Climate Change and Keeping Cool

(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.

Model Climate Change with Melting Ice

(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.

How Nature Records Changes in Climate

(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.

Ocean Currents

(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.

Calcium Carbonate and Shell Production

(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.

Carbon Dioxide Levels in Seawater

(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.

Forest Fires

(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.

Albedo and Composition of Earth's Surface

(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.

Alternative Energy

(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.

Wind

(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.