New
- [x] Revised

If revised, the previous course name if there was a change

Transcript Course Code/Number:

104051, 104052

(To be assigned by Educational Services if it's a new course)

CREDIT TYPE EARNED:	CALPADS CODE:
Science	9327

Subject Area:

- [ ] Social Science
- [ ] English
- [ ] Mathematics
- [x] Laboratory Science
- [ ] World Languages
- [ ] Visual or Performing Arts
- [ ] College Prep Elective
- [ ] Other

Is this classified as a Career Technical Education course?

- [ ] Yes
- [x] No

If yes, which pathway does this course align to?
Pathway Name:

CTE CDE Code:

Grade Level(s)

- [ ] MS
- [x] HS
- [ ] 5
- [ ] 6
- [ ] 7
- [ ] 8
- [x] 9
- [ ] 10
- [ ] 11
- [ ] 12

Was this course *previously approved by UC* for PUHSD?

- [x] Yes
- [ ] No

(Will be verified by Ed Services)

Which A-G Requirement does/will this course meet?

D	[ ] Pending

Credential Required to teach this course:
To be completed by Human Resources only.

Single Subject: Science: Biological Sciences; Science: Chemistry; Science: Geosciences; Science: Physics

Signature — Date: 3/15/2024

Submitted by: Matthew Thomas
Site: Student Service Center
Date: 03/12/24
Email: matthew.thomas@puhsd.org

Unit Value/Length of Course:

- [ ] 0.5 (half-year or semester equivalent)
- [x] 1.0 (one-year equivalent)
- [ ] 2.0 (two-year equivalent)
- [ ] Other:

Approvals	Name/Signature	Date
Director of Curriculum & Instruction		03/25/24
Asst. Superintendent of Educational Services	Kindylee Mackamul	3/24/24
Governing Board		

Prerequisite(s) (REQUIRED):
None
Corequisite(s) (REQUIRED):
None
Brief Course Description (REQUIRED):
This course teaches students the basic principles of Physics and Earth/Space Science through experimentation and engineering practices designed for introductory level, conceptual physics. Classic science principles of forces, motion, waves, and energy conservation will be explored through both Earth and Space science phenomena as well as classical and modern physics principles. Students will continue to develop their skills of reading, writing, discussion, and analysis through laboratory work, investigations, and group projects. There will be a strong emphasis on investigations and engineering solutions to both problems in the class and problems in the larger world. This course builds a foundation of basic physics concepts that are fundamental for understanding science and cover NGSS Performance Expectations from the domains of Physical Science, Earth/Space Science, and Engineering, Technology, and Applications of Science.

B. COURSE CONTENT

Course Purpose (REQUIRED): *What is the purpose of this course? Please provide a brief description of the goals and expected outcomes. Note: More specificity than a simple recitation of the State Standards is needed.*
In order to achieve the NGSS goal of "All Standards, All Students" through implementation of the California Science Framework High School Three Course Model with Earth Science standards embedded in physics and chemistry (basics), we must expand our science curriculum to make the curriculum accessible to all students. This course is aligned with California NGSS and addresses the standards of physics and chemistry at a conceptual level. The Geosciences and Physics (Conceptual Science) course meets the requirements of a D approved course and allows students to complete the physical science graduation requirement for PUHSD, as well as achieve college and career readiness through building scientific and mathematical reasoning skills within the context of physics and earth science concepts. This course provides a foundation for advanced physics science courses by providing a general understanding of scientific principles and practices, presented in all levels of science rigor and coursework.
Course Outline (REQUIRED):

Detailed description of topics covered. All historical knowledge is expected to be empirically based, give examples. Show examples of how the text is incorporated into the topics covered.

Unit 1: Safety and Science Methods
This unit introduces the nature of science, what physical science is, and provides tools for the study of science. After this unit, students will be able to ask questions and perform investigations to learn more about the natural world. Students do this by implementing the metric system in their measurements. Using their measurements, students will learn how to gather and represent their data through graphical presentations. By the end of the unit, students will be able to use their knowledge to better understand how technology influences the societal and economic forces around the world.

Writing Assignments: Design a Safety Inspection for an Amusement Park Ride, Diagram and order the steps of the scientific method.

Assessments: Science Safety Test

Labs/Activities:

1. Students will demonstrate the 'Methods of Science' by creating a Science Safety Rules Poster.
2. Students will demonstrate mastery of the 'Standards of Measurement' by completing a series of conversions from imperial units to metric units.
3. Students will 'Communicate with Graphs' by using collected data to create a series of graphs to show their understanding.
4. Students will complete a mini-activity about how 'Science and Technology' influences the world around them.

Unit 2: Motion and Forces
This unit introduces the basics of motion and forces through applications of velocity, momentum, acceleration, and Newton's Laws. After this unit, students will be able to determine the motion of an object by measuring the object's distance and displacement. Upon understanding, students will be able to solve for velocity and momentum of an object using the given data - distance and time (velocity), mass and velocity (momentum). Using the velocity and time of an object's motion, students will be able to solve for acceleration. By understanding the basics of motion, students will be able to determine the basic forces acting on everything in this universe - balanced and unbalanced. In turn, students will use their understanding of forces and apply it towards Newton's Laws in the real-world.

Writing Assignments: Describe a trip from your home to school using the words position, distance, displacement, and speed. Explain why streets and highways have speed limits rather than velocity limits. Compare the terms weight and mass. Predict the weight of different objects on Earth and the moon.

Assessments: 3 quizzes (one every two weeks) and Unit Exam

- **Practice Quizzes:** formative assessment, unlimited attempts with feedback for each wrong question, open book.
- **Unit Tests:** summative assessment, 1 attempt, retake upon request, open notebook
    - Questions pulled from Canvas Item banks that are based on each topic covered in class.

Questions are organized into 3 levels based on difficulty and Bloom's Taxonomy. Each assessment is organized to include 60% level 1 questions, 30% level 2 questions, and 10% level 3 questions. Have formative and summative versions of each type of assessment so students can practice and test their knowledge.

- **McGraw Smartbook 2.0:** Interactive Formative Assessment

Labs/Activities:

1. During a collision lab, students will 'Describe Motion' by graphing distance and displacement by time.
2. Using their data from the last lab, students will be able to solve for 'Velocity and Momentum' to show mastery of the concept.
3. Through discussions of velocity, students will be able to solve for 'Acceleration' when given a change of velocity and the time.
4. Students learn the 'Basic Forces' that govern our lives (gravitational, normal, drag, friction, applied)
5. Using the basic forces, students will learn 'Newton's Laws of Motion' through laboratory applications.
6. Students will 'Use Newton's Laws' by exploring real-world applications.

Unit 3: Energy and Waves

This unit introduces the basics of energy and waves through real-life applications. After this unit, students will be able to understand the differences between potential, kinetic, mechanical, and chemical energy. Using this knowledge, students will be able to apply the Law of Conservation of Energy to everyday life. Through their understanding of energy, students will determine how the electromagnetic force is related to electrical and magnetic fields. They will also determine the relationship between light and sound waves by applying the range of frequencies to their understanding of the physical world around them. Through their understanding, students will understand the difference in energy resources and what alternatives are needed to slow down the reactions of climate change.

Writing Assignments: Describe what happens to the energy carried by a water wave.
Compare and contrast transverse and longitudinal waves. Describe how the world would be different if all waves were mechanical.

Assessments: 3 quizzes (one every two weeks) and Unit Exam

- **Practice Quizzes:** formative assessment, unlimited attempts with feedback for each wrong question, open book.
- **Unit Tests:** summative assessment, 1 attempt, retake upon request, open notebook
    - Questions pulled from Canvas Item banks that are based on each topic covered in class. Questions are organized into 3 levels based on difficulty and Bloom's Taxonomy. Each assessment is organized to include 60% level 1 questions, 30% level 2 questions, and 10% level 3 questions. Have formative and summative versions of each type of assessment so students can practice and test their knowledge.

- **McGraw Smartbook 2.0:** Interactive Formative Assessment

Labs/Activities:

1. Students will learn how to 'Describe Energy' in terms of kinetic, potential, mechanical, and chemical energy.
2. Students will demonstrate 'Conservation of Energy' by designing their dream roller coaster.
3. Students will demonstrate 'Electricity and Magnetism' by designing a power bank for storing electrical power.
4. Students will research 'Renewable and Nonrenewable Energy Sources and Environmental Impacts' that govern our daily lives.
5. Students will manipulate 'Sound and Light Waves' through a series of mini laboratory experiments.
6. Using their understanding of waves, students will explore the visible and not visible range of the 'Electromagnetic Spectrum'.

Unit 4: Basics of Matter and Reactions

This unit introduces students to the basics of chemistry and how to use the periodic table. After this unit, students will be able to understand the four states of matter and how they interact with each other. Using the electric cloud model, students will determine how an atom is structured and how atoms interact with each other. By understanding the basics of an atom, students will be able to explore the structure of the Periodic Table and its useful properties in science. Using the Periodic Table, students can determine the different classifications of bonds and how they share/lose electrons. Students can then explore the five basic classifications of chemical changes and how particles have the potential to decay over time.

Writing Assignments: Describe the four states of matter. Explain why a steel block sinks, but a steel boat floats. Explain the relationship between pressure and volume.

Assessments: 3 quizzes (one every two weeks) and Unit Exam

Practice Quizzes: formative assessment, unlimited attempts with feedback for each wrong question, open book.

Unit Tests: Summative assessment

McGraw Smartbook 2.0: Interactive Formative Assessment

Labs/Activities:

1. Students will discover the 'Properties, Behaviors, and Composition of Matter' through explorations of solids, liquids, gasses, and plasma.
2. Students will determine the 'Structure and Masses of Atoms' by rebuilding the electric cloud model of an atom.
3. Students will research the different components of 'The Periodic Table', choose an element, and build the element based on their understanding of the electric cloud model.
4. Students can determine the 'Types of Chemical Bonds' through exploration of different solutions and compounds.

5. Using their understanding of bonds, students will experiment with 'Chemical Changes and Reactions' by creating reactions during laboratory time and observing decay over time.

Unit 5: Applications of Chemistry
This unit further delves into the world of chemistry through chemical reactions and applications. After this unit, students will be able determine how solutions are formed and the different types of mixtures they can create. Using concepts of temperature and pressure, students will explore how concentrated solutions can be impacted. To delve into solutions further, students will explore concepts of acids and bases. Students will then determine how biological and organic compounds can form dependent on the molecular structure of the chemicals.

Writing Assignments: Explain why the noble gasses are unusually stable. Compare and contrast ionic and covalent bonds. Compare and contrast the properties of potassium (K) and iodine (I) the the compound KI, Diagram how nuclear radiation can be used in medicine

Assessments: 3 quizzes (one every two weeks) and Unit Exam

Labs/Activities:
1. Students will discover the different 'Formation of Solutions' by creating solutions during laboratory time.
2. Students will determine the 'Concentration and Solubility' of different solutions through laboratory work.
3. Students will be given different 'Acids and Bases' to determine which category they belong in based on the pH scale.
4. Students will determine the 'Organic and Biological Compounds' based on their molecular structure.

Unit 6: Earth and Space
This unit introduces students to space science through exploration of our solar system and its place in the universe. After this unit, students will be able to analyze the structure of the planet and the different natural disasters that helped create it. They will use plate tectonics to determine how the Earth dramatically changes on the crust/mantle level. They then use erosion, transport and deposition of sediment to understand how landforms change over eons. Using Earth's axis, rotation, and the moon to determine the different ways those concepts impact the changing seasons. Then we go into a deep dive of the inner and outer planets in our solar system. Going beyond our system, we discover the different space objects and how they impact the universe.

Writing Assignments: Explain how the Earth is like a bar magnet, Explain why there is no volcanic activity sling transform boundaries, Explain plate tectonic theory and include the evidence, Compare and contrast seismic waves with sound waves, Diagram and label the rock cycle,

Assessments: 3 quizzes (one every two weeks) and Unit Exam

Labs/Activities:
1. Students will be able to identify the different layers of 'Earth's Structure' and how that has changed

over time.

2. Students create 'Plate Tectonics' and discover how those have changed the surface of the planet.
3. Students determine how the 'Shape of the Landscape' has changed by exploring the different states of erosion, transport, and deposition that we can find around school.
4. Students research what impacts 'Earth in Space' in terms of moon pull, tilted axis, and the rotation around the sun.
5. Students create a mini-poster to better understand the 'Inner and Outer Planets' of our solar system.
6. Students deep dive into the 'Observations of the Universe' by identifying the different types of space objects that exist and what we can do with the information that we obtain from them.

Writing Assignments (REQUIRED):
Give examples of the writing assignments and the use of critical analysis within the writing assignments.

Unit 1: Safety and Science Methods
Design a Safety Inspection for an Amusement Park Ride, Diagram and order the steps of the scientific method.

Unit 2: Motion and Forces
Describe a trip from your home to school using the words position, distance, displacement, and speed. Explain why streets and highways have speed limits rather than velocity limits. Compare the terms weight and mass. Predict the weight of different objects on Earth and the moon.

Unit 3: Energy and Waves
Describe what happens to the energy carried by a water wave. Compare and contrast transverse and longitudinal waves. Describe how the world would be different if all waves were mechanical.

Unit 4: Basics of Matter and Reputations
Describe the four states of matter. Explain why a steel block sinks, but a steel boat floats. Explain the relationship between pressure and volume.

Unit 5: Applications of Chemistry
Explain why the noble gasses are unusually stable. Compare and contrast ionic and covalent bonds. Compare and contrast the properties of potassium (K) and iodine (I) the compound KI, Diagram how nuclear radiation can be used in medicine.

Unit 6: Earth and Space
Explain how the Earth is like a bar magnet, Explain why there is no volcanic activity sling transform boundaries, Explain plate tectonic theory and include the evidence, Compare and contrast seismic waves with sound waves, Diagram and label the rock cycle.

INSTRUCTIONAL MATERIALS (REQUIRED)

Textbook #1	
Title: Inspire Physical Science with Earth	Edition: 1st
Author: Mclaughlin	ISBN: 978-0076716852
Publisher: McGraw Hill	Publication Date: March 13, 2020
Usage: ☑ Primary Text ☐ Read in entirety or near	

Textbook #2	
Title:	Edition:
Author:	ISBN:
Publisher:	Publication Date:
Usage: ☐ Primary Text ☐ Read in entirety or near	

Supplemental Instructional Materials *Please include online, and open source resources if any.*	

Estimated costs for classroom materials and supplies (REQUIRED). *Please describe in detail.* If more space is needed than what is provided, please attach a backup as applicable.	
Cost for a class set of textbooks: $	Description of Additional Costs:
Additional costs:$	
Total cost per class set of instructional materials:	$

Key Assignments (REQUIRED):
Please provide a detailed description of the Key Assignments including tests, and quizzes, which should incorporate not only short answers but essay questions also. How do assignments incorporate topics? Include all major assessments that students will be required to complete
Unit 1: Safety and Science Methods: Science Safety Contract and Science Safety Test **Unit 2: Motion and Forces**: Design and build a balloon powered vehicle **Unit 3: Energy and Waves**: 3D EM Model, Magnetic Pet Door **Units 1-3:**

- Final Project Presentation
    - Students pick a concept from the first three units
    - Using their chosen concept, students will relate their concept to something they enjoy.
    - They present their work via slides, poster, or video format
    - This is a 5-10 minute long presentation

Unit 4: Basics of Matter and Reactions: 3D Atomic Model
Unit 5: Applications of Chemistry: Crime Scene Project
Unit 6: Earth and Space: Scaled 3D solar system

Units 4-6:

- Final Project Gallery Walk Science Fair
    - Students pick a concept from the first three units
    - Using their chosen concept, students will relate their concept to something they enjoy.
    - They present their work via poster board.

Instructional Methods and/or Strategies (REQUIRED):

Please list specific instructional methods that will be used.

- Oral In-Class Participation/Classwork/Homework
- Focus Activities
- Homework/Classwork
- Student Presentations
- Quizzes and Tests
- Writing Assessments
- Projects (including Artifact, Written and Oral Assessment)

Assessment Methods and/or Tools (REQUIRED):

Please list different methods of assessments that will be used.

- Writing Assessments
- Labs experiments and write-ups
- Lesson Assessments
- Unit/Chapter Assessments
- Individual Presentations
- Group Presentations
- Cumulative Semester Final