TTUISD - TEKS Tracker

Author Jo Anne Jackson Submission Date _____/_____/_____

Evaluator_____ Evaluation Date _____/_____/_____

TTUISD: Environmental Systems (ENVS 1B) Course v.2.0

TEKS: §112.37 High School, Beginning with School Year 2010-2011

Text: *Global Science: Energy, Resources, Environment.* 5th edition ISBN: 0-7872-9010-6

TEKS Requirement (Secondary)		Sem. B	Lesson & Assignment Number	Textbook Chapter/Page #	Bloom's Taxonomy
(a) General requirements. Students shall be awarded one credit for successful completion of this course. Suggested prerequisite: one unit high school life science and one unit of high school physical science. This course is recommended for students in Grade 11 or 12.					
(b) Introduction.					
(1) Environmental Systems. In Environmental Systems, students conduct laboratory and field investigations, use scientific methods during investigations, and make informed decisions using critical thinking and scientific problem solving. Students study a variety of topics that include: biotic and abiotic factors in habitats, ecosystems and biomes, interrelationships among resources and an environmental system, sources and flow of energy through an environmental system, relationship between carrying capacity and changes in populations and ecosystems, and changes in environments.					
(2) Nature of science. Science, as defined by the National Academy of Sciences, is the "use of evidence to construct testable explanations and predictions of natural phenomena, as well as the knowledge generated through this process." This vast body of changing and increasing knowledge is described by physical, mathematical, and conceptual models. Students should know that some questions are outside the realm of science because they deal with phenomena that are not scientifically testable.					
(3) Scientific inquiry. Scientific inquiry is the planned and deliberate investigation of the natural world. Scientific methods of investigation can be experimental, descriptive, or comparative. The method chosen should be appropriate to the question being asked.					
(4) Science and social ethics. Scientific decision making is a way of answering questions about the natural world. Students should be able to distinguish between scientific decision-making methods and ethical and social decisions that involve the application of scientific information.					
(5) Scientific systems. A system is a collection of cycles, structures, and processes that interact. All systems have basic properties that can be described in terms of space, time, energy, and matter. Change and constancy occur in systems as patterns and can be observed, measured, and modeled. These patterns help to make predictions that can be scientifically tested. Students should analyze a system in terms of its components and how these components relate to each other, to the whole, and to the external environment.					
(c) Knowledge and skills.					
(1) Scientific processes. The student, for at least 40% of instructional time, conducts hands-on laboratory and field investigations using safe, environmentally appropriate, and ethical practices. The student is expected to:					
(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; and		**B**	1,3,4,5	7/274-276,10/399-401,13/533	Remember
(B) demonstrate an understanding of the use and conservation of resources and the proper disposal or recycling of materials.		**B**	1,3,4,5	7/274-276,10/399-401,13/533	Understand
(2) Scientific processes. The student uses scientific methods during laboratory and field investigations. The student is expected to:					
(A) know the definition of science and understand that it has limitations, as specified in subsection (b)(2) of this section;		**B**	4	12/520	Understand
(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;		**B**	4	12/520	Understand

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(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;		**B**	4	12/520	Understand
(D) distinguish between scientific hypotheses and scientific theories;		**B**	4	12/520	Apply
(E) follow or plan and implement investigative procedures, including making observations, asking questions, formulating testable hypotheses, and selecting equipment and technology;		**B**	1,4,5	7/274-276,12/506-507,13/561	Apply
(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;		**B**	1,2,3,4,5	7/276,9/379-380,10/416,13/561	Apply
(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;		**B**	1,2,4,5	7/274-275,299,10/399-401,12/406-507,13/533-534,561	Apply
(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;		**B**	1,4,5	7/274-276,12/496,13/566	Apply
(I) organize, analyze, evaluate, build models, make inferences, and predict trends from data;		**B**	1,2,4,5	7/270-272,274-276,299,9/348, 13/533-534,561	Evaluate
(J) perform calculations using dimensional analysis, significant digits, and scientific notation; and		**B**	3	10/416	Apply
(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.		**B**	1,2,3,4,5,6	7/270-272,274-276,299,9/348, 13/533-534,561,14/577-578	Apply
(3) Scientific processes. The student uses critical thinking, scientific reasoning, and problem solving to make informed decisions within and outside the classroom. The student is expected to:					
(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 the student;		**B**	1,2,3,4,5,6	7/270-272,274-276,299,9/348, 13/533-534,561,14/577-578	Evaluate
(B) communicate and apply scientific information extracted from various sources such as current events, news reports, published journal articles, and marketing materials;		**B**	3,4,5	11/450,12/496-500,12/529-530	Apply
(C) draw inferences based on data related to promotional materials for products and services;		**B**	4	12/520	Analyze
(D) evaluate the impact of research on scientific thought, society, and the environment;		**B**	1,2,3,6	7/307,8/335,9/362, 10/403,11/452,14/579-580	Evaluate
(E) describe the connection between environmental science and future careers; and		**B**	1,2,3,6	7/307,8/335,9/362, 10/403,11/452,14/579-580	Understand
(F) research and describe the history of environmental science and contributions of scientists.		**B**	1,2,3,7	7/307,8/335,9/362, 10/403,11/452,15/621-622,649-650	Understand
(4) Science concepts. The student knows the relationships of biotic and abiotic factors within habitats, ecosystems, and biomes. The student is expected to:					
(A) identify native plants and animals using a dichotomous key;		**B**		Covered in Sem. A	Apply

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(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;		**B**		Covered in Sem. A	Analyze
(C) diagram abiotic cycles, including the rock, hydrologic, carbon, and nitrogen cycles;		**B**		Covered in Sem. A	Understand
(D) make observations and compile data about fluctuations in abiotic cycles and evaluate the effects of abiotic factors on local ecosystems and local biomes;		**B**	5	13/561	Evaluate
(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;		**B**	4	12/506-507	Analyze
(F) predict how the introduction or removal of an invasive species may alter the food chain and affect existing populations in an ecosystem;		**B**		Covered in Sem. A	Analyze
(G) predict how species extinction may alter the food chain and affect existing populations in an ecosystem; and		**B**		Covered in Sem. A	Analyze
(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.		**B**		Covered in Sem. A	Analyze
(5) Science concepts. The student knows the interrelationships among the resources within the local environmental system. The student is expected to:					
(A) summarize methods of land use and management and describe its effects on land fertility;		**B**	6	14/570-614	Remember
(B) identify source, use, quality, management, and conservation of water;		**B**	4	12/476-521	Understand
(C) document the use and conservation of both renewable and non-renewable resources as they pertain to sustainability;		**B**	4,6	12/494,14/583-586	Analyze
(D) identify renewable and non-renewable resources that must come from outside an ecosystem such as food, water, lumber, and energy;		**B**	1,3	7/271-271,10/424,434-435,11/463-464	Analyze
(E) analyze and evaluate the economic significance and interdependence of resources within the environmental system; and		**B**	1	7/271	Evaluate
(F) evaluate the impact of waste management methods such as reduction, reuse, recycling, and composting on resource availability.		**B**	3,4	11/442,452	Evaluate
(6) Science concepts. The student knows the sources and flow of energy through an environmental system. The student is expected to:					
(A) define and identify the components of the geosphere, hydrosphere, cryosphere, atmosphere, and biosphere and the interactions among them;		**B**	5	13/529-530	Understand
(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;		**B**	1,2,3	7/271,279,284,289,297-299,9/355,10/399-402,406,416,424-427,433-435	Analyze
(C) explain the flow of energy in an ecosystem, including conduction, convection, and radiation;		**B**	3	10/399-400	Understand
(D) investigate and explain the effects of energy transformations in terms of the laws of thermodynamics within an ecosystem; and		**B**		Covered in Sem. A	Apply
(E) investigate and identify energy interactions in an ecosystem.		**B**	1,2,3	10/399-401,9/379	Analyze
(7) Science concepts. The student knows the relationship between carrying capacity and changes in populations and ecosystems. The student is expected to:					
(A) relate carrying capacity to population dynamics;		**B**	7	15/663-664	Analyze
(B) calculate birth rates and exponential growth of populations;		**B**		Covered in Sem. A	Apply
(C) analyze and predict the effects of non-renewable resource depletion; and		**B**	1	8/314-338	Analyze
(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.		**B**		Covered in Sem. A	Analyze
(8) Science concepts. The student knows that environments change naturally. The student is expected to:					
(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**	5	13/531,535	Analyze
(B) explain how regional changes in the environment may have a global effect;		**B**	5	13/554-566	Understand

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(C) examine how natural processes such as succession and feedback loops restore habitats and ecosystems;		**B**	4	12/513	Understand
(D) describe how temperature inversions impact weather conditions, including El Niño and La Niña oscillations; and		**B**		Covered in Sem. A	Understand
(E) analyze the impact of temperature inversions on global warming, ice cap and glacial melting, and changes in ocean currents and surface temperatures.		**B**	5	13/554-566	Analyze
(9) Science concepts. The student knows the impact of human activities on the environment. The student is expected to:					
(A) identify causes of air, soil, and water pollution, including point and nonpoint sources;		**B**	4,5	12/500-506,13/534-538	Understand
(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;		**B**	4,5	12/506-507,13/534-538	Understand
(C) examine the concentrations of air, soil, and water pollutants using appropriate units;		**B**	4,5	12/506-507,13/533	Apply
(D) describe the effect of pollution on global warming, glacial and ice cap melting, greenhouse effect, ozone layer, and aquatic viability;		**B**	5	13/554-566	Understand
(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;		**B**	6	14/580-582	Evaluate
(F) evaluate cost-benefit trade-offs of commercial activities such as municipal development, farming, deforestation, over-harvesting, and mining;		**B**	2,6	14/570-614,9/363,365-367	Evaluate
(G) analyze how ethical beliefs can be used to influence scientific practices such as methods for increasing food production;		**B**		Covered in Sem. A	Analyze
(H) analyze and evaluate different views on the existence of global warming;		**B**	5	13/559-564	Evaluate
(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;		**B**	6,7	14/606-614,579-580	Evaluate
(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;		**B**	3,6	11/449,14/577-579	Evaluate
(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; and		**B**	4,5,6,7	12/376,13/532,14/608-609	Analyze
(L) analyze past and present international treaties and protocols such as the environmental Antarctic Treaty System, Montreal Protocol, and Kyoto Protocol.		**B**	7	In lesson	Analyze
Source: The provisions of this §112.37 adopted to be effective August 4, 2009, 34 TexReg 5063.					