Central High School
Physical Science Syllabus
Mr. D. Ladehoff

Course Description
This course is designed to give students the opportunity to learn the basic fundamentals involved in physical science disciplines of particle physics, Earth science, meteorology, and astronomy. Students will be able to define the atomic characteristics that make elements unique including atomic number, visible light spectra, and electron shells; distinguish between alpha beta and gamma radiation and know natural sources for each; describe the basics for nuclear energy; understand Seismic waves, Earth mantle, and plate tectonics in global events; connect the effects of ocean, air, and sun in its role for weather change; interpret a weather map; and locate celestial markers in the sky.

Course Objectives
Know that atoms are made of sub-atomic particles (protons, neutrons, electrons) which have positive, neutral, or negative charges.
Understand that the periodic table displays the elements in increasing atomic number and shows how periodicity of the physical and chemical properties of the elements relates to atomic structure.
Understand the different states of matter: solid, liquid, gas, plasma. Define freezing, melting, boiling, condensing, and sublimation.
Understand that the temperature of water (or any substance) is constant during phase changes, even when heat is being added or removed.
Understand that the kinetic molecular theory explains the properties of gases by the random motion of molecules in them.
Understand how to convert between Celsius and Kelvin temperature scales.
Understand that there is no temperature lower than 0 Kelvin, or absolute zero.
Know the first two laws of thermodynamics: (1) Energy is conserved (neither created nor destroyed) and (2) Heat flows naturally from a hot object to a cold object; heat will not flow spontaneously from a cold object to a hot object.
Understand that another statement of the Second Law is that no device is possible whose sole effect is to transform a given amount of heat completely into work.
Recount the concept of entropy and know that entropy in the universe considered as a whole always increases.
Indicate that the earth's crust is made from mostly igneous and metamorphic materials and was formed as a result of partial melting of part of the mantle rock.
Know that there is a thin layer of sedimentary rock on top in many places.
Understand that most scientists believe that the sun, the earth, and the rest of the solar system formed from a nebular cloud of dust and gas 4.6 billion years ago.
Understand that interactions among the solid earth, the oceans, the atmosphere, and organisms have resulted in the ongoing transformation of the earth system. Understand that we can observe some changes (such as earthquakes and volcanic eruptions) on a human time-scale, but many processes (such as mountain building and plate movements) take place so sporadically or so slowly (over hundreds of millions of years) that we cannot observe them but only infer that they take place from other kinds of evidence.

Understand why earthquakes occur and how scales are used to measure their intensity and magnitude, specifically the Richter and Mercalli scales.
Understand that energy enters the systems of Earth chiefly as solar radiation and eventually escapes again as heat.
Understand that incoming solar radiation is either reflected or absorbed.
Understand that non-uniform heating of the earth results in circulation patterns in the atmosphere and oceans that globally distribute heat (in the form of winds and ocean currents).
Understand the connection between the earth's rotation and the circular motion of ocean currents and air pressure centers.
Understand that weather (over a short time) and climate (over a long time) result from the transfer of energy and water in and out of the atmosphere.
Understand the effects on climate of latitude, elevation, topography (especially the presence of mountains and valleys), and proximity to large bodies of water, and cold or warm ocean currents.
Analyze weather conditions of an area, given specific weather data.
Understand and describe the physical characteristics of galaxies and the objects within galaxies (e.g., stars, pulsars, black holes, planets, comets, asteroids).
Describe physical characteristics of the sun (e.g., corona, prominences, sunspots, solar flares), and know that solar events can cause phenomena such as auroras.
Know the theory that over 10 billion years ago the universe began in a huge expansion called the Big Bang. Understand that in this event, all matter, energy, space, and time were created as the universe expanded from a single point. Understand that one piece of evidence for this theory is the 3K background radiation.
Understand the effects of gravity within the solar system. Understand that the tides are caused by the gravitational interaction among the earth, moon, and sun.

Required Materials

Paper for laboratory reporting
Spiral notebook
Student handbook

Textbook

Conceptual Physical Science Expolrations, Hewitt, Addison Wesley, 2003

Course Outline

Heat-

Thermal energy, temperature, absolute zero, 1st Law of Thermodynamics, 2nd Law of Thermodynamic, specific heat, thermal expansion

Heat transfer-

Conduction, convection, radiation, evaporation, sublimation, condensation, boiling, freezing, Heat of fusion, heat of vaporazation

Architecture of the Earth –

Seismic waves, core, mantle, crust, folds, faults, earthquakes, continental drift, plate tectonics

Earth's Atmosphere and Oceans-

Troposphere, stratosphere, mesosphere, thermosphere, ionosphere, exosphere, greenhouse effect, Coriolis effects, doldrums, horse latitudes, trade winds, westerlies, Gulf stream,

Weather-

Humidity, dew point, adiabatic rate, temperature inversion, clouds, air mass, convectional lifting, Fronts, storm cell, tornadoes, hurricanes, isobars

Astronomy-

Moon, phases, solar eclipse, lunar eclipse, Sun, sunspots, Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus, Neptune, Kuiper-belt objects, asteroids, meteoroids, comets, constellations, protostar, red giant, white dwarf, nova, neutron star, pulsars, black holes, galaxy, Big Bang,

Quizzes

The occasional need to discover how you are progressing will require the occurrence of a quiz or two depending on the difficulty of the unit. There may not be a formalized or verbalized notice for a quiz.

Test Schedule

Test 1: Heat/Heat Transfer – Feb. 18
Test 2: Earth Architecture and Continents – March 17
Test 3: Atmosphere/Weather – April 16
Test 4: Solar System/Stars – May 21

Comprehensive Final included/added to Test 4 for 2nd Semester.
Weighted score of 15% of Semester Grade

Final Grade

To achieve a final grade; it will be tabulated from:

Homework/Worksheet	:25%
Quizzes	:15%
Laboratory Reports	:25%
Tests	:20%
Final Exam	:15%
	100%

Scale Percentages

The grading scale used in the Physical Science class is designed to the standards set by the administration. Students are assessed using the following scale:

A+ → 98-100%	C- → 77-78%
A → 94-97%	D+ → 75-76%
B+ → 90-91%	D → 72-74%
B → 87-89%	D- → 70-71%
B- → 85-86%	F → ≤ 69%
C+ → 83-84%	
C → 79-82%	

Classroom Procedures

1. Start the beginning task written on the board
2. Discipline yourself to listen first
3. Life-long learning comes one step at a time
4. Write names on the upper right on any assignment along with the class period
5. Do your own work, shore your thoughts, and avoid temptations to take from others

Laboratory Report

The writing of laboratory reports will consist of a title page, data collection page or table (include with that the required calculations), answers to questions in complete sentences, and a conclusion paragraph telling what you learned of the lab and its relevance towards your understanding of the physical sciences.

Instructor Contact

I can be reached through e-mail at dladehoff@cusd4.org , in B154 before school Monday, Tuesday, and Wednesday,