

Environmental Science Institute

The University of Texas - Austin

Global Energy: The role of Texas in energy production

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This file contains suggestions for how to incorporate the material from this CD-ROM into curriculum using the Texas Essential Knowledge and Skills for Science.

Elementary

Kindergarten

(K.5) Science concepts. The student knows that organisms, objects, and events have properties and patterns. The student is expected to:

(C) recognize and copy patterns seen in charts and graphs. [slide 17- graphs can be used to show a pattern of increase and decrease.]

Science, Grade 1.

(1.5) Science concepts. The student knows that organisms, objects, and events have properties and patterns. The student is expected to:

(B) identify, predict, and create patterns including those seen in charts, graphs, and numbers. [slide 17- graphs can be used to show a pattern of increase and decrease.]

Science, Grade 2.

(2.5) Science concepts. The student knows that organisms, objects, and events have properties and patterns. The student is expected to:

(B) identify, predict, replicate, and create patterns including those seen in charts, graphs, and numbers. [slide 17- graphs can be used to show a pattern of increase and decrease.]

(2.10) Science concepts. The student knows that the natural world includes rocks, soil, water, and gases of the atmosphere. The student is expected to:

(B) identify uses of natural resources. [slide 26- How do we use the sun? If the sun's activity changes, what happens to our planet?]

Science Grade 3.

(3.8) Science concepts. The student knows that living organisms need food, water, light, air, a way to dispose of waste, and an environment in which to live. The student is expected to:

(C) describe environmental changes in which some organisms would thrive, become ill, or perish; [slide 25- Can the current rise in CO₂ be harmful to some animals or humans?]

(3.11) Science concepts. The student knows that the natural world includes earth materials and objects in the sky. The student is expected to:

(A) identify and describe the importance of earth materials including rocks, soil, water, and gases of the atmosphere in the local area and classify them as renewable, nonrenewable, or inexhaustible resources; [slide 4- What natural resource is used the most? Which is used the least? Show the impact of technology on these numbers.]

Science Grade 4.

(4.10) Science concepts. The student knows that certain past events affect present and future events. The student is expected to:

(A) identify and observe effects of events that require time for changes to be noticeable including growth, erosion, dissolving, weathering, and flow; and [slide 24 - Are we just now seeing the effects of our past use of coal and wood consumption? What can we expect to see over the next 10, 20, 30 years?]

(4.11) Science concepts. The student knows that the natural world includes earth materials and objects in the sky. The student is expected to:

(C) identify the Sun as the major source of energy for the Earth and understand its role in the growth of plants, in the creation of winds, and in the water cycle. [slide 9 & 24- The use of solar power is increasing while other forms of energy use are dropping, why is this? How do technological advances like solar power devices affect this trend?]

Science Grade 5.

(5.8) Science concepts. The student knows that energy occurs in many forms. The student is expected to:

(A) differentiate among forms of energy including light, heat, electrical, and solar energy; [slides 31-37, 43-50]

(5.11) Science concepts. The student knows that certain past events affect present and future events. The student is expected to:

(A) identify and observe actions that require time for changes to be measurable, including growth, erosion, dissolving, weathering, and flow; [slide 24, 25 -Are we just now seeing the effects of our past use of coal and wood consumption? What can we expect to see over the next 10, 20, 30 years? How does our use of fossil fuels affect the environment? Where does CO₂ come from?]

Middle School

Science Grade 6.

(6.9) Science concepts. The student knows that obtaining, transforming, and distributing energy affects the environment. The student is expected to:

(A) identify energy transformations occurring during the production of energy for human use such as electrical energy to heat energy or heat energy to electrical energy; compare methods used for transforming energy in devices such as water heaters, cooling systems, or hydroelectric and wind power plants; and
[slides 31-37, 43-50]

(C) research and describe energy types from their source to their use and determine if the type is renewable, non-renewable, or inexhaustible. [slide 30- What patterns do we see and why?]

Science Grade 7.

(7.14) Science concepts. The student knows that natural events and human activity can alter Earth systems. The student is expected to:

(C) make inferences and draw conclusions about effects of human activity on Earth's renewable, non-renewable, and inexhaustible resources.

Science Grade 8.

(8.7) Science concepts. The student knows that there is a relationship between force and motion. The student is expected to:

(B) recognize that waves are generated and can travel through different media.
[slide 18- seismic waves can be used by industry to pinpoint the location of oil. It saves consumers millions of dollars by minimizing the cost of unnecessary drilling. They also reduce the environmental impact of drilling.]

(8.12) Science concepts. The student knows that cycles exist in Earth systems. The student is expected to:

(C) predict the results of modifying the Earth's nitrogen, water, and carbon cycles. [slide 24,25- Are we just now seeing the effects of our past use of coal and wood consumption? What can we expect to see over the next 10, 20, 30 years? How does our use of fossil fuels affect the environment? Where does CO₂ come from? What are its effects on us? What will the graph of CO₂ vs. time look like after the year 2000? 2050?]

(8.14) Science concepts. The student knows that natural events and human activities can alter Earth systems. The student is expected to:

(B) analyze how natural or human events may have contributed to the extinction of some species; and [slide 24,25- Are we just now seeing the effects of our past use of coal and wood consumption? What can we expect to see over the next 10, 20, 30 years? How does our use of fossil fuels affect the environment? Where does CO₂ come from? What are the indirect effects on animals, plants and humans? What will the graph of CO₂ vs. time look like after the year 2000? 2050?]

High School

Environmental Systems.

(5) Science concepts. The student knows the interrelationships among the resources within the local environmental system. The student is expected to:

(C) document the use and conservation of both renewable and non-renewable resources; [slide 3, 4, 8 -Establish the effects of population growth and energy consumption. What can we expect if the population decrease? What natural resource do we use the most, the least? How will these numbers change with increasing technology, such as the hydroelectric car? How will this effect our need for petroleum? What form of energy consumption is currently increasing? What form of energy consumption will be increasing in 2050? Why has the use of coal decreased in the past 75 years? What about wood? What occurs over time that makes these numbers change?]

(E) analyze and evaluate the economic significance and interdependence of components of the environmental system; and [slide 3, 4, 7, 17- Establish the effects of population growth and energy consumption. How does energy consumption change with the change in GDP? Is the increase in population the only factor in energy consumption? What can we expect if the population decrease? What could we expect if energy consumption was reduced drastically? What natural resource do we use the most, the least? How will these numbers change with increasing technology, such as the hydroelectric car? How will this effect our need for petroleum? Does an increase in offshore production increase our available supply? What can we assume happens to oil prices as availability of oil increases ?]

(F) evaluate the impact of human activity and technology on land fertility and aquatic viability.[slide 10, 17, 24, 25- What are the dangers to our land and water if nuclear energy is the energy source of the future? What kind of waste does this form of energy produce? Does it affect our available supply? What can we assume happens to oil prices as availability of oil increases? Are we just now seeing the effects of our past use of coal and wood consumption? What can we expect to see over the next 10, 20, 30 years? How does our use of fossil fuels affect the environment? Where does CO₂ come from? What are its effects on us? What will the graph look like after the year 2000? 2050?]

(6) Science concepts. The student knows the sources and flow of energy through an environmental system. The student is expected to:

(A) summarize forms and sources of energy;[slide 10- what forms of energy are we highly dependent on?]

Physics.

(8) Science concepts. The student knows the characteristics and behavior of waves. The student is expected to:

(C) interpret the role of wave characteristics and behaviors found in medicinal and industrial applications. [slide 18- seismic waves can be used by industry to pinpoint the location of oil. It saves consumers millions

of dollars by minimizing the cost of unnecessary drilling. They also reduce the environmental impact of drilling.]

Geology, Meteorology, and Oceanography.

(9) Science concepts. The student knows the role of natural energy resources. The student is expected to:

(B) analyze issues regarding the use of fossil fuels and other renewable, non-renewable, or alternative energy resources; and [slide 3, 4, 7, 8, 17, 24, 25, -Establish the effects of population growth and energy consumption. What can we expect if the population decreases? What natural resource do we use the most, the least? How will these numbers change with increasing technology, such as the hydroelectric car? How will this effect our need for petroleum? What are the down side to using nuclear energy? Who decides where the nuclear plants, waste shall go? Does an increase in offshore production increase our available supply? What can we assume happens to oil prices as availability of oil increases? Are we just now seeing the effects of our past use of coal and wood consumption? What can we expect to see over the next 10, 20, 30 years? How does our use of fossil fuels affect the environment? Where does CO₂ come from? What are its effects on us? What will the graph look like after the year 2000? 2050?]

(C) analyze the significance and economic impact of the use of fossil fuels and alternative energy resources. [slide 3, 4, 7, 8, 17, 24, 25, -Establish the effects of population growth and energy consumption. What can we expect if the population decreases? What natural resource do we use the most, the least? How will these numbers change with increasing technology, such as the hydroelectric car? How will this effect our need for petroleum? Does an increase in offshore production affect our available supply? What can we assume happens to oil prices as availability of oil increases? Are we just now seeing the effects of our past use of coal and wood consumption? What can we expect to see over the next 10, 20, 30 years? How does our use of fossil fuels affect the environment? Where does CO₂ come from? What are its effects on us? What will the graph of CO₂ vs. time look like after the year 2000? 2050? What form of energy consumption is currently increasing? What form of energy consumption will be increasing in 2050? Why has the use of coal decreased in the past 75 years? What about wood? What

occurs over time that makes these numbers change? If our projected population growth is correct, what can we expect will happen to energy consumption? CO2 levels? Earth's climate? How might the cost of fuel change?]