Environmental Systems Course Syllabus (2015-2016)

Mr. Keller’s email is pkeller@dallasisd.org. Students and parents may contact me through email or call the Garza ECHS main number (214) 860-3680 and leave a number for call back.

Environmental Systems is a full-year college-preparatory course covering ecology, populations, water, air, soil, land, pollution, energy sources, wastes, sustainability, and environmental laws. Pre-requisites are completion of Biology, Algebra I, and Chemistry (or concurrent registration).

Staff Core Beliefs: 1. Our main purpose is to promote student success through a high-quality education. 2. For every child to succeed, we must hold students and ourselves to high expectations. 3. Only the courageous pursuit of excellence will lead to success.

Student Core Beliefs: 1. My future success depends on working hard today. 2. I have high expectations for myself, my classmates, and my school. 3. I aim for excellence even when it’s difficult.

Textbook: Environmental Science—$98.80 for loss or damage. Readings will also be assigned from library, Internet, and classroom handouts and sources. Students are responsible for obtaining and completing readings outside of class. A calculator is required and will be assigned in your math course; students may provide their own—a scientific calculator costs around ten dollars.

Expectations—Class Rules: Students are expected to: 1—Enter the classroom quietly and begin work on time; 2—Listen to instruction carefully to promote the learning process; 3—Respect everyone and only speak when it’s their turn; 4—Bring all of their supplies every day; 5—Follow all school, college, and class rules. AKA—be Positive, Productive, and Polite☺

Consequences for not meeting the expectations for behavior and productivity include initial redirection, parent (guardian) contact, parent conference, and administrative referral.

Attendance—tardy to class results in disruption and loss of learning. Students are expected to be in the classroom and beginning work at the posted start time, and are tardy (late) on entry to class after the start time—students entering after an extended time are marked absent. Records (absent and tardy) showing a pattern of being late to class three or more times will result in administrative action and parent contact. Students absent from class three or more times are missing important learning; parents will be contacted and are invited to call in advance to discuss any special circumstances.

Students are responsible for completing all work. A student absent just before or on a test day will take the test as scheduled or on the day they return. The test will be given after school during tutoring, or as arranged with the instructor outside of class time. Any special circumstances should be discussed with the instructor outside of class. Refer to the Student Handbook—DISD and Garza ECHS policy shall prevail in case of any conflict.

Grading—Six-week report card grades will be calculated on the following basis:

- 40% Class work/Outside Assignments—typically:
  - 20% Class work (CW: Includes Pop Quizzes, Labs, Notebooks, work done in class)
  - 20% Outside Assignments (OA: work outside of class)
- 20% Work Products (WP: Projects/Presentations/Lab Reports)
- 25% Exams/Tests (T: Includes Scheduled Quizzes)
- 15% 6-Week Test (T-6wk)
- 100% Total
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The semester report card grade is the average of the three six-week report card grades, each equally weighted, and the semester final exam grade, weighted as 15% of the semester grade.

Academic integrity means using your own thoughts, your own words, and doing your own work to support your own learning. This means no cheating, copying, stealing, plagiarism, or representing someone else's work as your own. Any of these actions are dishonest and will result in a parent conference and administrative referral.

Late Work will receive a maximum grade of 80 points, twenty points being deducted for each class period not turned in, and no credit given after three periods late. For example, if due Monday and turned in on Tuesday or Wednesday, the maximum possible grade is 80; and if turned in Friday (two periods late) then 60 is the maximum grade. All work must still be completed within two weeks of the due date and turned in for credit recovery of up to 50 points. A parent (guardian) contact is required if work is late three or more times in any six-weeks.

Makeup work should be arranged with the instructor outside of class in advance or on the day returning from an absence. A student has, for every day of an excused absence, two days to turn in work that was assigned on the day of the absence. Do not wait until the next class meeting to obtain missed work; get class notes from your classmates and attend a tutorial to stay on track.

Tutorials are offered 3:30 – 4:20 Monday through Friday afternoons by appointment.

Class work: Activities in class are designed to enable every student to be successful in college-level science classes. Each student will be required to keep a class notebook and folder to maintain class notes, handouts, lab notes, observations, corrected homework, and any miscellaneous items. The class notebook will also be used for Cornell notes and to collect the relevant terms as they are encountered, and will contain any data collected for projects and labs. Pages should be numbered sequentially: 1—title and name page, 2—table of contents, 3—contemporaneous notes, observations, terms, and lab work. Lab notes are records of all formal and informal observations, such as demonstrations, informal experiments, and experimental lab data for experiments that do not have a lab data form. The class notebook is the central repository of current and past work and must be brought to class each day. The class notebook should be a bound composition book or a spiral notebook. A two-pocket folder should be kept with the class notebook to organize handouts. Grades for the class notebook and folder may be assigned multiple times each six weeks. The notebook and folder will be due for turn in at any class without prior notice—keep both complete for maximum credit—notebooks and folders that are not with the student in the classroom when called for turn in are late. The notebook/folder may be called for turn in more than once each six weeks and may be called for turn in on different dates for different class sections—this is not predictable; these are considered due at every class.

Quizzes: On occasion, without prior announcement, class will begin or end with a quiz (Pop Quiz) featuring items similar to previous homework and class work topics. Pop Quiz grades are final and may not be made up or replaced. Pop Quiz grades are part of the class work grade.

Outside Assignments: For each unit, outside assignments must be completed outside of class time. The goal is for students to apply the concepts they have been learning in class. The relatively low weighting on this category is to encourage students to attack topics that may be outside their comfort zone. Much of learning comes from making mistakes, and this is an opportunity for learning. The overall grade for outside assignments is based on effort, display of critical thinking, accuracy of work, and presentation to the class—excelling here will produce higher quiz and exam grades.
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Projects: A minimum of one project must be completed each six-weeks. Projects will be assigned; however, students may submit alternative projects for instructor approval. Projects represent independent student thought and work, and are a vehicle to apply concepts and skills learned in class. Large projects that can be broken down into six-week segments will also be considered. Students wishing to participate in the Science Fair should submit their project plan for the Fall Semester with a description of the segments to be completed in each six-week period. All projects must be detailed in the class notebook and will be submitted as a presentation, construction, or formal report as assigned or agreed in advance with the instructor.

Exams: Examinations will be given approximately every one to two weeks and each may include all or a mix of multiple-choice items, problems, essay, and lab-based items. Examinations are cumulative throughout the year since mastery of concepts introduced early in the course is required to perform adequately on material that comes later in the course—many topics and skills are interrelated. Students failing a test will have until the following Tuesday or Wednesday to take a make-up test during the afternoon Tutorial Period. The grade for each 6-Week Test is final and may not be made up.

Labs: A significant portion of class time will be devoted to laboratory experiments, including field work, and the observations and investigations should be recorded in the class notebook with an individual lab report for each experiment or observation. Investigations will be identified in advance as formal or informal. Typically, up to three reports will be assigned each six-week period to be written from laboratory and project investigations.

Environmental Systems reports will be either informal or formal lab reports, scientific letters, or project reports. A scientific writing guide is included at the end of this syllabus that explains the report formats, and gives both examples and references for successful scientific writing.

Course Outline

A general sequence of topics follows—the material is cumulative, building on prior learning, and overlap is expected (adapted from Environmental Systems TEKS 112.37).

Sections 1, 2, and 3 are applied throughout the course, first through sixth 6-weeks.

(1) Scientific processes: (40% of instructional time) Conduct hands-on laboratory and field investigations using safe, environmentally appropriate, and ethical practices.
   (A) Demonstrate safe practices during laboratory and field investigations, including appropriate first aid responses to accidents that could occur in the field such as insect stings, animal bites, overheating, sprains, and breaks.
   (B) Demonstrate an understanding of the use and conservation of resources and the proper disposal or recycling of materials.

(2) Scientific processes: Use scientific methods during laboratory and field investigations.
   (A) Know the definition of science and understand that it has limitations.
   (B) Know that scientific hypotheses are tentative and testable statements that must be capable of being supported or not supported by observational evidence. Hypotheses of durable explanatory power which have been tested over a wide variety of conditions are incorporated into theories.
   (C) Know that scientific theories are based on natural and physical phenomena and are capable of being tested by multiple independent researchers. Unlike hypotheses, scientific theories are well-established and highly-reliable explanations, but may be subject to change as new areas of science and new technologies are developed.
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(D) Distinguish between scientific hypotheses and scientific theories.
(E) Follow or plan and implement investigative procedures, including making observations, asking questions, formulating testable hypotheses, and selecting equipment and technology.
(F) Collect data individually or collaboratively, make measurements with precision and accuracy, record values using appropriate units, and calculate statistically relevant quantities to describe data, including mean, median, and range.
(G) Demonstrate the use of course apparatuses, equipment, techniques, and procedures, including meter sticks, rulers, pipettes, graduated cylinders, triple beam balances, timing devices, pH meters or probes, thermometers, calculators, computers, Internet access, turbidity testing devices, hand magnifiers, work and disposable gloves, compasses, first aid kits, binoculars, field guides, water quality test kits or probes, soil test kits or probes, 100-foot appraiser's tapes, tarps, shovels, trowels, screens, buckets, and rock and mineral samples.
(H) Use a wide variety of additional course apparatuses, equipment, techniques, materials, and procedures as appropriate such as air quality testing devices, cameras, flow meters, Global Positioning System (GPS) units, Geographic Information System (GIS) software, computer models, densiometers, clinometers, and field journals.
(I) Organize, analyze, evaluate, build models, make inferences, and predict trends from data.
(J) Perform calculations using dimensional analysis, significant digits, and scientific notation.
(K) Communicate valid conclusions supported by the data through methods such as lab reports, labeled drawings, graphic organizers, journals, summaries, oral reports, and technology-based reports.

(3) Scientific processes: Use critical thinking, scientific reasoning, and problem solving to make informed decisions within and outside the classroom.

(A) In all fields of science, analyze, evaluate, and critique scientific explanations by using empirical evidence, logical reasoning, and experimental and observational testing, including examining all sides of scientific evidence of those scientific explanations, so as to encourage critical thinking by all students.
(B) Communicate and apply scientific information extracted from various sources such as current events, news reports, published journal articles, and marketing materials.
(C) Draw inferences based on data related to promotional materials for products and services.
(D) Evaluate the impact of research on scientific thought, society, and the environment.
(E) Describe the connection between environmental science and future careers.
(F) Research and describe the history of environmental science and contributions of scientists.

1st 6 Weeks (Environment)

(4) Science concepts: Know the relationships of biotic and abiotic factors within habitats, ecosystems, and biomes.

(C) Diagram abiotic cycles, including the rock, hydrologic, carbon, and nitrogen cycles.

(6) Science concepts: Know the sources and flow of energy through an environmental system.

(A) Define and identify the components of the geosphere, hydrosphere, cryosphere, atmosphere, and biosphere and the interactions among them.
(B) Explain the flow of energy in an ecosystem, including conduction, convection, and radiation.
(D) Investigate and explain the effects of energy transformations in terms of the laws of thermodynamics within an ecosystem.
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2nd 6 Weeks (Ecology)

(4) Science concepts: Know the relationships of biotic and abiotic factors within habitats, ecosystems, and biomes.
   (A) Identify native plants and animals using a dichotomous key.
   (B) Assess the role of native plants and animals within a local ecosystem and compare them to plants and animals in ecosystems within four other biomes.
   (D) Make observations and compile data about fluctuations in abiotic cycles and evaluate the effects of abiotic factors on local ecosystems and local biomes.
   (F) Predict how the introduction or removal of an invasive species may alter the food chain and affect existing populations in an ecosystem.
   (G) Predict how species extinction may alter the food chain and affect existing populations in an ecosystem.
   (H) Research and explain the causes of species diversity and predict changes that may occur in an ecosystem if species and genetic diversity is increased or reduced.

(6) Science concepts: Know the sources and flow of energy through an environmental system.
   (E) Investigate and identify energy interactions in an ecosystem.

3rd 6 Weeks (Populations)

(7) Science concepts: Know the relationship between carrying capacity and changes in populations and ecosystems.
   (A) Relate carrying capacity to population dynamics.
   (B) Calculate birth rates and exponential growth of populations.
   (D) Analyze and make predictions about the impact on populations of geographic locales due to diseases, birth and death rates, urbanization, and natural events such as migration and seasonal changes.

(8) Science concepts: Know that environments change naturally.
   (A) Analyze and describe the effects on areas impacted by natural events such as tectonic movement, volcanic events, fires, tornadoes, hurricanes, flooding, tsunamis, and population growth.
   (B) Explain how regional changes in the environment may have a global effect.
   (C) Examine how natural processes such as succession and feedback loops restore habitats and ecosystems.
   (D) Describe how temperature inversions impact weather conditions, including El Niño and La Niña oscillations.
   (E) Analyze the impact of temperature inversions on global warming, ice cap and glacial melting, and changes in ocean currents and surface temperatures.

4th 6 Weeks (Water and Air)

(5) Science concepts: Know the interrelationships among the resources within the local environmental system.
   (A) Summarize methods of land use and management and describe their effects on land fertility.
   (B) Identify source, use, quality, management, and conservation of water.
   (C) Document the use and conservation of both renewable and non-renewable resources as they pertain to sustainability.
   (D) Identify renewable and non-renewable resources that must come from outside and ecosystem such as food, water, lumber, and energy.
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(E) Analyze and evaluate the economic significance and interdependence of resources within the environmental system.
(F) Evaluate the impact of waste management methods such as reduction, reuse, recycling, and composting on resource availability.

(6) Science concepts: Know the sources and flow of energy through an environmental system.
(B) Describe and compare renewable and non-renewable energy derived from natural and alternative sources such as oil, natural gas, coal, nuclear, solar, geothermal, hydroelectric, and wind.

(7) Science concepts: Know the relationship between carrying capacity and changes in populations and ecosystems.
(C) Analyze and predict the effects of non-renewable resource depletion.

5th 6 Weeks (Soil, Land, Pollution, Energy Sources)

(4) Science concepts: Know the relationships of biotic and abiotic factors within habitats, ecosystems, and biomes.
(E) Measure the concentration of solute, solvent, and solubility of dissolved substances such as dissolved oxygen, chlorides, and nitrates and describe their impact on an ecosystem.

(9) Science concepts: Know the impact of human activities on the environment.
(A) Identify causes of air, soil, and water pollution, including point and nonpoint sources.
(B) Investigate the types of air, soil, and water pollution such as chlorofluorocarbons, carbon dioxide, pH, pesticide runoff, thermal variations, metallic ions, heavy metals, and nuclear waste.
(C) Examine the concentrations of air, soil, and water pollutants using appropriate units.
(D) Describe the effect of pollution on global warming, glacial and ice cap melting, greenhouse effect, ozone layer, and aquatic viability.
(E) Evaluate the effect of human activities, including habitat restoration projects, species preservation efforts, nature conservancy groups, hunting, fishing, ecotourism, all-terrain vehicles, and small personal watercraft, on the environment.
(F) Evaluate cost-benefit trade-offs of commercial activities such as municipal development, farming, deforestation, over-harvesting, and mining.
(G) Analyze how ethical beliefs can be used to influence scientific practices such as methods for increasing food production.
(H) Analyze and evaluate different views on the existence of global warming.
(I) Discuss the impact of research and technology on social ethics and legal practices in situations such as the design of new buildings, recycling, or emission standards.
(J) Research the advantages and disadvantages of “going green” such as organic gardening and farming, natural methods of pest control, hydroponics, xeriscaping, energy-efficient homes and appliances, and hybrid cars.
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6th 6 Weeks (Wastes, Sustainability, Laws)

(9) Science concepts: Know the impact of human activities on the environment.

(E) Evaluate the effect of human activities, including habitat restoration projects, species preservation efforts, nature conservancy groups, hunting, fishing, ecotourism, all-terrain vehicles, and small personal watercraft, on the environment.

(F) Evaluate cost-benefit trade-offs of commercial activities such as municipal development, farming, deforestation, over-harvesting, and mining.

(G) Analyze how ethical beliefs can be used to influence scientific practices such as methods for increasing food production.

(I) Discuss the impact of research and technology on social ethics and legal practices in situations such as the design of new buildings, recycling, or emission standards.

(J) Research the advantages and disadvantages of "going green" such as organic gardening and farming, natural methods of pest control, hydroponics, xeriscaping, energy-efficient homes and appliances, and hybrid cars.

(K) Analyze past and present local, state, and national legislation, including Texas automobile emissions regulations, the National Park Service Act, the Clean Air Act, the Clean Water Act, the Soil and Water Resources Conservation Act, and the Endangered Species Act.

(L) Analyze past and present international treaties and protocols such as the environmental Antarctic Treaty System, Montreal Protocol, and Kyoto Protocol.
Scientific Writing

Lab reports will be either informal or formal. Informal lab reports are recorded in the class notebook or printed lab form. Formal lab reports are submitted as typewritten manuscripts using the data recorded in the class notebook.

Environmental Systems Letters are typewritten manuscripts using the data recorded in the class notebook or information researched from library sources. This is a shortened format scientific report covering a narrow topic, and can incorporate laboratory and field observations.

Formal lab reports are comprehensive and will include the following sections: Title, Abstract, Introduction, Methods, Results, Discussion, Conclusion, and Works Cited (References). The report must be written in third-person without any personal references; occasional use of the first person is acceptable in the discussion section. The abstract should be typed single-spaced and not exceed one-half page or 250 words. It is a summary of the entire investigation and should only be as long as required to summarize the report. The introduction should include a problem statement, conceptual background, and hypothesis. The methods section will detail all materials and how they were used in the experiment in such a way that the experiment could be reproduced by someone else by reading this section. The results section contains all of the data from the experiment in tables and graphs with a written analysis of the results. The discussion section ties all of the sections together with any relevant comments about statements made in previous sections. The discussion answers the hypothesis, although this may have also been pointed out briefly in the results, and leads to the conclusion to the investigation that may point out future areas to investigate based on what was learned in the experiment. The works cited section is a list of any sources (references) used in creating the report. Sources may be from books, articles, or the Internet and must always be cited. As a citation example from a book, if information or a quotation was taken from page 21, the text would read . . . matter is not infinitely divisible (Strathern, 2000, p. 21) and the following would be in the works cited section:


Videos and images must be also be included in the works cited:


Check the APA Citation Style site, http://www2.liu.edu/cwis/cwp/library/workshop/citapa.htm or other sources on using the APA format in reports.

Project reports must follow the same guidelines; however section headings may be adjusted for the investigation conducted in case the project is not an experiment.

An online tutorial for lab report writing is available from North Carolina State University and the National Science Foundation at http://www.ncsu.edu/labwrite/index_labwrite.htm.
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PTSA (Parent Teacher Student Association) is an important part of being involved in our Garza Early College High School. Please join me in this and other opportunities to make our school the very best. Yours truly, P. Keller (Mr. Keller), Science Department. Acknowledgements follow:

I and my parents have read this syllabus. Today’s Date: _______________________

I agree to abide by all class, school, and college rules, those that are in force now, and any that may be changed or added in the future.

I understand that tutoring is available for the first half hour after school every Monday through Friday, by appointment, and that tutoring may also be provided on some Saturdays. I also understand that tutoring is mandatory if my grade average falls below a 75.

I agree to do my best every day, and to ask for help when I need it from both my teachers and my parents (guardians).

I agree to complete and return the lab safety contract and to keep my home phone number and address current so my teacher can speak with my parents (guardians).

I agree to take correspondence from my teacher home to my parent (guardian) and to return it to my teacher with parent (guardian) signature when requested.

I understand that I may be filmed in Mr. Keller’s classes and labs for the purpose of improving instruction according to Dallas Independent School District policy and agree to this and agree to sign any further releases as may be required by the Dallas Independent School District.

Please complete the bottom portion of this page to stay in contact with Mr. Keller.

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Other parent contact numbers ________________________________________________

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Please return this sheet to your instructor as soon as completed.