

# ENVIRONMENTAL SCIENCE PACING GUIDE

Santa Rosa County Math & Science Department  
Teacher Created and Reviewed

## **Unit 1- Introduction** Weeks 2-3

- Chapter 1- Science and Our Environment
  - Section 1- Understanding Our Environment
  - Section 2- The Environment and Society
- Chapter 2 - Tools of Environmental Science
  - Section 1- Scientific Methods
  - Section 2- Statistics and Models
  - Section 3- Making Informed Decisions
- Chapter 3- The Dynamic Earth
  - Section 1- The Geosphere
  - Section 2- The Atmosphere
  - Section 3- The Hydrosphere and Biosphere

## **Unit 2- Ecology** Weeks 4-11

- Chapter 4- The Organization of Life
  - Section 1- Ecosystems: Everything Is Connected
  - Section 2- Evolution
  - Section 3- The Diversity of Living Things
- Chapter 5- How Ecosystems Work
  - Section 1- Energy Flow in Ecosystems
  - Section 2- The Cycling of Matter
  - Section 3- How Ecosystems Change
- Chapter 6- Biomes
  - Section 1- What Is a Biome?
  - Section 2- Forest Biomes
  - Section 3- Grassland, Desert, and Tundra Biomes
- Chapter 7- Aquatic Ecosystems
  - Section 1- Freshwater Ecosystems
  - Section 2- Marine Ecosystems

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## **Unit 1 Suggested Activities**

Field Activity: What's an Ecosystem?

Data Analysis: Risk Assessment

Simulation: Beaches

Differentiated Instruction: Group Activity-Tragedy of the Commons

## **Unit 2 Suggested Activities**

Behavior Analysis: How Do Brine Shrimp Select and Habitat?

Data Analysis: Factors That Influence Ecosystems

Field Activity- Identify Your Local Biome

Observation- Eutrophication: Too Much of a Good Thing

## **Unit 3- Populations** Weeks 12-18

Chapter 8- Understanding Populations

Section 1- How Populations Change in Size

Section 2- How Species Interact with Each Other

Chapter 9- Human Population

Section 1- Studying Human Populations

Section 2- Changing Population Trends

Chapter 10- Biodiversity

Section 1- What is Biodiversity

Section 2- Biodiversity at Risk

Section 3- The Future of Biodiversity

## **Unit 4- Water, Air, and Land** Weeks 19- 26

Chapter 11- Water

Section 1- Water Sources

Section 2- Water Use and Management

Section 3- Water Population

Chapter 12- Air

Section 1- What Causes Air Pollution

Section 2- Air, Noise, and Light Pollution

Section 3- Acid Precipitation

Chapter 13- Atmosphere and Climate Change

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Section 1- Climate  
Section 2- The Ozone Shield  
Section 3 Climate Change

## Chapter 14- Land

Section 1- How We Use Land  
Section 2- Urban Land Use  
Section 3- Land Management and Conservation

## Chapter 15- Food and Agriculture

Section 1- Feeding the World  
Section 2- Crops and Soil  
Section 3- Animals and Agriculture

### **Unit 3 Suggested Activities**

Observation: Calculating Generation Rate  
Data Analysis: How Will Our Population Grow  
Field Activity: Differences in Diversity

### **Unit 4 Suggested Activities**

Simulation: Groundwater Filters  
Simulation: The Acid Test  
Environmental Engineering: Build a Model of Global Air Movement  
Modeling- Creating a Land-Use Model  
Simulation: Managing the Moisture in Garden Soil

### **Unit 5- Mineral and Energy Resources** Weeks 27-32

Chapter 16- Mining and Mineral Resources  
Section 1- Minerals and Mineral Resources  
Section 2- Mineral Exploration and Mining  
Section 3- Mining Regulations and Mine Reclamation  
Chapter 17- Nonrenewable Energy  
Section 1- Energy Resources and Fossil Fuels  
Section 2- Nuclear Energy  
Chapter 18- Renewable Energy  
Section 1- Renewable Energy Today

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Section 2- Developing Energy Technologies

Chapter 19- Waste

Section 1- Solid Waste

Section 2- Reducing Solid Waste

Section 3 Hazardous Waste

**Unit 6- Our Health and Our Future** Weeks 33-36

Chapter 20- The Environment and Human Health

Section 1- Pollution and Human Health

Section 2- Biological Hazards

Chapter 21- Economics, Policy, and the Future

Section 1- Economics and International Cooperation

Section 2- Environmental Policies in the United States

Section 3- The Importance of the Individual

**Unit 5 Suggested Activities**

Observation: Extraction of Copper from Its Ore

Data Analysis: Your Household Energy Consumption

Modeling: Blowing in the Wind

Data Analysis: Out of Sight- Out of Mind

**Unit 6 Suggested Activities**

Data Analysis: Lead Poisoning and Mental Ability

Research: Be an Environmental Scientist

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Time Frame	Chapter/Lesson	Suggested Activities	Vocabulary	SSS Benchmark
Week 1 5 days	<b>Introductory: Lab Safety etc...</b>	Please consult the textbook for activities and labs appropriate for each unit and chapter.		
Weeks 2-6	<p><b>Unit 1 Introduction</b></p> <p><b>Chapter 1: An Introduction to Environmental science</b> Lesson 1: Our Island, Earth Lesson 2: The Nature of Science Lesson 3: The Community of Science</p> <p><b>Chapter 2: Economics and Environmental Policy</b> Lesson 1: Economics Lesson 2; United States Environmental Policy Lesson 3:International Environmental Policy and Approaches</p> <p><b>Chapter 3: Earth’s Environmental Systems</b></p>		Environment, Environmental science Environmentalism, Natural resource Renewable resource Nonrenewable resource Sustainable Fossil fuel Ecological footprint Hypothesis Prediction Independent variable Dependent variable Controlled study data	<b>N.1.1</b> <b>N.1.2</b> <b>N.1.3</b> <b>N.1.4</b> <b>N.1.5</b> <b>N.1.6</b> <b>N.1.7</b> <b>N.2.1</b> <b>N.2.2</b> <b>N.2.4</b> <b>N.2.5</b> <b>N.3.1</b> <b>N.3.5</b> <b>SC.912.E.6.6</b> <b>SC.912.L.17.18</b> <b>L.17.13</b> <b>L.17.15</b> <b>L.14.6</b> <b>L.16.10</b>
Week 7-9	<p><b>Unit 2: Ecology</b></p> <p>Chapter 4: Population Ecology Lesson 1:  Lesson 2:</p>		Ecology, Species, Population, Community Ecosystem, Biosphere Biotic factor, Abiotic factor Habitat Population size population density Population distribution Age structure, Age structure diagram Sex ratio Survivorship curve	SC.912.L.17.6 – compare and contrast the relationships among organisms, including predation, parasitism, competition, commensalism, and mutualism SC.912.L.17.1 – Discuss the characteristics of populations, such as number of individuals, age structure, density, and pattern of distribution



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	Lesson 2: Biomes  Lesson 3: Aquatic Ecosystems  Chapter 7; Biodiversity and Conservation Lesson 1: Our planet of Life Lesson 2: Extinction and Biodiversity Lesson 3:		Upwelling Biodiversity Species diversity Genetic diversity Ecosystem diversity Extirpation Endangered species, Threatened species Habitat fragmentation Poaching Endangered species act (ESA) Captive breeding Species survival plan (SSP) Biodiversity hotspot Endemic	SC.912.L.15.3 – describe how biological diversity is increased by the origin of new species and how it is decreased by the natural process of extinction.
Weeks 13-17	<b>Unit 3 Humans and the Environment</b>  Chapter 8: Human Population  Lesson 1 Lesson 2 Lesson 3  Chapter 9 Environmental Health Lesson 1 Lesson 2 Lesson 3 Lesson 4  Chapter 10 Urbanization Lesson 1 Lesson 2 Lesson 3		Industrial revolution Infant mortality, Life expectancy, Growth rate Demography Total fertility rate Replacement fertility Demographic transition Wealth gap Environmental health Hazard Pathogen, Epidemiology Toxicology, Toxicity Dose, Response Dose-response relationship Risk, Risk assessment Infectious disease Emerging disease Pollution, Carcinogen, Teratogen Neurotoxin Asbestos, Radon Bioaccumulation, Biomagnifications Earthquake, Landslide, Tsunami, Volcano Tornado, Hurricane, Thunderstorm Avalanche Land cover, Land use Urban area, Rural area Urbanization Infrastructure Heat island Sprawl City planning Geographic information system Zoning	SC.912.L.17.1 SC.912.L.17.20 – Predict the impact of individuals on environmental systems and examine how human lifestyles affect sustainability. HE.912.C.1.3 – Evaluate how environment and personal health are interrelated. SC.912.L.14.6 – Explain the significance of genetic factors, environmental factors, and pathogenic agents to health from the perspectives of both individual and public health. SC.912.L.17.18 – Describe how human population size and resource use relate to environmental quality SC.912.L.17.20 – Predict the impact of individuals on environmental systems and examine how human lifestyles affect sustainability

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WEEK 18	<b>End of 2<sup>nd</sup> 9 weeks</b> <b>End of First Semester</b> <b>SEMESTER EXAMS</b>		Urban growth boundary Smart growth Ecological restoration greenway	
Weeks 19-22	<b>Unit 4 Earth's Resources</b>  Chapter 11:Forestry and Resource  Chapter 12 :Soil and Agriculture		Resource management Maximum sustainable yield (MSY) Ecosystem-based management, Adaptive management Even-aged, Uneven-aged Clear-cutting, Seed-tree approach Shelterwood approach Selection system Deforestation, Old-growth forest Soil, Parent material, Bedrock Weathering Soil horizon, Soil profile Clay, Silt, Sand, Laom Soil degredation Intercropping, Crop rotation Cover crop, Shelterbelt Tilling, Terracing, Contour farming Overgrazing, Desertification Irrigation, Salinization Pesticides	SC.912.L.17.13 – discuss the need for adequate monitoring of environmental parameters when making policy decisions. SC.912.L.17.11 – evaluate the costs and benefits of renewable and nonrenewable resources, such as water, energy, fossil fuels, wildlife, and forests. SC.912.L.17.12 – Discuss the political, social, and environmental consequences of sustainable use of land. SC.912.L.17.19 – describe how different natural resources are produced and how their rates of use and renewal limit availability. SC.912.L.17.20 SC.912.L.17.15 – discuss the effects of technology on environmental quality. SC.912.L.17.14 – discuss the need for adequate waste management strategies. SC.912.L.17.16 – discuss the large-scale environmental impacts resulting from human activity, including waste spills, oil spills, runoff, greenhouse gases, ozone depletion and surface and groundwater pollution.
Weeks 23-25	Chapter 13:Mineral Resources and Mining  Chapter 14: Water resources		Mineral, precipitation, polymorph Rock, rock cycle Ore Strip mining, surface mining, open pit mining Mountaintop removal, placer mining Tailings, smelting Acid drainage Fresh water, surface water, runoff River system, watershed, groundwater Permeable, impermeable Aquifer, water table, recharge zone, well Water diversion, dam, reservoir Salinization, desalinization, xeriscaping Point-source pollution, non-point-source pollution Cultural eutrification Wastewater, algal bloom, pathogen, red tide Septic system	
Weeks 26-27	Chapter 15:The Atmosphere			

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	Lesson 1 Lesson 2 Lesson 3		Atmosphere, relative humidity, air pressure Troposphere, stratosphere, ozone layer, mesosphere, thermosphere, radiation, conduction, convection convection current, air mass, front air pollution, emission fossil fuel primary air pollutant, secondary air pollutant smog, temperature inversion, acid deposition clean air act, catalytic converter, scrubber ozone hole, chlorofluorocarbon Montreal protocol	
	<b>End of the 3<sup>rd</sup> 9 weeks</b>			
Weeks 28-29	<b>Unit 5: Toward A Sustainable Future</b>  <b>Chapter 16: Global climate change</b>  Lesson 1  Lesson 2  Lesson 3  Lesson 4		Greenhouse effect, greenhouse gas thermohaline circulation, El Nino topography global climate change, global warming proxy indicator, climate model, fossil fuel coral bleaching carbon footprint, carbon tax, carbon offset carbon sequestration, Kyoto protocol	SC.912.E.7.9 – cite evidence that the ocean has had a significant influence on climate change by absorbing, storing, and moving heat, carbon and water. SC.912.L.17.4 – Describe changes in ecosystems resulting from seasonal variations, climate change, and succession.
Weeks 30-32	<b>Chapter 17: Nonrenewable Energy</b> <b>Lesson 1</b> <b>Lesson 2</b> <b>Lesson 3</b> <b>Lesson 4</b>		energy, kinetic energy, potential energy combustion, energy efficiency renewable energy, nonrenewable energy electricity strip mining, subsurface mining petroleum, petrochemical, oil sands, shale methane hydrate acid drainage, energy conservation nuclear energy, nuclear fission, nuclear reactor, meltdown, nuclear waste, nuclear fusion	SC.912.P.10.1 – Differentiate between the various forms of energy and recognize that they can be transformed from one form to another. SC.912.L.17.19 – Describe how different natural resources are produced and how their rates of use and renewal limit availability. SC.912.E.6.6 – Analyze past, present, and potential future consequences to the environment resulting from various energy production technologies.
Weeks 33-35	<b>Chapter 18: Renewable Energy Sources</b> <b>Lesson 1</b>		biomass energy, biofuel, biopower, geothermal energy, ground source heat pump hydropower, tidal energy ocean thermal energy conversion	

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Week 36	<b>Lesson 2</b> <b>Lesson 3</b> <b>Lesson 4</b>  <b>Chapter 19: Waste management</b> <b>Lesson 1</b> <b>Lesson 2</b> <b>Lesson 3</b>		passive solar heating, active solar heating flat-plate solar collector, photovoltaic cell concentrating solar power wind turbine, wind farm electrolysis, fuel cell  waste, municipal solid waste, industrial waste hazardous waste, sanitary landfill, leachate incineration source reduction, biodegradable, composting recycling, material recovery facility e-waste, surface impoundment, deep-well injection, radioactive waste, Superfund	SC.912.L.17.11 – Evaluate the costs and benefits of renewable and nonrenewable resources, such as water, energy, fossil fuels, wildlife and forests.  SC.912.L.17.14 – assess the need for adequate waste management strategies. SC.912.L.17.20 – Predict the impact of individuals on environmental systems and examine how human lifestyles affect sustainability/
Week 37	<b>Review for semester exam and catch up</b>			
WEEK 38	<b>SEMESTER EXAMS</b>			