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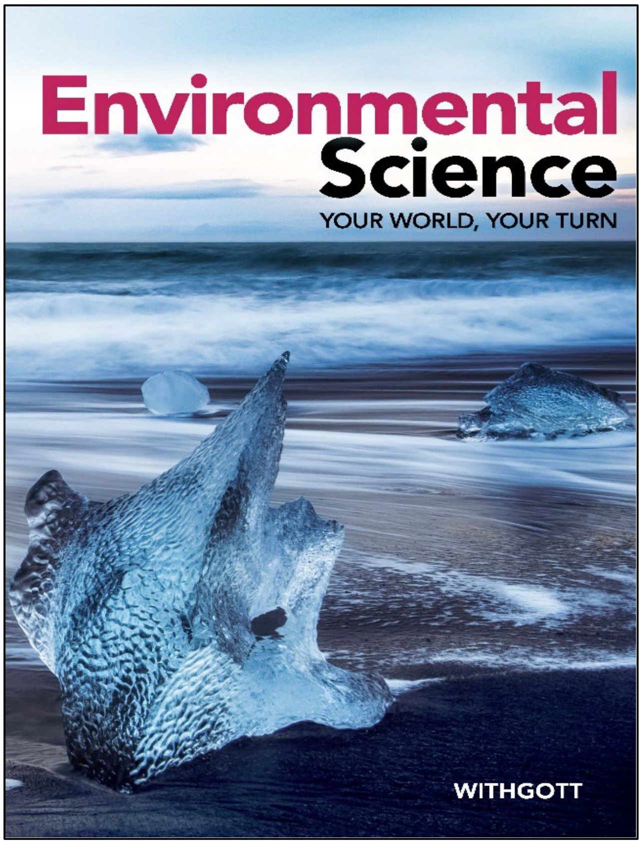

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To the

Oklahoma 2020 Academic Standards for Science
High School Environmental Science

Prepared by Savvas Learning Company, formerly Pearson K12 Learning

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EN.ESS2.7.DCI.1: Gradual atmospheric changes were due to plants and other organisms that captured carbon dioxide and released oxygen.	**SE/TE:** Producers, 84 Cellular Respiration, 85 The Missing Carbon Sink, 85 Regional Vegetation, 490
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EN.ESS3.1.CCC.1: Cause and Effect: Empirical evidence is required to differentiate between cause and correlation and make claims about specific causes and effects.	**SE/TE:** Everyday Phenomenon, 277 Investigative Phenomenon, 280 Lesson 3 Assessment, #2, #3, 501 Chapter 16 Assessment, #40, 513
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EN.ESS3.2: Evaluate competing design solutions for developing, managing, and utilizing energy and mineral resources based on cost-benefit ratios on large and small scales.	For supporting content, please see: **SE/TE:** Mining Methods, 399-402 Investigative Phenomenon, 400 554, 558, 566 Responsible Mineral Use, 411 Lesson 3 Assessment, #4, 411; #5, 535 Chapter 13 Assessment, #35, 417 Find Out More, 524 New Sources of Fossil Fuels, 528 Lesson 2 Assessment, #6, 528 Energy Conservation, 535 Benefits and Costs of Nuclear Power, 539-540 Lesson 4 Assessment, #5, 541; #3, 573 Using Coal to Generate Electricity, 542-543 Chapter 17 Assessment, #39, 547 What Do You Think?, 553 Benefits and Costs of Geothermal Energy, 555 Lesson 1 Assessment, #4, 555 Benefits and Costs of Hydropower, 558-559 Benefits and Costs of Solar Power, 565-566 Benefits and Costs of Wind Power, 568-569 Benefits and Costs of Energy from Hydrogen, 572 Are Biofuels Better For the Environment?, 574-575 Chapter 18 Assessment, #37, 579

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Disciplinary Core Ideas	
EN.ESS3.2.DCI.1: All forms of energy production and other resource extraction have associated economic, social, environmental, and geopolitical costs and risks as well as benefits. New technologies and social regulations can change the balance of these factors.	**SE/TE:** Negative Impacts of Mining, 405-408 Surface Mining Control and Reclamation Act (1977), 410 Advantages of Coal, 524 Find Out More, 524 Pollution from Fossil Fuels, 530-531 Damage Caused by Extracting Fuels, 532-533 Benefits and Costs of Nuclear Power, 539-540 Benefits of Biomass Energy, 553 Benefits and Costs of Geothermal Energy, 555 Benefits and Costs of Hydropower, 558-559 Tidal Energy, 559-560 Benefits and Costs of Solar Power, 565-566 Benefits and Costs of Wind Power, 568-569 Benefits and Costs of Energy from Hydrogen, 572
EN.ESS3.2.DCI.2: When evaluating solutions, it is important to take into account a range of constraints, including cost, safety, reliability, and aesthetics, and to consider social, cultural, and environmental impacts.	**SE/TE:** Damage Caused by Extracting Fuels, 532-533 Benefits and Costs of Nuclear Power, 539-540 Benefits of Biomass Energy, 553 Benefits and Costs of Geothermal Energy, 555 Benefits and Costs of Hydropower, 558-559 Benefits and Costs of Solar Power, 565-566 Benefits and Costs of Wind Power, 568-569 Benefits and Costs of Energy from Hydrogen, 572
Science and Engineering Practices	
EN.ESS3.2.SEP.1: Engaging in Argument from Evidence: Evaluate competing design solutions to a real-world problem based on scientific ideas and principles, empirical evidence, and logical arguments regarding relevant factors (e.g. economic, societal, environmental, ethical considerations).	**SE/TE:** Investigative Phenomenon, 407 Lesson 3 Assessment, #4, 411; #5, 535 Chapter 13 Assessment, #35, 417 Interpret Graphs, 527 Lesson 2 Assessment, #6, 528 Lesson 4 Assessment, #5, 541; #3, 573 21st Century Skills, 543, 575 What Do You Think?, 553 Lesson 1 Assessment, #4, 555 Chapter 18 Assessment, #37, 579
Crosscutting Concepts	
EN.ESS3.2.CCC.1: Scale Proportion and Quantity: Using concepts of orders of magnitude allows one to understand how a model at one scale relates to a model at another scale.	**SE/TE:** Conservation and Transportation, 535 Personal Choices, 535 Ecological Footprints, 547, 579

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Performance Expectation	
EN.ESS3.3: Use computational simulations to illustrate changes between the relationships of natural resources, human populations, and biodiversity and their sustainability within Earth systems.	**SE/TE:** Causes of Biodiversity Loss, 209-211 Lesson 2 Assessment, #3, 211 Ecosystem and Habitat Approaches, 215-517 Chapter 7 Assessment, #20, 222 Ecological Footprints, 223, 253 Impacts of Population, 242-246 Investigative Phenomenon, 245, 325 What Do You Think?, 246 Chapter 8 Assessment, #34, 253 Renewable Resource Management, 324-327 Management Approaches, 327-329 Dwindling Deposits, 527
Science and Engineering Practices	
EN.ESS3.3.SEP.1: Using Mathematical and Computational Thinking: Create a computational model or simulation of a phenomenon, design device, process, or system.	For supporting content, please see: **SE/TE:** Ecological Footprints, 223
Disciplinary Core Ideas	
EN.ESS3.3.DCI.1: The sustainability of human societies and biodiversity that supports them requires responsible management of natural resources.	**SE/TE:** Renewable Resource Management, 324-327 Investigative Phenomenon, 325 Management Approaches, 327-329 What Do You Think?, 328 Responsible Mineral Use, 411 Solutions That Reduce Demand, 433-434 Lesson 2 Assessment, #5, 434 Energy Conservation, 535
Crosscutting Concepts	
EN.ESS3.3.CCC.1: Stability and Change: Change and rates of change can be quantified and modeled over very short or very long periods of time. Some systems' changes are irreversible.	**SE/TE:** Chapter 7 Assessment, #17, #18, #19, #20, 222 Chapter 8 Assessment, #33, #34, 253 Interpret Graphs, 327, 527 Chapter 17 Assessment, #33, #34, #35, #36, 547

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Performance Expectation	
EN.ESS3.4: Evaluate design solutions for a major global or local environmental problem that reduces or stabilizes the impacts of human activities on natural systems.	**SE/TE:** Real Data, 332 Everyday Phenomenon, 502 Use and Production of Electricity, 502-503 Transportation, 504 Other Approaches to Reducing Greenhouse Gases, 505-506 Lesson 4 Assessment, #5, 507 Chapter 16 Assessment, #38, 512 Figure 8: Hydropower Dam, 557 Figure 17: How a Wind Turbine Generates Electricity, 567 How Fuel Cells Are Used, 573
Disciplinary Core Ideas	
EN.ESS3.4.DCI.1: Scientists and engineers can make major contributions by developing technologies that produce less pollution and waste and that preclude ecosystem degradation.	**SE/TE:** Vehicle Technology, 504 Air Pollution, 530 Benefits of Nuclear Power, 539 21st Century Skills, 543 Ground Source Heat Pumps, 554-555 Figure 8: Hydropower Dam, 557 Photovoltaic Cells, 562-563 Figure 13: Going Solar, 563 Concentrating Solar Power (CSP), 564 Figure 17: How a Wind Turbine Generates Electricity, 567 How Fuel Cells Are Used, 573
EN.ESS3.4.DCI.2: When evaluating solutions, it is important to take into account a range of constraints, including cost, safety, reliability, and aesthetics, and to consider social, cultural, and environmental impacts.	**SE/TE:** Benefits and Costs of Nuclear Power, 539-540 What Do You Think?, 553 Benefits and Costs of Geothermal Energy, 555 Benefits and Costs of Hydropower, 558-559 Benefits and Costs of Solar Power, 565-566 Benefits and Costs of Wind Power, 568-569 Benefits and Costs of Energy from Hydrogen, 572
Science and Engineering Practices	
EN.ESS3.4.SEP.1: Constructing Explanations: Design or refine a solution to a complex problem, based on scientific knowledge, student generated sources of evidence, prioritized criteria, and tradeoff considerations.	**SE/TE:** Real Data, 332 Lesson 4 Assessment, #5, 507 Chapter 16 Assessment, #38, 513 What Do You Think?, 553

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Crosscutting Concepts	
EN.ESS3.4.CCC.1: Stability and Change: Feedback (negative or positive) can stabilize or destabilize a system.	**SE/TE:** Feedback Loops, 73-74 Agriculture and Forestry, 505