

Project WILD and Aquatic WILD

Correlations to Indiana Science Standards, grades 9-12



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Biology

Principles of Biology

Students work with the concepts, principles, and theories that enable them to understand the living environment. They recognize that living organisms are made of cells or cell products that consist of the same components as all other matter, involve the same kinds of transformation of energy, and move using the same kinds of basic forces. Students investigate, through laboratories and fieldwork, how living things function and how they interact with one another and their environment.

B.1.7 Explain that complex interactions among the different kinds of molecules in the cell cause distinct cycles of activities, such as growth and division. Note that cell behavior can also be affected by molecules from other parts of the organism, such as hormones. (Core Standard)

PWA: Hooks and Ladders p. 43

B.1.17 Understand that and describe how the maintenance of a relatively stable internal environment is required for the continuation of life and explain how stability is challenged by changing physical, chemical, and environmental conditions, as well as the presence of disease agents.

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B.1.18 Explain that the regulatory and behavioral responses of an organism to external stimuli occur in order to maintain both short-and long-term equilibrium.

PW: Microtrek Treasure Hunt p. 82

B.1.21 Understand and explain that the information passed from parents to offspring is transmitted by means of genes which are coded in DNA molecules. (Core Standard)

PW: Bottleneck Genes p. 172

B.1.27 Explain that the similarity of human DNA sequences and the resulting similarity in cell chemistry and anatomy identify human beings as a unique species, different from all others. Likewise, understand that every other species has its own characteristic DNA sequence. (Core Standard)

PW: Urban Nature Search p. 70

B.1.28 Illustrate that the sorting and recombination of genes in sexual reproduction results in a great variety of possible gene combinations from the offspring of any two parents. Recognize that genetic variation can occur from such processes as crossing over, jumping genes, and deletion and duplication of genes. (Core Standard)

PW: Bottleneck Genes p. 172

B.1.29 Understand that and explain how the actions of genes, patterns of inheritance, and the reproduction of cells and organisms account for the continuity of life, and give examples of how inherited characteristics can be observed at molecular and whole-organism levels - in structure, chemistry, or behavior. (Core Standard)

PW: Bottleneck Genes p. 172

B.1.31 Describe how natural selection provides the following mechanism for evolution: Some variation in heritable characteristics exists within every species, and some of these characteristics give individuals an advantage over others in surviving and reproducing. Understand that the advantaged offspring, in turn, are more likely than others to survive and reproduce. Also understand that the proportion of individuals in the population that have advantageous characteristics will increase. (Core Standard)

PW: Bottleneck Genes p. 172

Dropping In On Deer p. 421

B.1.32 Explain how natural selection leads to organisms that are well suited for survival in particular environments, and discuss how natural selection provides scientific explanation for the history of life on Earth as depicted in the fossil record and in the similarities evident within the diversity of existing organisms. (Core Standard)

PW: Bottleneck Genes p. 172

B.1.36 Trace the relationship between environmental changes and changes in the gene pool, such as genetic drift and isolation of sub-populations. (Core Standard)

PW: Bottleneck Genes p. 172

B.1.37 Explain that the amount of life any environment can support is limited by the available energy, water, oxygen, and minerals, and by the ability of ecosystems to recycle the residue of dead organic materials. Recognize, therefore, that human activities and technology can change the flow and reduce the fertility of the land. (Core Standard)

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B.1.38 Understand and explain the significance of the introduction of species, such as zebra mussels, into American waterways, and describe the consequent harm to native species and the environment in general. (Core Standard)

PW: Move Over Rover p. 144
Planting Animals p. 152
Time Lapse p. 158
World Travelers p. 330
Career Critters p. 371

PWA: Blue-Ribbon Niche p. 52
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B.1.39 Describe how ecosystems can be reasonably stable over hundreds or thousands of years. Understand that if a disaster such as flood or fire occurs, the damaged ecosystem is likely to recover in stages that eventually result in a system similar to the original one. (Core Standard)

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PWA: Pond Succession p. 66
Watered-Down History p. 91
When a Whale is Right p. 94

B.1.40 Understand and explain that like many complex systems, ecosystems tend to have cyclic fluctuations around a state of rough equilibrium. However, also understand that ecosystems can always change with climate changes or when one or more new species appear as a result of migration or local evolution. (Core Standard)

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PWA: Migration Headache p. 15
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B.1.41 Recognize that and describe how human beings are part of the Earth's ecosystems. Note that human activities can, deliberately or inadvertently, alter the equilibrium in ecosystems. (Core Standard)

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Living Research: Aquatic Heroes and Heroines p. 204

B.1.43 Understand that and describe how organisms are influenced by a particular combination of living and non-living components of the environment. (Core Standard)

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B.1.44 Describe the flow of matter, nutrients, and energy within ecosystems. (Core Standard)

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PWA: Where Does Water Run? p. 21

B.1.45 Recognize that and describe how the physical or chemical environment may influence the rate, extent, and nature of the way organisms develop within ecosystems. (Core Standard)

PW: How Many Bears Can Live in This Forest? p. 23
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B.1.46 Recognize and describe that a great diversity of species increases the chance that at least some living things will survive in the face of large changes in the environment. (Core Standard)

PW: Ecosystem Facelift p. 166
Bottleneck Genes p. 172
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PWA: Edge of Home p. 75
Fishable Waters p. 158

Environment

Principles of Environmental Science

Students investigate, through laboratory and fieldwork, the concepts of environmental systems, populations, natural resources, and environmental hazards.

ENV.1.1 Know and describe how ecosystems can be reasonably stable over hundreds or thousands of years. Consider as an example the ecosystem of the Great Plains prior to the advent of the horse in Native American Plains societies, from then until the advent of agriculture, and well into the present.

PW Birds of Prey p. 111
Quick Frozen Critter p. 122
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PWA Pond Succession p. 66
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ENV.1.2 Understand and describe that if a disaster, such as flood or fire occurs, the damaged ecosystem is likely to recover in stages that eventually result in a system similar to the original one.

PW Carrying Capacity p. 46
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ENV.1.3 Understand and explain that ecosystems have cyclic fluctuations, such as seasonal changes or changes in population, as a result of migrations.

PW Oh Deer! p. 36
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PWA Migration Headache p. 15
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ENV.1.4 Understand and explain that human beings are part of the Earth's ecosystems, and give examples of how human activities can, deliberately or inadvertently, alter ecosystems.

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ENV.1.5 Explain how the size and rate of growth of the human population in any location is affected by economic, political, religious, technological, and environmental factors, some of which are influenced by the size and rate of growth of the population.

PW Arctic Survival p. 234
 Changing Societies p. 258

ENV.1.6 Describe and give examples about how the decisions of one generation both provide and limit the range of possibilities open to the next generation.

PW Habitat Lap Sit p. 61
 Ecosystem Facelift p. 166
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ENV.1.9 Diagram the cycling of carbon, nitrogen, phosphorus, and water.

PW MuskoX Maneuvers p. 130

ENV.1.10 Identify and measure biological, chemical, and physical factors within an ecosystem.

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ENV.1.11 Locate, identify, and explain the role of the major earth biomes and discuss how the abiotic and biotic factors interact within these ecosystems.

PW Move Over Rover p. 144
 Time Lapse p. 158

ENV.1.12 Explain the process of succession, both primary and secondary, in terrestrial and aquatic ecosystems.

PW Forest in a Jar p. 137
 Fire Ecologies p. 140
 Time Lapse p. 158

PWA Pond Succession p. 66

ENV.1.13 Understand and describe how layers of energy-rich organic material have been gradually turned into great coal beds and oil pools by the pressure of the overlying earth. Recognize that by burning these fossil fuels, people are passing stored energy back into the environment as heat and releasing large amounts of carbon dioxide.

PW Arctic Survival p. 234

PWA Watershed p. 132
 What's in the Air? p. 136

ENV.1.14 Recognize and explain that the amount of life any environment can support is limited by the available energy, water, oxygen, and minerals, and by the ability of ecosystems to recycle organic materials from the remains of dead organisms.

PW How Many Bears Can Live in This Forest? p. 23
 Oh Deer! p. 36
 We're In This Together p. 44
 Carrying Capacity p. 46
 Habitat Lap Sit p. 61
 Which Niche? p. 66
 What Did Your Lunch Cost Wildlife? p. 68
 Urban Nature Search p. 70
 Rainfall and the Forest p. 73
 Microtrek Treasure Hunt p. 82
 Ants on a Twig p. 88
 Birds of Prey p. 111
 Quick Frozen Critter p. 122
 Muskox Maneuvers p. 130

I'm Thirsty p. 134
 Move Over Rover p. 144
 Planting Animals p. 152
 Here Today, Gone Tomorrow p. 154
 Time Lapse p. 158
 Ecosystem Facelift p. 166
 Bottleneck Genes p. 172
 Prairie Memoirs p. 188
 Ethi-Reasoning p. 203
 Arctic Survival p. 234
 Let's Talk Turkey p. 248
 Shrinking Habitat p. 310
 Hazardous Links, Possible Solutions p. 326
 World Travelers p. 330
 Riparian Zone p. 341
 Changing the Land p. 345
 Back from the Brink p. 355
 Career Critters p. 371
 Checks and Balances p. 387
 Deer Crossing p. 394
 From Bison to Bread: The American Prairie pg. 395
 Bird Song Survey p. 406
 A Picture is Worth a Thousand Words p. 409
 Dropping In On Deer p. 421
 Deer Dilemma p. 426
 Planning for People and Wildlife p. 436
 Improving Wildlife Habitat in the Community p. 440
 Can Do! p. 446
 Sustainability: Then, Now, Later p. 449

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Migration Headache p. 15
 Designing a Habitat p. 19
 Water Canaries p. 24
 Wetland Metaphors p. 39
 Hooks and Ladders p. 43
 Blue-Ribbon Niche p. 52
 When a Whale is Right p. 94
 Puddle Wonders! p. 114
 Riparian Retreat p. 118
 Watershed p. 132
 What's in the Air? p. 136
 What's in the Water p. 140
 Something's Fishy Here! p. 145
 Alice in Waterland p. 154
 The Glass Menagerie p. 155
 Fishable Waters p. 158
 Turtle Hurdles p. 172
 Aquatic Roots p. 163
 Where Have All the Salmon Gone? p. 180
 To Dam or Not to Dam p. 170
 Dragonfly Pond p. 184

ENV.1.15 Describe how the chemical elements that make up the molecules of living things pass through food webs and are combined and recombined in different ways.

PW Eco-Enrichers p. 102

ENV.1.16 Cite examples of how all fuels have advantages and disadvantages that society must question when considering the trade-offs among them, such as how energy use contributes to the rising standard of living in the industrially developing nations. However, explain that this energy use also leads to more rapid depletion of Earth's energy resources and to environmental risks associated with the use of fossil and nuclear fuels.

PW Ethi-Reasoning p. 203
 What You Wear is What They Were p. 210
 Arctic Survival p. 234
 Flip the Switch for Wildlife p. 319
 Enviro-Ethics p. 443
 Sustainability: Then, Now, Later p. 449

PWA Watershed p. 132
 What's in the Air? p. 136
 What's in the Water p. 140
 Alice in Waterland p. 154
 The Glass Menagerie p. 155
 Fishable Waters p. 158

ENV.1.17 Describe how decisions to slow the depletion of energy sources through efficient technology can be made at many levels, from personal to national, and they always involve trade-offs of economic costs and social values.

PW Urban Nature Search p. 70
 Ethi-Reasoning p. 203
 What You Wear is What They Were p. 210
 Arctic Survival p. 234
 Flip the Switch for Wildlife p. 319
 Enviro-Ethics p. 443
 Sustainability: Then, Now, Later p. 449

PWA To Dam or Not to Dam p. 170
 Dam Design p. 193

ENV.1.18 Illustrate the flow of energy through various trophic levels of food chains and food webs within an ecosystem. Describe how each link in a food web stores some energy in newly made structures and how much of the energy is dissipated into the environment as heat. Understand that a continual input of energy from sunlight is needed to keep the process going.

PW Oh Deer! p. 36
 Which Niche? p. 66
 Urban Nature Search p. 70
 Ants on a Twig p. 88
 What's for Dinner? p. 96
 Owl Pellets p. 100
 Eco-Enrichers p. 102
 Energy Pipeline p. 105
 Hazardous Links, Possible Solutions p. 326
 Back from the Brink p. 355
 From Bison to Bread: The American Prairie pg. 395
 Improving Wildlife Habitat in the Community p. 440

PWA Migration Headache p. 15
 Micro Odyssey p. 49

Blue-Ribbon Niche p. 52
Net Gain, Net Effect p. 85
What's in the Air? p. 136
Alice in Waterland p. 154

ENV.1.19 Demonstrate and explain how the factors, such as birth rate, death rate, and migration rate, determine growth rates of populations.

PW How Many Bears Can Live in This Forest? p. 23
 Oh Deer! p. 36
 Carrying Capacity p. 46
 Quick Frozen Critter p. 122
 Here Today, Gone Tomorrow p. 154
 Bottleneck Genes p. 172
 Prairie Memoirs p. 188
 Let's Talk Turkey p. 248
 Migration Barriers p. 308
 Shrinking Habitat p. 310
 Back from the Brink p. 355
 Checks and Balances p. 387
 Deer Crossing p. 395
 From Bison to Bread: The American Prairie pg. 395
 Deer Dilemma p. 426

PWA Hooks and Ladders p. 43
 Net Gain, Net Effect p. 85
 When a Whale is Right p. 94
 The Glass Menagerie p. 155
 Fishable Waters p. 158
 Turtle Hurdles p. 172
 Aquatic Roots p. 163
 Where Have All the Salmon Gone? p. 180
 To Dam or Not to Dam p. 170
 Dam Design p. 193
 Dragonfly Pond p. 184

ENV.1.20 Demonstrate how resources, such as food supply, influence populations.

PW How Many Bears Can Live in This Forest? p. 23
 Oh Deer! p. 36
 Carrying Capacity p. 46
 Habitat Lap Sit p. 61
 What Did Your Lunch Cost Wildlife? p. 68
 Rainfall and the Forest p. 73
 Birds of Prey p. 111
 Quick Frozen Critter p. 122
 I'm Thirsty p. 134
 Move Over Rover p. 144
 Planting Animals p. 152
 Here Today, Gone Tomorrow p. 154
 Time Lapse p. 158
 Ecosystem Facelift p. 166
 Bottleneck Genes p. 172
 Prairie Memoirs p. 188
 Ethi-Reasoning p. 203
 Arctic Survival p. 234

Shrinking Habitat p. 310
Back from the Brink p. 355
Checks and Balances p. 387
Deer Crossing p. 396
From Bison to Bread: The American Prairie pg. 395
Deer Dilemma p. 426
Improving Wildlife Habitat in the Community p. 440
Can Do! p. 446

PWA Hooks and Ladders p. 43
 Net Gain, Net Effect p. 85
 When a Whale is Right p. 94
 What's in the Air? p. 136
 Alice in Waterland p. 154
 The Glass Menagerie p. 155
 Fishable Waters p. 158
 Aquatic Roots p. 163
 Where Have All the Salmon Gone? p. 180
 Dragonfly Pond p. 184

ENV.1.21 Differentiate between renewable and non-renewable resources, and compare and contrast the pros and cons of using non-renewable resources.

PW What You Wear is What They Were p. 210
 Arctic Survival p. 234
 Enviro-Ethics p. 443
 Sustainability: Then, Now, Later p. 449

PWA Sea Turtles International p. 98

ENV.1.22 Demonstrate a knowledge of the distribution of natural resources in the U. S. and the world, and explain how natural resources influence relationships among nations.

PW What You Wear is What They Were p. 210
 Arctic Survival p. 234

PWA Sea Turtles International p. 98

ENV.1.23 Recognize and describe the role of natural resources in providing the raw materials for an industrial society.

PW What You Wear is What They Were p. 210
 Arctic Survival p. 234
 Enviro-Ethics p. 443
 Sustainability: Then, Now, Later p. 449

PWA Sea Turtles International p. 98
 Water's Going On? p. 149
 Alice in Waterland p. 154

ENV.1.24 Give examples of the various forms and uses of fossil fuels and nuclear energy in our society.

PW What You Wear is What They Were p. 210
 Arctic Survival p. 234
 Enviro-Ethics p. 443

Sustainability: Then, Now, Later p. 449

ENV.1.25 Recognize and describe alternative sources of energy provided by water, the atmosphere, and the sun.

PW Ethical-Reasoning p. 203
Sustainability: Then, Now, Later p. 449

PWA Alice in Waterland p. 154
Fishable Waters p. 158
To Dam or Not to Dam p. 170
Dam Design p. 193

ENV.1.26 Identify specific tools and technologies used to adapt and alter environments and natural resources in order to meet human physical and cultural needs.

PW Fire Ecologies p. 140
Time Lapse p. 158
Ecosystem Facelift p. 166
Ethical-Reasoning p. 203
Let's Talk Turkey p. 248
History of Wildlife Management p. 267
The Hunter p. 287
Smokey Bear Said What? p. 314
Riparian Zone p. 341
Changing the Land p. 345
Back from the Brink p. 355
Career Critters p. 371
Checks and Balances p. 387
Deer Crossing p. 397
From Bison to Bread: The American Prairie pg. 395
A Picture is Worth a Thousand Words p. 409
Dropping In On Deer p. 421
Deer Dilemma p. 426
Sustainability: Then, Now, Later p. 449

PWA Migration Headache p. 15
Water's Going On? p. 149
Alice in Waterland p. 154
Fishable Waters p. 158
Aquatic Roots p. 163
Dam Design p. 193
Dragonfly Pond p. 184

ENV.1.27 Understand and describe the concept of integrated natural resource management and the values of managing natural resources as an ecological unit.

PW Fire Ecologies p. 140
Time Lapse p. 158
Ecosystem Facelift p. 166
Bottleneck Genes p. 172
Ethical-Reasoning p. 203
Pay to Play p. 216
Let's Talk Turkey p. 248
History of Wildlife Management p. 267
The Hunter p. 287

Smokey Bear Said What? p. 314
Riparian Zone p. 341
Changing the Land p. 345
Back from the Brink p. 355
Career Critters p. 371
Checks and Balances p. 387
Deer Crossing p. 398
From Bison to Bread: The American Prairie pg. 395
A Picture is Worth a Thousand Words p. 409
Dropping In On Deer p. 421
Deer Dilemma p. 426
Sustainability: Then, Now, Later p. 449

PWA Migration Headache p. 15
Water's Going On? p. 149
Alice in Waterland p. 154
Fishable Waters p. 158
Aquatic Roots p. 163
Dam Design p. 193
Dragonfly Pond p. 184

ENV.1.28 Understand and describe the concept and the importance of natural and human recycling in conserving our natural resources.

PW Bottleneck Genes p. 172
Ethi-Reasoning p. 203
Career Critters p. 371

PWA Water's Going On? p. 149
Alice in Waterland p. 154

ENV.1.29 Recognize and describe important environmental legislation, such as the Clean Air and Water Act.

PW History of Wildlife Management p. 267
Wild Bill's Fate p. 270
Know Your Legislation: What's in it for Wildlife? p. 272
The Hunter p. 287
No Water Off a Duck's Back p. 305
To Zone or Not to Zone p. 321
Hazardous Links, Possible Solutions p. 326
Riparian Zone p. 341
Cabin Conflict p. 353
Back from the Brink p. 355
From Bison to Bread: The American Prairie pg. 395
A Picture is Worth a Thousand Words p. 409
Deer Dilemma p. 426

PWA Migration Headache p. 15
Wetland Metaphors p. 39
Net Gain, Net Effect p. 85
When a Whale is Right p. 94
Sea Turtles International p. 98
Watershed p. 132
What's in the Water p. 140
Fishable Waters p. 158

Turtle Hurdles p. 172

ENV.1.30 Describe how agricultural technology requires trade-offs between increased production and environmental harm and between efficient production and social values.

PW Ethi-Reasoning p. 203
 No Water Off a Duck's Back p. 305
 Hazardous Links, Possible Solutions p. 326
 Career Critters p. 371
 From Bison to Bread: The American Prairie pg. 395
 Can Do! p. 446

PWA Migration Headache p. 15
 Where Does Water Run? p. 21
 Alice in Waterland p. 154
 The Glass Menagerie p. 155
 Fishable Waters p. 158
 Dragonfly Pond p. 184

ENV.1.31 Understand and explain that waste management includes considerations of quantity, safety, degradability, and cost. Also understand that waste management requires social and technological innovations because waste-disposal problems are political and economic as well as technical.

PW No Water Off a Duck's Back p. 305
 Career Critters p. 371
 Planning for People and Wildlife p. 436
 Sustainability: Then, Now, Later p. 449

PWA Something's Fishy Here! p. 145
 Alice in Waterland p. 154
 The Glass Menagerie p. 155
 Fishable Waters p. 158
 To Dam or Not to Dam p. 170

ENV.1.34 Differentiate between natural pollution and pollution caused by humans and give examples of each.

PW What Did Your Lunch Cost Wildlife? p. 68
 Here Today, Gone Tomorrow p. 154
 Time Lapse p. 158
 Ethi-Reasoning p. 203
 Pay to Play p. 216
 No Water Off a Duck's Back p. 305
 Career Critters p. 371
 Litter We Know p. 434
 Planning for People and Wildlife p. 436
 Sustainability: Then, Now, Later p. 449

PWA Migration Headache p. 15
 Where Does Water Run? p. 21
 Water Canaries p. 24
 Watershed p. 132
 What's in the Air? p. 136
 What's in the Water p. 140
 Something's Fishy Here! p. 145

Alice in Waterland p. 154
The Glass Menagerie p. 155
Fishable Waters p. 158
Turtle Hurdles p. 172
Dragonfly Pond p. 184

ENV.1.35 Compare and contrast the beneficial and harmful effects of an environmental stressor, such as herbicides and pesticides, on plants and animals. Give examples of secondary effects on other environmental components.

PW What Did Your Lunch Cost Wildlife? p. 68
 Here Today, Gone Tomorrow p. 154
 Time Lapse p. 158
 Ethi-Reasoning p. 203
 Changing Societies p. 258
 No Water Off a Duck's Back p. 305
 Hazardous Links, Possible Solutions p. 326
 Career Critters p. 371
 Can Do! p. 446

PWA Migration Headache p. 15
 Where Does Water Run? p. 21
 Watershed p. 132
 Alice in Waterland p. 154
 The Glass Menagerie p. 155
 Fishable Waters p. 158
 Dragonfly Pond p. 184
 What's in the Water p. 140

Earth Sciences

Principles of Earth Sciences

Students investigate, through laboratory and fieldwork, the universe, the Earth, and the processes that shape the Earth. They understand that the Earth operates as a collection of interconnected systems that may be changing or may be in equilibrium. Students connect the concepts of energy, matter, conservation, and gravitation to the Earth, solar system, and universe. Students utilize knowledge of the materials and processes of the Earth, planets, and stars in the context of the scales of time and size

ES.1.18 Demonstrate the possible effects of atmospheric changes brought on by things such as acid rain, smoke, volcanic dust, greenhouse effect, and ozone depletion. (Core Standard)

PWA What's in the Air? p. 136

ES.1.20 Describe the relationship among ground water, surface water, and glacial systems. (Core Standard)

PWA Water Wings p. 110
 How Wet Is Our Planet? p. 121
 Water's Going On? p. 149
 Alice in Waterland p. 154

ES.1.21 Identify the various processes that are involved in the water cycle. (Core Standard)

PWA Where Does Water Run? p. 21
 How Wet Is Our Planet? p. 121

Water's Going On? p. 149
Alice in Waterland p. 154

ES.1.22 Compare the properties of rocks and minerals and their uses.

PWA Water Wings p. 110

ES.1.25 Investigate and discuss the origin of various landforms, such as mountains and rivers, and how they affect and are affected by human activities.

PWA Where Does Water Run? p. 21

ES.1.26 Differentiate among the processes of weathering, erosion, transportation of materials, deposition, and soil formation. (Core Standard)

PWA Where Does Water Run? p. 21
Riparian Retreat p. 118
What's in the Water p. 140
The Glass Menagerie p. 155

Chemistry

Principles of Chemistry

Students begin to conceptualize the general structure of the atom and the roles played by the main parts of the atom in determining the properties of materials. They investigate, through such methods as laboratory work, the nature of chemical changes and the role of energy in those changes.

C.1.2 Determine the properties and quantities of matter such as mass, volume, temperature, density, melting point, boiling point, conductivity, solubility, color, numbers of moles, and pH (calculate pH from the hydrogen-ion concentration), and designate these properties as either extensive or intensive. (Core Standard)

PWA Eat and Glow p. 69
What's in the Air? p. 136
The Glass Menagerie p. 155

C.1.26 Describe physical changes and properties of matter through sketches and descriptions of the involved materials. (Core Standard)

PWA Eat and Glow p. 69
What's in the Air? p. 136
The Glass Menagerie p. 155