

El Monte Union High School District

Course Outline

High School _____ District _____
Created by El Monte High School

Title: Conceptual Physical Science 1P

Transitional* _____ (Eng. Dept. Only)

Sheltered (SDAIE)* _____ Bilingual* _____

AP** _____ Honors** _____

Department: Science

Grade Level (s): 9th

Semester _____ Year X

Year of State Framework Adoption 1998

Year of Next Generation Standards 2013
(Common Core)

This course meets
graduation requirements:

- ☐ English
- ☐ Fine Arts
- ☐ Foreign Language
- ☐ Health & Safety
- ☐ Math
- ☐ Physical Education
- ☒ Science
- ☐ Social Science
- ☐ Elective

Department/Cluster Approval _____ Date _____

_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____

*Instructional materials appropriate for English Language Learners are required.

**For AP/Honors course attach a page describing how this course is above and beyond a regular course. Also, explain why this course is the equivalent of a college level class.

1. Prerequisite(s): Algebra 1 or Integrated Math 1

2. Short description of course which may also be used in the registration manual:

This one-year introductory Conceptual Physical Science course offers a more conceptual approach to the study of physical science covering physics, earth and chemistry standards outlined in the California Science Content Standards as well as the physics, earth and chemistry standards included in the Next Generation Science Standards. Science equation calculations will be taught with more guidance for the students, but the main focus will be on how the variables interact with each other in the equation. For example, $v=d/t$ problems will be calculated, but the focus will be on the relationships between v , d , and t . Such as, if the velocity increases, either the distance traveled must increase or the time traveled must decrease. Labs will be emphasized to help develop

3. Describe how this course integrates the schools ESLRs (Expected School-wide Learning Results):

The following ESLR's will be integrated:

Academic Skills: Students will seek, access, analyze and creatively use information to demonstrate effective communication, computation, critical thinking and technological skills by solving problems for assignments, labs and other assessments aligned to the California Content Standards, the Common Core Next Generation Standards, and the District Course Standards.

Interpersonal Skills: Students will be productive community members by learning to respect diversity, exercise rights, accept responsibility and work cooperatively with others while doing work for the class and while working cooperatively in labs.

Personal Skills: Students will make informed decisions, set goals, take actions and evaluate results while

7. Materials of Instruction (Note: Materials of instruction for English Language Learners are required and should be listed below.)

A. Textbook(s) and Core Reading(s):

Holt Science Spectrum with Earth and Space Science, Holt, Rinehart, & Winston 2008

B. Supplemental Materials and Resources:

C. Tools, Equipment, Technology, Manipulatives, Audio-Visual:

Visual presentations will be made using overhead transparencies, videos, models and/or presentations with a LCD projector. A variety of standard glassware, physics equipment and laboratory equipment including balances, hotplates, and chemicals, etc. will be used during the laboratories. Standard computer technologies including MS Office, web browsers and 3rd party software will be used as necessary.

8.

Objectives of Course

Unit detail including projects and activities including duration of units (pacing plan)

Indicate references to state framework(s)/standards (If state standard is not applicable then national standard should be used)

Student performance standards

Evaluation/assessment/rubrics

Include minimal attainment for student to pass course

Course Objectives:

1) Students will learn fundamental concepts in the Physical Sciences, including Physics, Chemistry and Earth Science, as prescribed by the California Science Content Standards and the Science & Engineering Common Core Next Generation Standards.

2) Students will learn introductory laboratory skills and measurement skills necessary to be successful in subsequent science courses, including Biology, Chemistry and Physics.

3) Students will learn computational skills and how to apply basic concepts of algebra to solve simple equations, but the main emphasis will be on learning how the variables interact with each other in the equations

4) Students will learn how to organize and present data, including how to construct, read and interpret bar, line and circle graphs.

Laboratory Investigation and Experimentation:

All students are expected to have an understanding of common laboratory safety procedures as demonstrated by their use during practical laboratory activities. Practical laboratory activities must consist of a minimum of 20% of the regular instructional time. (Ex. 2-3 days of a traditional schedule per 2-3 week period.)

The following are some suggested labs, to be supplemented, by additional labs preferred by the instructor.

Unit	Labs/Projects
Investigative Skills	<u>Soda Can Activity</u> - Students use inquiry skills, apply scientific method, hypothesize conclusions, and communicate results by determining which soda will float, diet or regular soda. <u>Density Lab</u> - Students determine the sugar content in bubble gum using scientific instruments to determine the density of the bubble gum before and after chewing.
Forces and Interactions	<u>Car Project</u> - Students design and create a car using manila folders, index cards, rubber bands, straws, paper clips, and tape. The cars must move forward on its own power. <u>Car Lab</u> - Students analyze the car built by determining speed, velocity, acceleration, weight, force, work, and power.
Work/Power/Energy	<u>Kinetic Energy/Potential Energy Lab</u> - Students calculate and compare the kinetic and potential energies of a toy car moving down a ramp. The students must evaluate their results in regard to the Law of Conservation of Energy.
Temperature	Can Lab

Electricity Project - Students design and create a house that has parallel and series circuits and handmade switches using lights, wires, and one battery.

Earth's Place in the
Universe

Structure and Properties of Matter	<u>Law of Conservation of Matter Lab</u> <u>Part I</u> - Students compare the mass of a Zip lock bag of water and an Alka-Seltzer separately and then compare the mass after the Alka-Seltzer has been sealed in the bag of water and reacted. <u>Part II</u> - Students compare the mass of an ice cube in a Zip lock bag before it has melted and after it has melted.
Matter and its Interactions	<u>Special Properties of Metals Lab</u> - Students calculate and compare properties of density, hardness, heat conductivity and magnetic properties of various metals.
Chemical Reactions	<u>Metal Transfer Lab</u> - Students perform a single displacement (redox) reaction of a nail and penny in vinegar.

Student Performance Standards for Physical Science 1P

Investigative Skills: (The students will be able to ...)

Science Standards: I&E 1a,b,c,d,e,f,g,i,j,k,l,m,n

CCSS: none

- a) select/identify appropriate tools to perform investigations and experiments while applying the scientific method and practicing laboratory safety.
- b) measure mass, volume, length/distances and use basic.
- c) perform experiments to collect data, interpret results, organize and display data into tables, charts, graphs and lab reports.
- d) use appropriate tools and such as: balances, stop watches, thermometers, meter sticks, etc. to collect data and perform basic calculations.
- e) apply and use the SI units during an investigation and apply the knowledge across the Physical Science curriculum. Identify the SI units for length, mass and time.
- f) describe and discuss the utilization of models and basic mathematics to illustrate scientific theories, laws, and phenomenon.

Forces and Interactions (The students will be able to ...)

Science Standards: Physics 1a,b,c,d,e,2d,e,f

CCSS: HSPS21,2

- a) use a reference point to discriminate distance and time and evaluate the speed of an object.
- b) define and distinguish and calculate speed and velocity, but mainly focus on how the variables interact with each other. For example, if the velocity increases, either the distance traveled must increase or the time traveled must decrease.
- c) understand, analyze, and evaluate problems involving time, distance, speed and velocity.

- a) understand and describe the properties of electricity: current, resistance, potential difference.
- b) understand and calculate the different parts of Ohm's Law. Focus on how the variables interact with each other.
- c) understand and calculate power. Focus on how the variables interact with each other.
- d) describe and understand the difference between conductors and insulators.
- e) explain and calculate the differences between circuits in series and parallel. Focus on how the variables interact with each other.
- f) understand and explain schematic diagrams.

Earth's Place in the Universe:(The students will be able to ...)

Science Standards: Earth Science 1a,b,c,d,e,2a,b,d,f,g

CCSS: HSPS18, HSESS11,2,3,6

- a) describe the origin (big bang theory) of the universe and its future.
- b) describe the structure of the Milky Way Galaxy and list the three types of galaxies.
- c) describe the properties and life cycles of stars. Describe the structure and location of our sun.
- d) describe the structure and birth (nebular theory) of the solar system. Differentiate terrestrial (inner) and Jovian (outer) planets.
- e) describe other types of heavenly bodies.
- f) describe the phases of the moon.

History of Earth/Earth's Systems (The students will be able to ...)

Science Standards: Physics 4a,b, Earth Science 3a,b,c,d,e,f

CCSS: HSESS15, HSESS21,3

- a) identify Earth's different geological layers.
- b) understand the Earth in terms of the unifying theory of plate tectonics. Know the three plate boundaries and the significance of their geological features.
- c) describe the effects and formation of earthquakes. Define and explain how earthquake waves provide information about the Earth's interior. Identify earthquake prone areas in California.
- d) explain the formation and classification of the three types of volcanoes (including hotspots). Identify volcanoes in California.
- e) identify the three rock families and explain the geological processes that form them. (Describe the Rock Cycle.)
- f) describe weathering and erosion.

Atmospheric Interactions: (The students will be able to ...)

Science Standards: Earth Science 1c,4a,b,c,8a,b,c

CCSS: HSESS22,6, HSESS31

- a) recognize the structure and temperature of the atmosphere. Explain the importance of the ozone layer and its location. Describe the greenhouse effect and the effect it has on Earth.
- b) know the fate of incoming solar radiation in terms of reflection, absorption, and photosynthesis.
- c) describe how the atmosphere has evolved over time.

Matter and its Interactions: (The students will be able to ...)

Science Standards: Chemistry 1a,b,c,d,e,3b,c,d,11c

CCSS: HSPS1-1,3,7

- a) explain the differences between the different Atomic Theories (Democritus, Dalton, Bohr and Modern Model)
- b) know how to use the periodic table such as: locating the atomic number, mass number, element, etc.
- c) identify the families on the periodic table.
- d) calculate basic conversions using grams, moles and molar mass.

Chemical Compounds (The students will be able to ...)

Science Standards: Chemistry 2a,b,c,10a,b,c

CCSS: HSPS1-2, LS1-6

- a) understand models of compounds and chemical formulas.
- b) understand the structure of organic compounds, polymers, and biological macromolecules.
- c) identify the different types of bonds.
- d) know common ions.
- e) write chemical names for chemical formulas and write chemical formulas from their chemical names.

Chemical Reactions (The students will be able to ...)

Science Standards: Chemistry 3a

CCSS: HSPS1-2,6

- a) describe the types of chemical reactions.
- b) balance simple chemical reactions.

Evaluation/ Assessment/ Rubrics including Attainment for Student to Pass Physical Science

"A" -level work (90-100%): (Excellence overall; no major weaknesses).

This student demonstrates real achievement in grasping scientific thinking, along with development of specific physical science thinking skills and abilities. This student's work is clear, precise, and well reasoned.

"B" -level work (80-89%): (Moderate level of understanding and skill in scientific thinking with some distinctive weaknesses, showing more strengths than weaknesses).

This student demonstrates a good level of achieving scientific thinking with occasional areas of weakness. This student's work is essentially clear and precise with occasional lapses into weak reasoning.

"C" -level work (70-79%): (More than a minimum of understanding and skill in scientific thinking with some weaknesses, showing more strengths than weaknesses.)

This student demonstrates a mediocre level of achieving scientific thought with pronounced areas of weakness. This student's work is inconsistent, showing only modest skills and weak reasoning.

"D" -level work (60-69%): (Minimal level of understanding and skill in scientific thinking).

This student demonstrates a lack of clarity and discipline. This student's work does not show good scientific reasoning and skills, only rarely showing any attempt to take charge of ideas.

"F"=level work (<59%): (Far below minimal level of unde

Conceptual Physical Science 1P Pacing Plan

CCSS Science Std. Objectives

FALL SEMESTER First Grading Period

IE **Investigative Skills**

1a,b,c,d,e,f,g
,i,j,k,l,m,n

Scientific Method

Organizing Data/Graphing

Tools

Metric System

Scientific Calculations - Conversions, Significant figures,
Scientific notation

HS-PS2-1,2 Physics **Forces and Interactions**

1a,b,c,d,e,2d,
e,f

Speed, Velocity, Acceleration

Momentum

Forces - balanced and unbalanced forces, friction, air resistance,

Conceptual Physical Science 1P Pacing Plan

<u>CCSS</u>	<u>Science Std.</u>	<u>Objectives</u>
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HS-PS4-1,3,5	Physics 4a,b,c,d,e,f	Waves and Electromagnetic Radiation
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Types of waves
Characteristics of waves
Calculations for waves - speed, period, frequency
Doppler Effect
Wave Interference
Electromagnetic spectrum

FALL SEMESTER Third Grading Period

HS-PS2-5,6 HS-PS3-1,2,5	Physics 5a,b,c,e	Electricity
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Properties of electricity - current, resistance, potential difference, Ohms Law, power
Conductors and insulators
Circuits - series and parallel
Schematic diagrams

HS-PS1-8 HS-ESS1-1,2,3,6	Earth Science 1a,b,c,d,e,2a, b,d,f,g	Earth's Place in the Universe
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Big Bang Theory - evidence
Types of galaxies
Life Cycle of Stars
Formation of the solar system
Other heavenly bodies
Phases of the moon

