# Chino Valley Unified School District
# High School Course Description#

| CONTACTS | |
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| **1. School Information:** | **School:** Chino Valley Unified School District<br>**Street Address:** 5130 Riverside Dr., Chino, CA 91710<br>**Mailing Address:** 5130 Riverside Dr., Chino, CA 91710<br>**Phone:** (909) 628-1201<br>**Web Site**: http://www.chino.k12.ca.us |
| **2. Course Contact:** | **Teacher Contact:** Paula Stow<br>**Position/Title:** Science Educator<br>**Phone:** (909) 606-7540<br>**E-mail:** paula_stow@chino.k12.ca.us |
| **A. COVER PAGE - COURSE ID** | |
| **1. Course Title:** | Environmental Science |
| **2. Transcript Title/Abbreviation:** | Environmental Science |
| **3. Transcript Course Code/Number:** | 5426 |
| **4. Seeking Honors Distinction:** | No |
| **5. Subject Area/Category:** | (d) Laboratory Science |
| **6. Grade level(s):** | 11-12 |
| **7. Unit Value:** | 5 credits per semester/10 total credits |
| **8. Was this course previously approved by UC?** | Yes |
| **9. Is this course classified as a Career Technical Education course:** | Yes |
| **10. Is this course modeled after an UC-approved course?** | Yes |

**11. Brief Course Description:**

The goal of the Environmental Science course is to provide students with the scientific principles, concepts, and methodologies required to understand the interrelationships of the natural world, to identify and analyze environmental problems both natural and human-made, to evaluate the relative risks associated with these problems, and to examine alternative solutions for resolving or preventing them. Environmental science is interdisciplinary; it embraces a wide variety of topics from different areas of study. Yet, there are several major unifying constructs, or themes, that cut across the many topics included in the study of environmental science.[1] This course utilizes the Environmental Education Initiative curriculum provided by the California Department of Education.[2]

[1]Source: www.collegeboard.com
[2]Source: http://www.cde.ca.gov/ci/sc/ee/

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| **12. Prerequisites:** | Two years of high school laboratory science— minimum one year of college preparatory biology and one year of college preparatory physical science (such as chemistry or physics) with a grade of C or better. |
| **13. Co-Requisites: (Recommended)** | Grade of C or better in Algebra II or higher math |

**14. Context for Course:**

Environmental education is the teaching about the natural and built environment, which provides a real-world context for learning by linking the classroom to the students' community. Students are engaged in hands-on learning that increases their knowledge and awareness about the environment. Because environmental education encourages inquiry

and investigation, students develop critical thinking, problem-solving, and effective decision-making skills.

**15. History of Course Development:**

The goal of the Career Technology Education (CTE) – Energy, Environment, and Utilities sector is designed to provide a foundation of knowledge and skills in careers related to energy, environment, and utilities. The pathways emphasize real-world, occupationally relevant knowledge, skills, and experiences of significant scope and depth in environmental resources, energy and power technology. The standards integrate academic and technical preparation and focus on career awareness, career exploration, preparation for entry to technical-level employment, and alignment with postsecondary programs focused on energy, utilities, and related fields.
http://www.cde.ca.gov/ci/ct/sf/ctemcstandards.asp

## B. COURSE CONTENT

**Course Purpose:**

This course provides the college preparatory student at a more accessible version of the AP Environmental Science class because the environment and environmental education is an interdisciplinary subject that integrates biology, chemistry, physics, earth science, and CTE into one hands-on, student-centered, real world, present day course. Students find the subject matter very interesting, and consequently, have a high degree of motivation. Environmentally literate students become citizens who are able to weigh various aspects of an environmental issue and make responsible decisions as individuals and as members of their community. Quality, standards-based environmental education improves everyday life by protecting human health and encouraging stewardship of natural resources.

The environmental principles examine the interactions and interdependence of human societies and natural systems. The nature of these interactions is summarized in the Environmental Principles and Concepts presented below.

**Course Outline:**

**Principle I**

The continuation and health of individual human lives and of human communities and societies depend on the health of the natural systems that provide essential goods and ecosystem services. As a basis for understanding this principle students identify:

**Concept A**

Goods produced by natural systems are essential to human life and to the functioning of our economies and cultures.

**Concept B**

Ecosystem services provided by natural systems are essential to human life and to the functioning of our economies and cultures.

**Concept C**

Quality, quantity, and reliability of the goods and ecosystem services provided by natural systems are directly affected by the health of those systems.

**Principle II**

The long-term functioning and health of terrestrial, freshwater, coastal, and marine ecosystems are influenced by their relationships with human societies. As a basis for understanding this principle students identify:

**Concept A**

The direct and indirect changes to natural systems due to the growth of human populations and their consumption rates influence the geographic extent, composition, biological diversity, and viability of natural systems.

**Concept B**

The methods used to extract, harvest, transport, and consume natural resources influence the geographic extent, composition, biological diversity, and viability of natural systems.

**Concept C**

The expansion and operation of human communities influences the geographic extent, composition, biological diversity, and viability of natural systems.

**Concept D**
The legal, economic and political systems that govern the use and management of natural systems directly influence the geographic extent, composition, biological diversity, and viability of natural systems.

**Principle III**
Natural systems proceed through cycles that humans depend upon, benefit from and can alter. As a basis for understanding this principle, students identify:
**Concept A**
The natural systems proceed through cycles and processes that are required for their functioning.
**Concept B**
The human practices depend upon and benefit from the cycles and processes that operate within natural systems.
**Concept C**
The human practices can alter the cycles and processes that operate within natural systems.

**Principle IV**
The exchange of matter between natural systems and human societies affects the long-term functioning of both. As a basis for understanding this principle students need to know:
**Concept A**
The effects of human activities on natural systems are directly related to the quantities of resources consumed and to the quantity and characteristics of the resulting byproducts.
**Concept B**
The byproducts of human activity are not readily prevented from entering natural systems and may be beneficial, neutral, or detrimental in their effect.
**Concept C**
The capacity of natural systems to adjust to human-caused alterations depends on the nature of the system as well as the scope, scale, and duration of the activity and the nature of its byproducts.

**Principle V**
Decisions affecting resources and natural systems are based on a wide range of considerations and decision-making processes. As a basis for understanding this principle, students identify:
**Concept A**
The spectrum of what is considered in making decisions about resources and natural systems and how those factors influence decisions.
**Concept B**
The process of making decisions about resources and natural systems, and how the assessment of social, economic, political, and environmental factors has changed over time.
[3]Source: EEI Model Curriculum Plan, Page 14 of 152

**Course Objectives:**
<u>California State Content Standards: Environmental Science</u>
**Biology**
**Standard 6** – (Ecology) Students understand that stability in an ecosystem is a balance between competing effects.
6.1 Objective: Understand biodiversity and the effects of alterations on a habitat.
6.2 Objective: Be able to evaluate how any change in an ecosystem effect the balance in that ecosystem.
6.3 Objective: Understand the concept of population size and the effects on the community.
6.4 Objective: Understand how water, carbon, and nitrogen cycle between abiotic resources and organic matter in

the ecosystem and how oxygen cycles through photosynthesis and respiration.

6.5 Objective: Understand the significant role of decomposers and producers as a vital part of an ecosystem.

6.6 Objective: Understand at each link in a food web some energy is stored in newly made structures but much energy is dissipated into the environment as heat. This dissipation may be represented in an energy pyramid.

6.7 Objective: Understand that extinction, the dying out of a species, is a natural event.

**Standard 7** - (Evolution) Students understand the concept of evolution.

7.1 Objective: Understand the effects of genetic change on an individual organism and a lineage of organisms over time

**Standard 7a** - (Evolution) Students understand allele frequency in populations.

7a.1 Objective: Be able to explain natural selection and that it determines the differential survival of groups of organisms.

7a.2 Objective: Understand the greater the diversity of species, the greater the chance of survival during major environmental change.

7a.3 Objective: Understand the effects of genetic drift on the diversity of organisms.

7a.4 Objective: Understand reproductive or geographic isolation affects speciation.

**Standard 8** - (Evolution) Students understand the processes that affect evolution.

8.1 Objective: Understand genetic drift in a population.

8.2 Objective: Understand that speciation is affected by reproductive and geographic isolation.

8.3 Objective: Be able to analyze how fossil evidence is used to explain biodiversity, episodic speciation, and mass extinction.

**Physics**

**Standard 3 –** (Heat and Thermodynamics) Students have an understanding that energy cannot be created or destroyed although in many processes energy is transferred to the environment as heat.

3.1 Objective: Know heat flow and work are two forms of energy transfer between systems.

**Chemistry**

**Standard 3 –** (Conservation of Matter and Stoichiometry) Students understand that the conservation of atoms in chemical reactions leads to the principle of conservation of matter and the ability to calculate the mass of products and reactants.

**Standard 7 –** (Chemical Thermodynamics) Students understand chemical thermodynamics and that energy is exchanged or transformed in all chemical reactions and physical changes of matter.

7.1 Objective: Describe temperature and heat flow in terms of the motion of molecules (or atoms).

**Earth Sciences**

**Standard 4 –** Energy enters the earth system primarily as solar radiation and eventually escapes as heat.

4.1 Objective: Understand the relative amount of incoming solar energy compared with Earth's internal energy and the energy used by society.

4.2 Objective: Understand the fate of incoming solar radiation in terms of reflection, absorption, and photosynthesis.

4.3 Objective: Understand the different atmospheric gases that absorb Earth's thermal radiation and the mechanism and significance of the greenhouse effect.

**Standard 5** – Heating of Earth's surface and atmosphere by the sun drives convection within the atmosphere and oceans, producing winds and ocean currents.

5.1 Objective: Understand how differential heating of Earth results in circulation patterns in the atmosphere and oceans that globally distribute the heat.

5.2 Objective: Understand the relationship between the rotation of Earth and the circular motions of ocean currents and air in pressure centers.

5.3 Objective: Understand the origin and effects of temperature inversions.

5.4 Objective: Understand the properties of ocean water, such as temperature and salinity, can be used to explain the layered structure of the oceans, the generation of horizontal and vertical ocean currents, and the geographic distribution of marine organisms.

5.5 Objective: Understand the rain forests and deserts on Earth are distributed in bands at specific latitudes.

**Standard 6** – Climate is the long-term average of a region's weather and depends on many factors.

6.1 Objective: Understand weather (in the short run) and climate (in the long run) involves the transfer of energy into and out of the atmosphere.

6.2 Objective: Understand the effects on climate of latitude, elevation, topography, and proximity to large bodies of water and cold or warm ocean currents.

6.3 Objective: Understand how Earth's climate has changed over time, corresponding to changes in Earth's geography, atmospheric composition, and other factors, such as solar radiation and plate movement.

**Standard 7** – Each element on Earth moves among reservoirs, which exist in the solid earth, in oceans, in the atmosphere, and within and among organisms as part of biogeochemical cycles.

7.1 Objective: Understand the carbon cycle of photosynthesis and respiration and the nitrogen cycle.

7.2 Objective: Understand the global carbon cycle: the different physical and chemical forms of carbon in the atmosphere, oceans, biomass, fossil fuels, and the movement of carbon among these reservoirs.

7.3 Objective: Understand that the movement of matter among reservoirs is driven by Earth's internal and external sources of energy

**Standard 8** – Life has changed Earth's atmosphere, and changes in the atmosphere affect conditions for life.

8.1 Objective: Understand the thermal structure and chemical composition of the atmosphere.

8.2 Objective: Understand how the composition of the Earth's atmosphere has evolved over geologic time and know the effect of outgassing, the variations of carbon dioxide concentration, and the origin of atmospheric oxygen.

8.3 Objective: Understand the location of the ozone layer in the upper atmosphere, its role in absorbing ultraviolet radiation, and the way in which this layer varies both naturally and in response to human activities.

**Standard 9** – The geology of California underlies the state's wealth of natural resources as well as its natural hazards.

9.1 Objective: Understand the resources of major economic importance in California and their relation to California's geology.

9.2 Objective: Understand the principal natural hazards in different California regions and the geologic basis of those hazards.

9.3 Objective: Understand the importance of water to society, the origins of California's fresh water, and the relationship between supply and need.

**Investigation and Experimentation**

Objective: Scientific progress is made by asking meaningful questions and conducting careful investigations. As a basis for understanding this concept and addressing the content in the other four strands, students develop their own questions and perform investigations.

**Career Technical Education Standards**

A. Environmental Resources Pathway

A1.0 Identify energy resources and the effects of these resources on the environment.
A1.1 Classify energy resources by type: depletable, nondepletable, renewable, and nonrenewable.
A1.2 Discover new and emerging energy resources.
A1.3 Compare the advantages and disadvantages of energy resources in terms of the effects on the environment.
A1.4 List jobs in the community that result from, or are influenced by, processing and using energy resources.

A2.0 Identify and describe the global interactive systems and elements that create and sustain climate.
A2.1 Describe the natural elements that interact to create climate.
A2.2 Identify world climate patterns and summarize factors that affect climate.
A2.3 Analyze the impact of climate upon human activities and needs.
A2.4 Identify the greenhouse effect and climate change.
A2.5 Explain how greenhouse gases are generated.
A2.6 Assess impacts of greenhouse gases on the environment.

A3.0 Evaluate regional interactive systems and elements that create harmful environmental effects.
A3.1 Describe the sources of, and impacts attributable to, pollution and contamination.
A3.2 Recognize the actions that cause resource depletion.
A3.3 Define the causes of erosion and soil depletion.
A3.4 Describe the attributes and proliferation of hardscape.
A3.5 Identify the sources of, and impacts attributable to, habitat alteration.

A4.0 Research the environmental implications of energy conversion processes and energy transmission systems.
A4.1 Define the basic terms, characteristics, and concepts of physical and chemical processes related to energy conversion.
A4.2 Identify the basic principles of energy systems, including chemical, hydraulic, pneumatic, electrical, nuclear, solar, wind, and geothermal.
A4.3 Analyze the impacts of energy conversion processes as they relate to activities across the environment.
A5.0 Identify the role and impact of waste management systems and their operations on the environment.
A5.1 Understand the role of waste and storm water management systems, their operation, and their impact on the environment.
A5.2 Explore the causes and effects of pollution linked to wastewater treatment facilities.
A5.3 Identify wastewater treatment processes that lessen environmental impacts and improve water reuse.
A5.4 Explain the types and sources of hazardous waste and associated safety practices and legal requirements for handling and disposing of such waste.
A5.5 Design solid waste disposal processes that lessen environmental impacts and improve recycling.

A6.0 Understand the field of land use management and its potential for environmental impact.
A6.1 Describe the need for, and role of, habitat preservation.
A6.2 Describe the composition, role, and function of ecosystems, including trends affecting viability.
A6.3 Demonstrate the need for, and methods of, land use planning.
A6.4 Identify the aspects of land use planning and describe current trends.
A6.5 Summarize the relationship between land use planning and energy use and distribution.
A6.6 Explain the laws and regulations pertaining to land use planning.
A6.7 Develop strategies to maximize the effectiveness of land use planning.

A7.0 Research the role of air quality management and systems, their operations, and their impact on the environment.
A7.1 Understand the elements that create outdoor air quality.
A7.2 Summarize the causes of air pollutants and their chemical composition.
A7.3 Research air pollutants and their threat to human health.
A7.4 Understand U.S. and California laws and regulations related to air pollution control programs and health effects of air pollution.
A7.5 Describe the basic U.S. Environmental Protection Agency (EPA) and California Air Resources Board (ARB) roles and regulations.
A8.0 Implement processes to support energy efficiency.
A8.1 Understand the relationship between power and energy efficiency.
A8.2 Outline how domestic and industrial appliances and systems affect the environment, such as water units and heating and cooling systems.
A8.3 Compare costs of alternate/renewable energy sources, systems, and appliances and traditional energy sources, systems, and appliances.
A8.4 Conduct an energy audit.

A9.0 Research drinking-water sources, systems, treatment, and conservation.
A9.1 Understand water reuse: issues, strategies, technologies, and applications.
A9.2 Analyze strategies for improving energy efficiencies in water collection and distribution.
A9.3 Describe the role of environmental engineering and green energy in water systems.
A9.4 Understand the functions and operations of water storage, reservoirs, aqueducts, and dams.

A10.0 Evaluate the impact and flow management of storm water, rivers, and groundwater.
A10.1 Understand the designs and tools used in water flow management.
A10.2 Describe watershed modeling.
A10.3 Understand the principles and applications of drainage engineering.
A10.4 Use the Hydrologic Engineering Centers River Analysis System (HEC- RAS).
A10.5 Analyze and interpret contaminated harbor and river sediment.
A10.6 Describe the concerns and strategies for catastrophic storm water events and management.
A11.0 Prepare an efficient solar heated water design and installation plan.
A11.1 Identify the characteristics of solar heated water design and installation.
A11.2 Describe the requirements of solar water heaters that meet regulations.
A11.3 Describe solar hot water financial support programs and regulations.
A11.4 Analyze efficient solar water heating systems.

A12.0 Identify and analyze issues, legislation, and regulations related to energy and the environment.
A12.1 Identify and discuss major environmental laws and policies, including the regulatory and legislative processes used to create such laws.
A12.2 Understand current regulations concerning recycling, solid waste, land use management, water quality, and renewable and nonrenewable energy.
A12.3 Compare and contrast environmental laws and regulations that may have a positive or negative impact on the environment and the economy.
A12.4 Create an environmental law or regulation and explain how it will impact the environment.

**B. Energy and Power Technology Pathway**

B1.0 Explore the basic conventional and emerging principles and concepts of the energy industry, including energy production, energy transmission, and alternative energy technologies.
B1.1 Describe the past, present, and anticipated demand for, and use of, energy.
B1.2 Identify the differences and challenges in energy needs, sources, and uses in developing regions.
B1.3 Explain the flow of energy from generation through distribution to the customer.
B1.4 Demonstrate an understanding of basic direct current (DC) electrical-circuit skills.
B1.5 Identify the role and function of generation, transmission, and distribution organizations.
B1.6 Explain the different structures of energy companies, including investor-owned utilities, municipalities (and associated utility practices, such as water/wastewater), electric cooperatives, and independent power producers and the different lines of energy business, including electric and gas.
B1.7 Explain the role of regulatory bodies in the energy industry (Federal Energy Regulatory Commission, Public Utilities Commission (PUC).
B1.8 Describe the process of electric metering and billing for energy consumption.

B2.0 Identify various conventional electric power generation fuel sources and the cost and efficiency issues associated with each.
B2.1 Explain the conventional electric power generation system and process (coal, oil, natural gas, solar, wind, geothermal, and hydroelectric).
B2.2 Explain how each source was created and is used to produce electricity.
B2.3 Evaluate and list the advantages and disadvantages for each energy source.
B2.4 Describe how cost and efficiency rates are determined for each source.

B3.0 Investigate emerging and alternative electric power generation technologies and fuel sources.
B3.1 Explain biomass conversion, including thermal and chemical processes used to produce electric energy.
B3.2 Describe the major sources, scale, and impacts of biomass energy.
B3.3 Define biofuels use and production.
B3.4 Explain how nuclear power is used to produce electric energy.
B3.5 Explain the process of nuclear fission.
B3.6 Explain how ocean wave energy is used to produce electric energy.
B3.7 Describe how wave power is harnessed in near shore, offshore and far shore locations.
B3.8 Explain wave energy technologies (terminator devices, oscillating water column, point absorbers, attenuators, and overtopping devices).
B3.9 Compare and contrast the advantages and disadvantages of using ocean wave energy technologies for energy.

B4.0 Understand nonnuclear power generation plant operations (coal, oil, natural gas, solar, wind, geothermal power, hydroelectric, or biofuel).
B4.1 Explain and use the fundamental laws and principles of electricity and magnetism.
B4.2 Classify the components of electrical generating systems, including boilers, generators, alternators, turbines, motors, engines, pumps, and switchgear.
B4.3 Discriminate the differences and similarities of power generation, including use of different fuel types and different power plant uses.
B4.4 Summarize the basic operating principles of fossil, hydroelectric, and internal combustion systems.
B4.5 Describe the location of equipment in the plant, how the equipment operates, and normal operating parameters.
B4.6 Describe the theory, construction, and application of the mechanical components of various types of power generation systems.

B5.0 Understand and apply basic knowledge and skills necessary for nuclear power generation and nuclear power plant personnel.
B5.1 Use the fundamental concepts associated with electricity (e.g., electric charge, electric current).
B5.2 Understand the components of electrical systems, including switchyard construction, transformers, relays, circuit breakers, and motors.
B5.3 Explain the basic atomic and nuclear physics terms, unit, definitions, and basic concepts, including atomic structure, nuclear interactions and reactions, sources of residual heat/decay heat, and reactor operation.
B5.4 Understand reactor theory and operations.
B5.5 Explain the general design overview of the basic reactor types.
B5.6 Demonstrate understanding of reactor startup and shutdown procedures.
B5.7 Explain the fission process, including the construction of fission product barriers.
B5.8 Operate, repair, and test machines, devices, and equipment based on electrical or mechanical principles in order to diagnose machine malfunctions, using basic hand and small electric tools and equipment.
B5.9 Conduct tests and inspections of products, services, or processes to evaluate quality or performance.

B6.0 Research methods of energy procurement, transmission, distribution, and storage.
B6.1 Describe the electric power transmission principles and processes.
B6.2 Explain the need for electric distribution systems and how they are designed to operate.
B6.3 Understand the emerging technologies in electric power transmission
B6.4 Identify electric power transmission equipment and systems.

B7.0 Understand the interrelationships among components of systems.
B7.1 Understand the components and workings of the electric transmission and distribution network.
B7.2 Understand the components and workings of the gas transmission and distribution network.
B7.3 Define and explain “voltage,” “current,” “resistance,” “power,” and “energy.”
B7.4 Measure voltage, amperage, and resistance using a volt-ohm meter (VOM) and a digital volt-ohm meter (DVM).
B7.5 Explain and apply Ohm’s Law.
B7.6 Design and construct an electrical circuit with a power generation source.

**Key Assignments:**

**Biology – Standard 6 – Ecology**

1. Biogeochemical Cycles Term Maps
2. Biome Postcards
3. Tragedy of the Commons Lab
4. Carbon Cycle, Water Cycle and Nitrogen Cycle Games
5. Design an Ecosystem Lab
6. Aquatic Ecosystem Web Whole Class Activity
7. Eating at a Lower Trophic Level Lab
8. Calculating Species Diversity in a Student Parking Lot Lab – Shannon Diversity Index
9. Grass Decomposition Lab
10. Primary vs. Secondary Succession Venn Diagrams

**Biology – Standards 7 and 8 – Evolution**

1. A Step in Speciation Lab
2. Island Biogeography and Evolution Lab
3. Origami Birds Evolution Lab
4. Geologic Timeline Activity

**Physics – Standard 3 – Heat and Thermodynamics**

1. Sun vs. Shade Lab
2. Measuring Relative Humidity Lab
3. Eating at a Lower Trophic Level Lab
4. How a Power Plant Works Notes

**Chemistry – Standard 3 and 7 – Conservation of Matter, Stoichiometry and Chemical Thermodynamics**

1. Biogeochemical Cycles Term Maps
2. Ozone Lab
3. Energy Basics Problems
4. Water Quality Lab
5. Physical and Chemical Characteristics of Soil Lab
6. How a Power Plant Works Notes
7. Lab: Measuring Relative Humidity
8. Sun vs. Shade Lab

**Earth Science – Standards 4, 5, 6, 7, and 8**

1. Sun vs. Shade Lab
2. Automotive Emissions and Greenhouse Gases Lab
3. Layers of Atmosphere Worksheet
4. How Clean is the Air in San Bernardino County Lab
5. Particulate Matter and You Lab
6. Climate Change Lab
7. El Nino and Coriolis Effect Notes and slide animations
8. Solar Insolation Lab
9. Specific Heat and Climate Lab
10. Biogeochemical Cycles Term Maps
11. Carbon Cycle, Nitrogen Cycle, and Water Cycle Games
12. Aquaculture Notes and Fishing for Solutions Lab
13. Ozone Lab
14. Planet Earth video – Part I: The Living Machine

**Earth Science – Standard 9 – California Geology**

1. Planet Earth video – Part I: The Living Machine
2. California Geology, Topography, and Water Resources Lab
3. Earthquake Lab

**CTE – A. Energy Resources Pathway and B. Energy and Power Technology Pathway**

1. Solar Panel Cooker Lab and Project
2. Energy Basics Problems Worksheet
3. Energy Primer Worksheet
4. Energy Efficiency Worksheet
5. Household Energy Audit Lab
6. Household Electricity Worksheet
7. Oil Spill Lab
8. Swimming Pool Energy Worksheet

9. Water Usage Lab
10. R-value Worksheet
11. Alternative Energy Power Point Group Project
12. Green Jobs Year-End Power Point Project
13. Half-Life Problems
14. Radioactive Decay Worksheet
15. Nuclear and Alternative Energy Study Guide Questions

**Instructional Methods and/or Strategies:**

- A multitude of methods or strategies will be utilized, including but not only:
- Direct instruction
- TPS
- Collaborative groups (including unit/theme-end projects)
- Thinking maps/graphic organizers
- Interactive notebooks
- Laboratories with lab reports
- Concept or key topic posters with museum walks to follow
- Essay writing, lab design
- Improve skills in scientific notation and dimensional analysis

**Assessment Including Methods and/or Tools:**

- Grading of homework
- Class work
- Lab reports
- Topic quizzes
- Unit tests
- Two midterm exams
- Two final exams
- Group projects that include participation
- Class presentations
- Use and implementation of technology to present required material