To the Student:

After your registration is complete and your proctor has been approved, you may take the Credit by Examination for Environmental Systems 1B.

ABOUT THE EXAM

The examination for the second semester of Environmental Systems consists of 60 questions, of which 55 are true/false and multiple-choice, and 5 are short answer, and is based on the Texas Essential Knowledge and Skills (TEKS) for this subject. The full list of TEKS is included in this document (it is also available online at the Texas Education Agency website, http://www.tea.state.tx.us/). The TEKS outline specific topics covered in the exam, as well as more general areas of knowledge and levels of critical thinking. Use the TEKS to focus your study in preparation for the exam.

The examination will take place under supervision, and the recommended time limit is three hours. You may not use any notes or books. A percentage score from the examination will be reported to the official at your school.

In preparation for the examination, review the TEKS for this subject. All TEKS are assessed. It is important to prepare adequately. Since questions are not taken from any one course, you can prepare by reviewing any of the state-adopted textbooks that are used at your school. You must review all of the concepts of environmental science. The textbook used with our ENVIRSYS 1B course is:

> *Global Science, Energy, Resources, Environment*, 5th edition, by Kendall/Hunt Publishing Co. (2000).

The practice exam included in this document will give you a model of the types of questions that will be asked on your examination. It is **not** a duplicate of the actual examination. It is provided to illustrate the format of the exam, not to serve as a complete review sheet.

Good luck on your examination!

ENVIRSYS 1B Practice Exam

Take this practice exam and check your answers with the answer key that follows.

1. At the present time, which one of the following provides the greatest amount of energy for powering the U.S. economy?

   A. natural gas
   B. oil
   C. solar energy
   D. coal

2. When atoms are split, from which part of the atom is the energy released?

   A. electrons
   B. isotopes
   C. the nucleus
   D. the radioactive part

3. Why would anyone want to change coal into a gas or a liquid when it works perfectly well as a solid fuel?

   A. Homes use gas.
   B. Cars use a liquid.
   C. Both A and B.
   D. Neither A or B.

4. Which shows the correct order for total water supply from the *largest* to the *smallest* source?

   A. icecaps/glaciers, oceans, groundwater, freshwater lakes
   B. freshwater lakes, oceans, groundwater, icecaps/glaciers
   C. oceans, icecaps/glaciers, groundwater, freshwater lakes
   D. oceans, freshwater lakes, groundwater, icecaps/glaciers

5. Which of the following is often used to remove poisonous gas emissions released by industries?

   A. catalytic converters
   B. scrubbers
   C. warm inversion layer
   D. crushed limestone

continued →

6. All of the following are classifications of hazardous wastes *except*

   A. flammable or explosive.
   B. corrosive.
   C. biodegradable.
   D. toxic.

7. The most important first step for beginning to solve environmental problems is

   A. joining political action groups that work to save the environment.
   B. educating people about environmental issues and solutions.
   C. working to pass laws that protect the environment.
   D. All of the above.

8. Which of the following substances can be recovered from solid wastes?

   A. metals
   B. plastics
   C. paper
   D. All of the above.

9. The city in the United States distinguished by having the toughest pollution control program and the greatest air pollution problem is

   A. New York City, New York.
   B. Birmingham, Alabama.
   C. Boston, Massachusetts.
   D. Los Angeles, California.

10. The greenhouse effect got its name because

    A. it increases plant growth.
    B. warmth is needed for it to occur.
    C. it is a natural phenomenon.
    D. heat is trapped.

11. When neighborhood residents noticed a large number of dead fish in a local creek, they traced the problem to a nearby gas station. It turned out that a tank of antifreeze had developed a leak. This is an example of

    A. point pollution.
    B. non-point pollution.
    C. thermal pollution.
    D. groundwater pollution.

continued →

12. An advantage associated with the Darrieus rotor is that it

    A. can utilize even low wind speeds to produce electricity.
    B. uses one vane.
    C. does not have to store electricity.
    D. is not expensive to build.

13. A reactor that produces more fissionable material than it consumes is called a

    A. fission reactor.
    B. breeder reactor.
    C. fusion reactor.
    D. conventional reactor.

14. Which of the following is *not* a renewable resource used by early humans?

    A. burned kerosene
    B. burned wood
    C. flowing water
    D. food from plants and animals

15. Office buildings are part of the

    A. residential sector.
    B. commercial sector.
    C. industrial sector.
    D. transportation sector.

16. Why is surface mining a problem?

    A. Irrigation is needed to reclaim the land.
    B. It removes good topsoil from productive use.
    C. It creates erosional problems.
    D. All of the above.

17. What is the main reason why few nuclear power plants are being built today, compared to 30 years ago?

    A. Nuclear fusion power plants are being built instead.
    B. Federal laws were passed prohibiting the development of new nuclear power plants.
    C. Nuclear power plants have become too expensive to generate electricity at a reasonable cost.
    D. Supplies of ^{235}U are exhausted.

18. Uranium isotopes are all unstable until uranium atoms eventually turn into

    A. gamma rays.
    B. lead.
    C. carbon-14.
    D. uranium-235.

19. All of the following are arguments for gasifying coal *except*

A. the United States has large coal reserves.
B. processes for gasifying coal are well established and little research is necessary to make gasification a reality.
C. gasified coal can be made into a gas that can be used in the gas furnaces we presently have in our homes.
D. coal can be gasified into a low BTU gas for burning at electrical power generation plants.

20. Most current solar energy units for homes are

A. cheap to buy and cheap to operate.
B. cheap to buy and expensive to operate.
C. expensive to buy and cheap to operate.
D. expensive to buy and expensive to operate.

21. All of the following are characteristics of a eutropic lake *except*

A. the blue-green algae population is large.
B. the DO level at the surface is high.
C. carp and bullheads are representative fish.
D. the water is crystal clear.

22. The area of land from which an aquifer is filled is its

A. percolation area.
B. recharge area.
C. refill surface.
D. run-off area.

23. Which of the following statements is false? Desalinization of salt water

A. produces nearly all the fresh water in desert countries such as Saudi Arabia.
B. can be accomplished by distillation, using heat to evaporate pure water, leaving salts behind.
C. can be accomplished by pushing water molecules through a membrane with tiny holes that salt molecules cannot pass through.
D. can be accomplished by using innocuous chemicals to precipitate salts out of the water.

24. Which of the following contributes most to acid precipitation?

A. burning of fossil fuels
B. ethanol
C. radon and ozone
D. All of these contribute about equally to acid precipitation.

25. The most significant greenhouse gas emitted in large quantities by human society is

A. carbon dioxide.
B. CFCs.
C. methane.
D. nitrous oxides.

ENVIRSYS 1B Practice Exam Answer Key

1. B
2. C
3. C
4. C
5. B
6. C
7. B
8. D
9. D
10. D
11. A
12. A
13. B
14. A
15. B
16. D
17. C
18. B
19. B
20. C
21. D
22. B
23. D
24. A
25. A

Texas Essential Knowledge and Skills
ENVIRSYS 1 – Environmental Systems

§112.37. Environmental Systems, Beginning with School Year 2010-2011 (One Credit).

(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) demonstrate an understanding of the use and conservation of resources and the proper disposal or recycling of materials.

(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) 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;

(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; and

(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. 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) 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; and

(F) research and describe the history of environmental science and contributions of scientists.

(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) 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;

(C) diagram abiotic cycles, including the rock, hydrologic, carbon, and nitrogen cycles;

(D) make observations and compile data about fluctuations in abiotic cycles and evaluate the effects of abiotic factors on local ecosystems and local 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;

(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; and

(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.

(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) 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 an ecosystem such as food, water, lumber, and energy;

(E) analyze and evaluate the economic significance and interdependence of resources within the environmental system; and

(F) evaluate the impact of waste management methods such as reduction, reuse, recycling, and composting on resource availability.

(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) 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;

(C) 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; and

(E) investigate and identify energy interactions in an ecosystem.

(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) calculate birth rates and exponential growth of populations;

(C) analyze and predict the effects of non-renewable resource depletion; and

(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. 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) 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; and

(E) analyze the impact of temperature inversions on global warming, ice cap and glacial melting, and changes in ocean currents and surface temperatures.

(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) 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;

(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

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

Source: The provisions of this §112.37 adopted to be effective August 4, 2009, 34 TexReg 5063.