

**MT. DIABLO UNIFIED SCHOOL DISTRICT
COURSE OF STUDY**

COURSE TITLE:	Environmental Science - Revised
COURSE NUMBER:	2360
CBEDS NUMBER:	2612
DEPARTMENT:	Science
LENGTH OF COURSE:	One Year
CREDITS PER SEMESTER:	5
GRADE LEVEL(S):	9-10
REQUIRED OR ELECTIVE:	This course fulfills one year of the high school Physical <u>or Biological</u> science requirement for graduation, and UC "g" requirement
PREREQUISITES:	None

BOARD OF EDUCATION ADOPTION: Original adoption date 6/17/13

COURSE DESCRIPTION: Environmental Science is the study of how humans affect and are in turn affected by their environment. It is the study of an ongoing relationship of how we interact with the earth and how the earth in turn responds to us. In Environmental Science we consider how our actions collectively and individually affect the environment. This introductory course provides a foundation based in earth science and builds on this to highlight the ways in which the earth adapts to a diversity of life forms. This course is designed to provide, students, primarily freshmen, with a solid foundation in scientific methodologies, laboratory skills/procedures, and biological and physical science topics. The course will be delivered using both traditional and project based formats. During the course students will identify and analyze problems within the natural world, analyze data sets, and develop and design solutions and ideas for preventing, reducing, or solving the identified problems.

COURSE OUTLINE:

1. MAJOR GOALS

1.1. Attitudes

1.1.1. To develop values, aspirations, and attitudes that promotes the individual's personal involvement with the environment and society.

1.2. Thinking Processes

1.2.1. To develop and apply rational and creative thinking processes.

1.3. Skills

1.3.1. To develop skills in the manipulation of materials and equipment.

1.3.2. To develop skills in the collection, organization, and communication of scientific information.

1.4. Knowledge

- 1.4.1. To develop knowledge of scientific processes, facts, principles, generalizations, and applications and to encourage their use to enhance the environment.

2. **PERFORMANCE OBJECTIVES** (parentheses indicate Common Core State Standards (CCSS) in Reading and Writing in Science and Technical Subjects, grades 9/10):

2.1. Attitudes

- 2.1.1. Show curiosity about objects and events.
- 2.1.2. Show an awareness of and respond in a positive manner to beauty and orderliness in the environment.
- 2.1.3. Appreciate importance of the environment to all living things.
- 2.1.4. Recognize and take interest in solving social problems related to science and technology.
- 2.1.5. Recognize that science and technology are compatible with the environment and must be used to enhance the environment.
- 2.1.6. Weigh alternative scientific, economic, psychological, or social factors when considering solutions to environmental problems.
- 2.1.7. Organize and report the results of scientific investigation in an honest and objective manner.
- 2.1.8. Show ability to subject data and ideas to the criticism of peers.
- 2.1.9. Have a critical, questioning attitude toward inferences.
- 2.1.10. Apply rational and creative thinking processes when trying to find relationships among seemingly unrelated phenomena and when seeking solutions to problems.
- 2.1.11. Give attention to and value science as an endeavor of human beings from all racial, ethnic, and cultural groups.
- 2.1.12. Consider environmental science related careers and make realistic decisions about preparing for such careers, taking into account the abilities, interests, and preparation required.

2.2. Thinking Processes

- 2.2.1. Develop ability to generate data by observing, recalling, recognizing, identifying, and measuring.
- 2.2.2. Develop ability to organize data by comparing, ordering, classifying, and relating.
- 2.2.3. Develop ability to apply and evaluate data and generate theories by hypothesizing, predicting, generalizing, theorizing, explaining, justifying, and judging.
- 2.2.4. Use data-generating and theory-building processes in a cyclic manner to solve a problem; i.e. participate in scientific inquiry at the appropriate level.

2.3. Skills Objectives

- 2.3.1. Assemble and use laboratory apparatus, tools, materials in a skillful manner, giving due attention to accident prevention.

- 2.3.2. Gather descriptive and quantitative information needed for developing or testing inferences and hypotheses by making purposeful, objective observations of things and events.
- 2.3.3. Cite specific textual evidence to support analysis of science and technical texts, attending to the precise details of explanations or descriptions. (CCSS)
- 2.3.4. Determine the central ideas or conclusions of a text; trace the text's explanation or depiction of a complex process, phenomenon, or concept; provide an accurate summary of the text. (CCSS)
- 2.3.5. Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context. (CCSS)
- 2.3.6. Analyze the structure of the relationships among concepts in a text, including relationships among key terms (e.g., force, friction, reaction force, energy). (CCSS)
- 2.3.7. Analyze the author's purpose in providing an explanation, describing a procedure, or discussing an experiment in a text, defining the question the author seeks to address. (CCSS)
- 2.3.8. Translate quantitative or technical information expressed in words in a text into visual form (e.g., a table or chart) and translate information expressed visually or mathematically (e.g., in an equation) into words. (CCSS)
- 2.3.9. Assess the extent to which the reasoning and evidence in a text support the author's claim or a recommendation for solving a scientific or technical problem. (CCSS)
- 2.3.10. Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience. (CCSS)
- 2.3.11. Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on addressing what is most significant for a specific purpose and audience. (CCSS)
- 2.3.12. Use technology, including the Internet, to produce, publish, and update individual or shared writing products, taking advantage of technology's capacity to link to other information and to display information flexibly and dynamically. (CCSS)
- 2.3.13. Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks, attending to special cases or exceptions defined in the text.
- 2.3.14. Compare and contrast findings presented in a text to those from other sources (including their own experiments), noting when the findings support or contradict previous explanations or accounts. Draw evidence from informational texts to support analysis, reflection, and research. (CCSS)
- 2.3.15. Record observations accurately and organize data and ideas in ways that enhance their usefulness.
- 2.3.16. Communicate effectively (orally and in writing) scientific procedures and information.
- 2.3.17. Conduct short as well as more sustained research projects to answer a question (including a self-generated question) or solve a problem; narrow or

broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation. (CCSS)

- 2.3.18. Gather relevant information from multiple authoritative print and digital sources (primary and secondary), using advanced searches effectively; assess the usefulness of each source in answering the research question; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and following a standard format for citation. (CCSS)
- 2.3.19. Write arguments focused on discipline-specific content. (CCSS)
 - 2.3.19.1. Introduce precise claim(s), distinguish the claim(s) from alternate or opposing claims, and create an organization that establishes clear relationships among the claim(s), counterclaims, reasons, and evidence. (CCSS)
 - 2.3.19.2. Develop claim(s) and counterclaims fairly, supplying data and evidence for each while pointing out the strengths and limitations of both claim(s) and counterclaims in a discipline-appropriate form and in a manner that anticipates the audience's knowledge level and concerns. (CCSS)
 - 2.3.19.3. Use words, phrases, and clauses to link the major sections of the text, create cohesion, and clarify the relationships between claim(s) and reasons, between reasons and evidence, and between claim(s) and counterclaims. (CCSS)
 - 2.3.19.4. Establish and maintain a formal style and objective tone while attending to the norms and conventions of the discipline in which they are writing. (CCSS)
 - 2.3.19.5. Provide a concluding statement or section that follows from or supports the argument presented. (CCSS)
- 2.3.20. Write informative/explanatory texts, including the narration of historical events, scientific procedures/experiments, or technical processes. (CCSS)
 - 2.3.20.1. Introduce a topic and organize ideas, concepts, and information to make important connections and distinctions; include formatting (e.g., headings), graphics (e.g., figures, tables), and multimedia when useful to aiding comprehension. (CCSS)
 - 2.3.20.2. Develop the topic with well-chosen, relevant, and sufficient facts, extended definitions, concrete details, quotations, or other information and examples appropriate to the audience's knowledge of the topic. (CCSS)
 - 2.3.20.3. Use varied transitions and sentence structures to link the major sections of the text, create cohesion, and clarify the relationships among ideas and concepts. (CCSS)
 - 2.3.20.4. Use precise language and domain-specific vocabulary to manage the complexity of the topic and convey a style appropriate to the discipline and context as well as to the expertise of likely readers. (CCSS)

- 2.3.20.5. Establish and maintain a formal style and objective tone while attending to the norms and conventions of the discipline in which they are writing. (CCSS)
- 2.3.20.6. Provide a concluding statement or section that follows from and supports the information or explanation presented (e.g., articulating implications or the significance of the topic). (CCSS)

- 3. **CONTENT OUTLINE** (parentheses indicate Next Generation Science standards):
 - 3.1. Unit 1: Introduction and Foundation for Environmental Science
 - 3.1.1. Introduction to Environmental Science: how scientists uncover, research, and solve environmental problems. (ESS2.A)
 - 3.1.2. Economics and Environmental Policy: balancing our own interests and needs with the health of the environment. (ESS3.C)
 - 3.1.3. Earth's Environmental Systems: how nonliving parts of Earth's systems provide the basic materials to support life. (LS2.B)
 - 3.2. Ecology.
 - 3.2.1. Population Ecology: how changes in population size relate to environmental conditions. (LS4.D)
 - 3.2.2. Evolution and Community Ecology: how organisms affect one another's survival and environment. (LS3.A, L3.B, LS4.A, LS4.B, LS4.C)
 - 3.2.3. Biomes and Aquatic Ecosystems: introduction to biomes and how the environment affects where and how an organism lives. (LS2.A, LS2.C)
 - 3.2.4. Biodiversity and Conservation: the importance of biodiversity (ESS3.C, LS4.D)
 - 3.3. Humans and the Environment.
 - 3.3.1. Human Population: the effect of human population on the environment. (LS2.A, ESS3.C)
 - 3.3.2. Environmental Health: the relationship between the health of the environment and our own health. (ESS3.C, LS4.D)
 - 3.3.3. Urbanization: balancing needs for housing and jobs with the needs of the environment. (LS4.D)
 - 3.4. Earth's Resources
 - 3.4.1. Forestry and Resource Management: wise use earth's resources. (ESS3.A)
 - 3.4.2. Soil and Agriculture: balancing the growing demand for food with the need to protect the environment. (ESS3.A)
 - 3.4.3. Mineral Resources and Mining: impact of mining on the environment. (ESS3.A)
 - 3.4.4. Water Resources: access to clean and abundant water. (ESS2.C)
 - 3.4.5. The Atmosphere : access to clean air to breathe. (ESS2.D)
 - 3.5. Toward a Sustainable Future.
 - 3.5.1. Global Climate Change: causes and consequences of a warming Earth. (ESS3.D)
 - 3.5.2. Nonrenewable Energy: nonrenewable energy sources for our energy needs. (ESS3.A, ESS3.D, PS1.A, PS1.B, PS3.A)

- 3.5.3. Renewable Energy Alternatives: potential uses and limitations of renewable energy sources. (ESS3.A, PS3.B)
- 3.5.4. Waste Management: choices as both consumers and waste producers and how these choices affect the environment. (ESS3.A, ESS3.C)
- 4. **TIME ESTIMATES:** Instructions sequences vary in length from a few days to several weeks.
- 5. **INSTRUCTIONAL MATERIALS:**
 - 5.1 District adopted textbooks
 - 5.2 Supplementary and teacher-created materials that include a career focus
 - 5.3 Technology materials and on-line resources
- 6. **EVALUATION OF STUDENT PROGRESS**
 - 6.1 Formative assessments such as warm-ups, check for understanding strategies, exit tickets, quizzes, and oral participation.
 - 6.2 Summative assessments such as quizzes, chapter tests, unit tests, labs and final exams.
 - 6.3 Student presentations that incorporate multimedia tools, relevant models or demonstrations and appropriate presentation style.
 - 6.4 Class participation and efficient, productive lab technique.
 - 6.5 Research papers that develop writing skills including the ability to organize and clearly state ideas.
 - 6.6 Lab write-ups showing that the student has a good grasp on the scientific method for example clearly stating a hypothesis, data analysis, graphs, and thoughtful discussions.
 - 6.7 Student project and field studies.

Committee Members:

College Park HS	Robert Lovelace	Teacher
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Crossroads SNHS	Christine Ulrichsen	Teacher
Student Achievement and School Support	Lorie O'Brien	Assist.Dir. Cat. School Support