ENVIRONMENTAL SCIENCE CURRICULUM MAP 2022-23

Course Description

Laboratory investigations that include the use of scientific inquiry, research, measurement, problem solving, laboratory apparatus and technologies, experimental procedures, and safety procedures are an integral part of this course. The National Science Teachers Association (NSTA) recommends that at the high school level, all students should be in the science lab or field, collecting data every week. School laboratory investigations (labs) are defined by the National Research Council (NRC) as an experience in the laboratory, classroom, or the field that provides students with opportunities to interact directly with natural phenomena or with data collected by others using tools, materials, data collection techniques, and models (NRC, 2006, p. 3). Laboratory investigations in the high school classroom should help all students develop a growing understanding of the complexity and ambiguity of empirical work, as well as the skills to calibrate and troubleshoot equipment used to make observations. Learners should understand measurement error; and have the skills to aggregate, interpret, and present the resulting data (National Research Council, 2006, p.77; NSTA, 2007).

Instructional Practices

Teaching from a range of complex text is optimized when teachers in all subject areas implement the following strategies on a routine basis:

A. Ensuring wide reading from complex text that varies in length.

B. Making close reading and rereading of texts central to lessons.

C. Emphasizing text-specific complex questions, and cognitively complex tasks, reinforce focus on the text and cultivate independence.

D. Emphasizing students supporting answers based upon evidence from the text.

E. Providing extensive research and writing opportunities (claims and evidence).

Semester 1

Unit 1-Introduction to Environmental Science

Weeks 1-4 (4 weeks)

UNIT/ORGANIZING PRINCIPLE:	Suggested PACING: CH 1 = 1wk, CH 2 = 1wk, CH 3 = 2wks
Introduction to Environmental Science, Ecology	TOTAL = 4 weeks (Traditional 45-50min classes)

STANDARDS:

EMBEDDED THROUGHOUT	SC.912.L.17.15:	Discuss the effects of technology on environmental quality.
EMBEDDED THROUGHOUT	SC.912.L.17.20:	Predict the impact of individuals on environmental systems and examine how human lifestyles affect sustainability.

Ch 1 & 2

CHAPTER 1 AND EMBEDDED	SC.912.N.1.1:	Define a problem based on a specific body of knowledge, for example: biology, chemistry, physics, and earth/space science, and do the following: **1. Pose questions about the natural world,** (Articulate the purpose of the investigation and identify the relevant scientific concepts). **2. Conduct systematic observations,** (Write procedures that are clear and replicable. Identify observables and examine relationships between test (independent) variable and outcome (dependent) variable. Employ appropriate methods for accurate and consistent observations; conduct and record measurements at appropriate levels of precision. Follow safety guidelines). **3. Examine books and other sources of information to see what is already known,** **4. Review what is known in light of empirical evidence,** (Examine whether available empirical evidence can be interpreted in terms of existing knowledge and models, and if not, modify or develop new models). **5. Plan investigations,** (Design and evaluate a scientific investigation). **6. Use tools to gather, analyze, and interpret data (this includes the use of measurement in metric and other systems, and also the generation and interpretation of graphical representations of data, including data tables and graphs),** (Collect data or evidence in an organized way. Properly use instruments, equipment, and materials (e.g., scales, probeware, meter sticks, microscopes, computers) including set-up, calibration, technique, maintenance, and storage). **7. Pose answers, explanations, or descriptions of events,** **8. Generate explanations that explicate or describe natural phenomena (inferences),** **9. Use appropriate evidence and reasoning to justify these explanations to others,** **10. Communicate results of scientific investigations, and** **11. Evaluate the merits of the explanations produced by others.**
CHAPTER 1 AND EMBEDDED	SC.912.N.1.2:	Describe and explain what characterizes science and its methods.
CHAPTER 1 AND EMBEDDED	SC.912.N.1.3:	Recognize that the strength or usefulness of a scientific claim is evaluated through scientific argumentation, which depends o critical and logical thinking, and the active consideration of alternative scientific explanations to explain the data presented.

CHAPTER 1 AND EMBEDDED	SC.912.N.1.4:	Identify sources of information and assess their reliability according to the strict standards of scientific investigation.
CHAPTER 1 AND EMBEDDED	SC.912.N.1.5:	Describe and provide examples of how similar investigations conducted in many parts of the world result in the same outcome.
CHAPTER 1 AND EMBEDDED	SC.912.N.1.6:	Describe how scientific inferences are drawn from scientific observations and provide examples from the content being studie
CHAPTER 1 AND EMBEDDED	SC.912.N.2.1:	Identify what is science, what clearly is not science, and what superficially resembles science (but fails to meet the criteria fo science).
CHAPTER 1 AND EMBEDDED	SC.912.N.2.2:	Identify which questions can be answered through science and which questions are outside the boundaries of scientific investigation, such as questions addressed by other ways of knowing, such as art, philosophy, and religion.
CHAPTER 1 AND EMBEDDED	SC.912.N.2.4:	Explain that scientific knowledge is both durable and robust and open to change. Scientific knowledge can change because i often examined and re-examined by new investigations and scientific argumentation. Because of these frequent examination scientific knowledge becomes stronger, leading to its durability.
CHAPTER 1 AND EMBEDDED	SC.912.N.3.1:	Explain that a scientific theory is the culmination of many scientific investigations drawing together all the current evidence concerning a substantial range of phenomena; thus, a scientific theory represents the most powerful explanation scientists ha to offer.
CHAPTER 1 AND EMBEDDED	SC.912.N.3.5:	Describe the function of models in science, and identify the wide range of models used in science.
CHAPTER 2 AND EMBEDDED	SC.912.N.4.1:	Explain how scientific knowledge and reasoning provide an empirically-based perspective to inform society's decision making

Ch 3

CH 3	SC.912.E.7.7:	Identify, analyze, and relate the internal (Earth system) and external (astronomical) conditions that contribute to global climate change.
CH 3	SC.912.E.7.9:	Cite evidence that the ocean has had a significant influence on climate change by absorbing, storing, and moving heat, carbo and water.

Nassau County School Board

ESSENTIAL QUESTIONS:	**District Resources:**
1. What is a good hypothesis? 2. What is the difference between a scientific theory and a law? 3. What are scientific methods? 4. What is meant by bias? 5. Why does earth have layers and why do plates move as they do?	HMH Environmental Science- Chapter 1, 2 and 3

CONCEPTS /CONTENT	**LEARNING TARGETS/GOALS/OBJECTIVES**	**KEY TERMINOLOGY**
SCIENCE AND THE ENVIRONMENT (Ch 1) & TOOLS OF ENVIRONMENTAL SCIENCE (Ch 2)	SECTION 1.1 ● Define environmental science and compare environmental science with ecology. ● List the five major fields of study that contribute to environmental science. ● Describe the major environmental effects of hunter-gatherers, the agricultural revolution, and the Industrial Revolution. ● Distinguish between renewable and nonrenewable resources. ● Classify environmental problems into three major categories SECTION 1.2 ● Describe the "Tragedy of the Commons." ● Explain the law of supply and demand. ● List three differences between developed and developing countries. ● Explain what sustainability is, and describe why it is a goal of environmental science SECTION 2.1 ● List and describe the steps of the experimental method. ● Describe why a good hypothesis is not simply a guess. ● Describe the two essential parts of a good experiment. ● Describe how scientists study subjects in which experiments are not possible.	1. Environmental Science 2. Ecology 3. Agriculture 4. natural resource 5. pollution 6. biodiversity 7. ecological footprint 8. sustainability 9. observation 10. hypothesis 11. prediction 12. experiment 13. variable 14. experimental group 15. data 16. correlation 17. bias 18. model 19. theory 20. law 21. inference

	• Explain the importance of curiosity and imagination in science SECTION 2.2 • Explain how scientists use statistics. • Explain why the size of a statistical sample is important. • Describe three types of models commonly used by scientists. • Explain the relationship between probability and risk. • Explain the importance of conceptual and mathematical models SECTION 2.3 • Describe three values that people consider when making decisions about the environment. • Describe the four steps in a simple environmental decision-making model. • Compare the short-term and long-term consequences of two decisions regarding a hypothetical environmental issue	
THE DYNAMIC EARTH (Ch 3)	SECTION 3.1 • Describe the composition & structure of Earth. • Describe Earth's tectonic plates. • Explain the main cause of earthquakes and their effects. • Identify the relationship between volcanic eruptions and climate change. • Describe how wind and water alter Earth's surface SECTION 3.2 • Describe the composition of Earth's atmosphere. • Describe the layers of Earth's atmosphere. • Explain three mechanisms of heat transfer in Earth's atmosphere. • Explain the greenhouse effect. SECTION 3.3 • Name the three major processes in the water cycle. • Describe the properties of ocean water. • Describe the two types of ocean currents.	1. geosphere 2. hydrosphere 3. crust 4. mantle 5. core 6. lithosphere 7. asthenosphere 8. tectonic plate 9. erosion 10. weathering 11. atmosphere

	• Explain how the ocean regulates Earth's temperature. • Discuss the factors that confine life to the biosphere. • Explain the difference between open and closed systems.	12. radiation 13. conduction 14. convection 15. Biogeochemical 16. biosphere
Scales		**Sample Progress Monitoring and Assessment Activities**
4.0 *Knowledge Utilization*	**IN ADDITION TO SCORE 3.0, IN –DEPTH INFERENCES AND APPLICATIONS THAT GO BEYOND WHAT WAS TAUGHT** Student(s) will be able to: **I CAN** • Develop a theoretical scientific investigation, entailing all processes of the scientific method	• So, you have an environmental problem? Experiment design_____ (W,I,C,O,R)
3.0 *Analysis* (Learning Goal)	Student(s) will be able to: **I CAN** • Describe what characterizes science and its methods • Recognize that the strength of a scientific claim is evaluated through scientific argumentation, which depends on critical and logical thinking, and the active consideration of alternative scientific explanations to explain the data presented	• Environmental Problem Case Study_____ (W,I,C,O,R) • Before the Flood Video CER Analysis____(W,I,C,O,R) • Determine Scientific Bias_____(W,I,C,O,R)
2.0 *Comprehension*	Student(s) will be able to: **I CAN** • Recognize a problem based on a specific body of knowledge	• The Nature of Science Cornell Notes _____(W, O,R) • Metric System Cornell

	• Describe the processes used in scientific investigations, including posing a research question, forming a hypothesis, reviewing what is known, collecting evidence, evaluating results and reaching conclusions • Describe how scientific inferences are drawn from scientific observations and provide examples from the content being studied • Differentiate between a theory and a law • Define bias **However, the student exhibits major errors or omissions regarding the more complex ideas and processes.**	Notes_____(W,O,R) • Metric Conversion and Measurement lab _____(W,I,C,O,R)
1.0 *Retrieval*	**WITH HELP** **A partial understanding of some of the simpler details and processes**	

Suggested Resources
Environmental Science Standards (CPALMS) **Environmental Science Honors Standards (CPALMS)** **QuickLab-Classifying Resource** (Textbook p. 14) **Virtual Investigation-The Scientific Process** (Online Textbook p. 33) **Case Study- Saving the Everglades: Making Informed Decisions** (Textbook p. 47-49) **Virtual Investigation-Tectonic Plate Boundaries** (Online Textbook p. 62)

Semester 1

Unit 2- Ecology

Weeks 5-11 (7 weeks)

UNIT/ORGANIZING PRINCIPLE:	**Suggested PACING: CH 4 = 2wks, CH 5 = 2wks , CH 6 = 2wks, CH 7 = 1wk**
Organization of Life, How Ecosystems Work, Biomes, Aquatic Ecosystems	**TOTAL = 7 weeks (Traditional 45-50min classes)**

STANDARDS:

EMBEDDED THROUGHOUT	SC.912.L.17.15:	Discuss the effects of technology on environmental quality.
EMBEDDED THROUGHOUT	SC.912.L.17.20:	Predict the impact of individuals on environmental systems and examine how human lifestyles affect sustainability.

Ch 4

CH 4 & 10	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.
CH 4 & 10	SC.912.L.15.13:	Describe the conditions required for natural selection, including: overproduction of offspring, inherited variation, and t struggle to survive, which result in differential reproductive success.

Ch 5

CH 5	SC.912.L.17.6:	Compare and contrast the relationships among organisms, including predation, parasitism, competition, commensali and mutualism.
CH 5	SC.912.L.17.9:	Use a food web to identify and distinguish producers, consumers, and decomposers. Explain the pathway of energy transfer through trophic levels and the reduction of available energy at successive trophic levels.
CH 5	SC.912.L.17.10:	Diagram and explain the biogeochemical cycles of an ecosystem, including water, carbon, and nitrogen cycle.

Ch 6

CH 6	SC.912.L.17.7:	Characterize the biotic and abiotic components that define freshwater systems, marine systems and terrestrial syste

Ch 7

CH 7	SC.912.L.17.7:	Characterize the biotic and abiotic components that define freshwater systems, marine systems and terrestrial syste

ESSENTIAL QUESTION:	**District Resources:**
1. What is the process of evolution by natural selection? 2. Differentiate between biotic and abiotic factors. 3. How is energy transferred through ecosystems? 4. What are biogeochemical cycles and how do they work? 5. How do species adapt to their specific environment?	HMH Environmental Science Chapter 4, 5, 6, 7

CONCEPTS /CONTENT	**LEARNING TARGETS/SKILLS/OBJECTIVES**	**KEY TERMINOLOGY**
THE ORGANIZATION OF LIFE (Ch 4)	SECTION 4.1 ● Distinguish between the biotic and abiotic factors in an ecosystem. ● Describe how a population differs from a species. ● Explain how habitats are important for organisms. SECTION 4.2 ● Explain the process of evolution by natural selection. ● Explain the concept of adaptation. ● Describe the steps by which a population of insects becomes resistant to a pesticide. SECTION 4.3 ● Name the three domains and the four kingdoms of organisms and list characteristics of each. ● Explain the importance of bacteria and fungi in the environment. ● Describe the role of protists in the ocean environment.	1. biotic 2. abiotic 3. biome 4. climate 5. latitude 6. altitude 7. tropical rain forest 8. emergent layer 9. canopy 10. epiphyte

	• Describe how organisms interact and depend on each other for survival.	11. understory 12. temperate rain forest 13. temperate deciduous forest 14. taiga 15. savanna 16. temperate grassland 17. chaparral 18. desert 19. tundra 20. permafrost
HOW ECOSYSTEMS WORK (Ch 5)	SECTION 5.1 • Describe how energy is transferred from the sun to producers and then to consumers. • Describe one way in which consumers depend on producers. • Identify two types of consumers. • Explain how energy transfer in a food web is more complex than energy transfer in a food chain. • Explain why an energy pyramid is a representation of trophic levels SECTION 5.2 • Describe the short-term and long-term process of the carbon cycle. • Identify one way that humans are affecting the carbon cycle. • List the three stages of the nitrogen cycle. • Describe the role that nitrogen-fixing bacteria play in the nitrogen cycle. • Explain how the excess use of fertilizer can affect the nitrogen and phosphorus cycles SECTION 5.3 • List two types of ecological succession.	1. photosynthesis 2. producer 3. consumer 4. decomposer 5. cellular respiration 6. food chain 7. food web 8. trophic level 9. carbon cycle 10. nitrogen cycle 11. phosphorus cycle 12. ecological succession 13. primary succession

	● Explain how a pioneer species contributes to ecological ● succession. ● Describe how lichens contribute to primary succession. ● Explain what happens during old-field succession	14. secondary succession 15. pioneer species 16. climax community 17. wetland 18. plankton 19. nekton 20. benthos 21. estuary 22. salt marsh 23. mangrove swamp 24. barrier island 25. coral reef
BIOMES (Ch 6)	SECTION 6.1 ● Describe why vegetation is used to describe a biome. ● Explain how temperature and precipitation determine which plants grow in an area. ● Explain how latitude and altitude affect which plants grow in an area. SECTION 6.2 ● List three characteristics of tropical rain forests. ● Name and describe the main layers of a tropical rain forest. ● Describe one plant in a temperate deciduous forest and an adaptation that helps the plant survive. ● Describe one adaptation that may help an animal survive in the taiga. ● Name two threats to the world's forest biomes. SECTION 6.3 ● Describe the difference between tropical and temperate grasslands. ● Describe the climate in a chaparral biome.	1. biodiversity 2. gene 3. keystone species 4. endangered species 5. threatened species 6. exotic species 7. invasive Species 8. poaching 9. endemic species 10. Endangered Species Act

	● Describe two desert animals and the adaptations that help them survive. ● Describe one threat to the tundra biome.	
AQUATIC ECOSYSTEMS (Ch 7)	SECTION 7.1 ● Describe the factors that determine where an organism lives in an aquatic ecosystem. ● Describe the littoral zone and the benthic zone that make up a lake or pond. ● Describe two environmental functions of wetlands. ● Describe one threat against river ecosystems. SECTION 7.2 ● Explain why an estuary is a very productive ecosystem. ● Compare salt marshes and mangrove swamps. ● Describe two threats to coral reefs. ● Describe two threats to ocean organisms.	1. population 2. density 3. growth rate 4. reproductive potential 5. carrying capacity 6. niche 7. predation 8. competition 9. parasitism 10. mutualism 11. commensalism 12. symbiosis 13. demography 14. survivorship 15. fertility rate 16. migration 17. life expectancy 18. infrastructure 19. developed countries

		20. least developed countries
Scales		**Sample Progress Monitoring and Assessment Activities**
4.0 *Knowledge Utilization*	**IN ADDITION TO SCORE 3.0, IN –DEPTH INFERENCES AND APPLICATIONS THAT GO BEYOND WHAT WAS TAUGHT** ● Student(s) will be able to: ● **I CAN** ● describe the economic, agricultural, medicinal, and ecological benefits of biodiversity and species richness.	● Biodiversity Case Study_____(W,I,C,O,R)
3.0 *Analysis* (Learning Goal)	Student(s) will be able to: **I CAN** ● Analyze past, present, and potential future consequences to the environment resulting from various energy production technologies. ● Investigate and discuss how humans affect and are affected by geological systems and processes by describing the possible long-term consequences (costs and benefits) that increased human consumption (e.g. mining and extraction techniques off-shore drilling petrochemical refining) has placed on the environment (e.g. pollution, health, habitat destruction) and the impact on future energy production. ● Identify, analyze, and relate the internal (Earth system) and external (astronomical) conditions that contribute to global climate change. ● Explain the possible natural (e.g. increased global temperature, wildfires, volcanic dust) and anthropogenic mechanisms (e.g. air pollution, acid rain, greenhouse gases, burning of fossil fuels) and the effects of these mechanisms on global climate change.	● Environmental Health WebQuest _____(W,I,C,O,R) ● Rachel Carson Research Assignment _____(W,I,C,O,R) ● Global Environmental Change Graphing Lab _____(W,I,C,O,R) ● Environmental Survey_____(W,I,C,O,R) ● Nassau County Land Use Assignment _____(W,I,C,O,R)

	• Explain how various atmospheric, oceanic, and hydrologic conditions in Florida have influenced and can influence human behavior, both individually and collectively. • Describe and discuss the conditions that bring about floods, droughts, wildfires, thunderstorms, hurricanes, rip currents, and tsunamis and how these conditions can influence human behavior (e.g. energy alternatives, conservation, migration, storm preparedness). • Discuss the need for adequate monitoring of environmental parameters when making policy decisions.	• Carbon Foot Print Project_____(W,I,C,O,R) • The Zika Pandemic_____(W,I,C,O,R)
2.0 *Comprehension*	Student(s) will be able to: **I CAN** • Evaluate the impact of biotechnology on the individual, society and the environment, including medical and ethical issues • Evaluate the costs and benefits of renewable and nonrenewable resources, such as water, energy, fossil fuels, wildlife, and forests. • Discuss the political, social, and environmental consequences of sustainable use of land. • Evaluate how environment and personal health are interrelated. • Assess the need for adequate waste management strategies. • Discuss the effects of technology on environmental quality. • Describe how human population size and resource use relate to environmental quality. • Describe how different natural resources are produced and how their rates of use and renewal limit availability. **However, the student exhibits major errors or omissions regarding the more complex ideas and processes.**	• Cornell Notes _____(W,I,C,O,R) • Powerpoint _____(W,I,C,O,R) • Class Videos_____(W,I,C,O,R) • Carbon Footprint Survey _____(W,I,C,O,R) • Measuring your Environmental Impact_____(W,I,C,O,R) • Offsetting Our Actions_____(W,I,C,O,R)

1.0 *Retrieval*	**WITH HELP** **A partial understanding of some of the simpler details and processes**	

Suggested Resources

Environmental Science Standards (CPALMS)

Environmental Science Honors Standards (CPALMS)

Science Based Novel: Who Really Killed Cock Robin by Jean Craighead George

Exploration Lab- Factor that influence Ecosystems- Textbook p.141

Survivor Biome Project

Exploration Lab- Identify Your Local Biome- Textbook p.171

Quicklab- Estuaries- Textbook p.181

Exploration Lab- Eutrophication: Too much of a Good Thing?- Textbook p.192

Quicklab- Population Growth- Textbook p.198

What Happened at Easter Island - Video & Questions (textbook article pg 233)

Exploration Lab- How will our population Grow?- Textbook p.238

Quicklab- Habitat Degradation- Textbook p.254

Exploration Lab- Creating a Land-use Model- Textbook p.254

Food Inc Worksheet Videos and Plastic Ocean Worksheet (pg 20, 26+) Video

Quicklab- Surface Coal Mining- Textbook p.420

Cookie Mining Lab- https://u.osu.edu/cemscientificthinkers/files//2016/08/cookie-mining-lab.doc

Semester 1

Unit 3 – Populations & MidTerm Project/Exam
Weeks 12-18 (7 weeks)

UNIT/ORGANIZING PRINCIPLE:	Suggested PACING: CH 8 = 1wk, CH 9 = 1wk , CH 10 =2wks, MidTerm Project/Exam Review = 2wks, EXAM Week = 1 wk TOTAL = 7 weeks (Traditional 45-50min classes)
Organization of Life, Ecosystems, Biomes, Aquatic Ecosystems and Population	

STANDARDS:

EMBEDDED THROUGHOUT	SC.912.L.17.15:	Discuss the effects of technology on environmental quality.
EMBEDDED THROUGHOUT	SC.912.L.17.20:	Predict the impact of individuals on environmental systems and examine how human lifestyles affect sustainability.

Ch 8

CH 8	SC.912.L.17.1:	Discuss the characteristics of populations, such as number of individuals, age structure, density, and pattern of distribution.
CH 8	SC.912.L.17.5:	Analyze how population size is determined by births, deaths, immigration, emigration, and limiting factors (biotic and abiotic) that determine carrying capacity.

Ch 9

CH 9	SC.912.L.17.1:	Discuss the characteristics of populations, such as number of individuals, age structure, density, and pattern of distribution.
CH 9	SC.912.L.17.5:	Analyze how population size is determined by births, deaths, immigration, emigration, and limiting factors (biotic and abiotic) that determine carrying capacity.
CH 9	SC.912.L.17.18:	Describe how human population size and resource use relate to environmental quality.

CH 9	SC.912.L.16.10:	Evaluate the impact of biotechnology on the individual, society and the environment, including medical and ethical issues.

CH 10

CH 10	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.
CH 10	SC.912.L.15.13:	Describe the conditions required for natural selection, including: overproduction of offspring, inherited variation, and the struggle to survive, which result in differential reproductive success.
CH 10	SC.912.L.17.8:	Recognize the consequences of the losses of biodiversity due to catastrophic events, climate changes, human activity, and the introduction of invasive, non-native species.

ESSENTIAL QUESTION:

1. How do organisms interact with each other and their surroundings?
2. What is biodiversity?
3. Why is biodiversity important?
4. What is an invasive species?
5. What is meant by sustainability?

District Resources:

HMH Environmental Science

Chapter 8, 9, 10

CONCEPTS /CONTENT	LEARNING TARGETS/SKILLS	KEY TERMINOLOGY
UNDERSTANDING POPULATIONS (Ch 8)	SECTION 8.1 ● Describe the three main properties of a population. ● Describe exponential population growth. ● Describe how the reproductive behavior of individuals can affect the growth rate of their population. ● Explain how population sizes in nature are regulated. SECTION 8.2 ● Explain the difference between niche and habitat. ● Give examples of parts of a niche. ● Describe the five major types of interactions between species.	1. population 2. density 3. growth rate 4. reproductive potential 5. carrying capacity 6. niche 7. predation

	• Explain the difference between parasitism and predation. • Explain how symbiotic relationships may evolve.	8. competition 9. parasitism 10. mutualism 11. commensalism 12. symbiosis
THE HUMAN POPULATION (Ch 9)	SECTION 9.1 • Describe how the size and growth rate of the human population has changed in the last 200 years. • Define four properties that scientists use to predict population sizes. • Make predictions about population trends based on age structure. • Describe the four stages of the demographic transition. • Explain why different countries may be at different stages of the demographic transition. SECTION 9.2 • Describe three problems caused by rapid human population growth. • Compare population growth problems in more-developed countries and less-developed countries. • Analyze strategies countries may use to reduce their population growth. • Describe worldwide population projections into the next century.	1. demography 2. survivorship 3. fertility rate 4. migration 5. life expectancy 6. infrastructure 7. developed countries 8. least developed countries
BIODIVERSITY (Ch 10)	SECTION 10.1 • Describe the diversity of species on Earth, and relate the difference between known numbers and estimated numbers of species. • List and describe three levels of biodiversity. • Explain four ways in which biodiversity is important to ecosystems and humans. • Analyze the potential value of a single species. SECTION 10.2 • Define and give examples of endangered and threatened species. • Describe several ways that species are threatened with extinction globally.	1. biodiversity 2. gene 3. keystone species 4. endangered species 5. threatened species 6. exotic species 7. invasive species

	● Explain which types of threats are having the largest impact on biodiversity. ● List areas of the world that have high levels of biodiversity and many threats to species. ● Compare the amount of biodiversity in the United States to that of the rest of the world. SECTION 10.3 ● List and describe four types of efforts to save individual species. ● Explain the advantages of protecting entire ecosystems rather than individual species. ● Describe the main provisions of the Endangered Species Act. ● Discuss ways in which efforts to protect endangered species can lead to controversy. ● Describe three examples of worldwide cooperative efforts to prevent extinctions	8. poaching 9. endemic species 10. Endangered Species Act
Scales		**Sample Progress Monitoring and Assessment Activities**
4.0 *Knowledge Utilization*	**IN ADDITION TO SCORE 3.0, IN –DEPTH INFERENCES AND APPLICATIONS THAT GO BEYOND WHAT WAS TAUGHT** ● Student(s) will be able to: ● **I CAN** ● describe the economic, agricultural, medicinal, and ecological benefits of biodiversity and species richness.	● Biodiversity Case Study_____(W,I,C,O,R)
3.0 *Analysis* (Learning Goal)	Student(s) will be able to: **I CAN** ● Analyze past, present, and potential future consequences to the environment resulting from various energy production technologies. ● Investigate and discuss how humans affect and are affected by geological systems and processes by describing the possible long-term consequences (costs and benefits) that increased human consumption (e.g. mining and	● Environmental Health WebQuest _____(W,I,C,O,R) ● Rachel Carson Research Assignment _____(W,I,C,O,R) ● Global Environmental Change Graphing

	extraction techniques off-shore drilling petrochemical refining) has placed on the environment (e.g. pollution, health, habitat destruction) and the impact on future energy production. ● Identify, analyze, and relate the internal (Earth system) and external (astronomical) conditions that contribute to global climate change. ● Explain the possible natural (e.g. increased global temperature, wildfires, volcanic dust) and anthropogenic mechanisms (e.g. air pollution, acid rain, greenhouse gases, burning of fossil fuels) and the effects of these mechanisms on global climate change. ● Explain how various atmospheric, oceanic, and hydrologic conditions in Florida have influenced and can influence human behavior, both individually and collectively. ● Describe and discuss the conditions that bring about floods, droughts, wildfires, thunderstorms, hurricanes, rip currents, and tsunamis and how these conditions can influence human behavior (e.g. energy alternatives, conservation, migration, storm preparedness). ● Discuss the need for adequate monitoring of environmental parameters when making policy decisions.	• Lab (W,I,C,O,R) • Environmental Survey_____(W,I,C,O,R) • Nassau County Land Use Assignment _____(W,I,C,O,R) • Carbon Foot Print Project_____(W,I,C,O,R) • The Zika Pandemic_____(W,I,C,O,R)
2.0 *Comprehension*	Student(s) will be able to: **I CAN** ● Evaluate the impact of biotechnology on the individual, society and the environment, including medical and ethical issues ● Evaluate the costs and benefits of renewable and nonrenewable resources, such as water, energy, fossil fuels, wildlife, and forests. ● Discuss the political, social, and environmental consequences of sustainable use of land. ● Evaluate how environment and personal health are interrelated. ● Assess the need for adequate waste management strategies.	• Cornell Notes _____(W,I,C,O,R) • Powerpoints _____(W,I,C,O,R) • Class Videos_____(W,I,C,O,R) • Carbon Footprint Survey _____(W,I,C,O,R) • Measuring your Environmental Impact_____(W,I,C,O,R)

	• Discuss the effects of technology on environmental quality. • Describe how human population size and resource use relate to environmental quality. • Describe how different natural resources are produced and how their rates of use and renewal limit availability. **However, the student exhibits major errors or omissions regarding the more complex ideas and processes.**	• Offsetting Our Actions_____(W,I,C,O,R)
1.0 *Retrieval*	**WITH HELP** **A partial understanding of some of the simpler details and processes**	

Suggested Resources

Environmental Science Standards (CPALMS)

Environmental Science Honors Standards (CPALMS)

Science Based Novel: The Case of the Missing Cutthroats by Jean Craighead George

Exploration Lab- Factor that influence Ecosystems- Textbook p.141

Survivor Biome Project

Exploration Lab- Identify Your Local Biome- Textbook p.171

Quicklab- Estuaries- Textbook p.181

Exploration Lab- Eutrophication: Too much of a Good Thing?- Textbook p.192

Quicklab- Population Growth- Textbook p.198

What Happened at Easter Island - Video & Questions (textbook article pg 233)

Exploration Lab- How will our population Grow?- Textbook p.238

Quicklab- Habitat Degradation- Textbook p.254

Exploration Lab- Creating a Land-use Model- Textbook p.254

Food Inc Worksheet Videos and Plastic Ocean Worksheet (pg 20, 26+) Video

Quicklab- Surface Coal Mining- Textbook p.420

Cookie Mining Lab- https://u.osu.edu/cemscientificthinkers/files//2016/08/cookie-mining-lab.doc

Semester 2

Unit 4 - Water, Air & Land

Weeks 19-26 (8 weeks)

UNIT/ORGANIZING PRINCIPLE: **Earth Structure, Water, Land, Air, and Minerals**	**Suggested PACING: CH 11 = 2wks, CH 12 = 1wk , CH 13 =2wks, CH 14 = 1wk, CH 15 = 2wks** **TOTAL = 8 weeks (Traditional 45-50min classes)**

STANDARDS:

EMBEDDED THROUGHOUT	SC.912.L.17.15:	Discuss the effects of technology on environmental quality.
EMBEDDED THROUGHOUT	SC.912.L.17.20:	Predict the impact of individuals on environmental systems and examine how human lifestyles affect sustainability.

Ch 11

CH 11, 12, 13 & 20	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.
CH 11	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.

Ch 12

CH 12	SC.912.E.7.8:	Explain how various atmospheric, oceanic, and hydrologic conditions in Florida have influenced and can influence human behavior, both individually and collectively.
CH 12	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.
CH 12	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.

Ch 13

CH 13	SC.912.E.7.7:	Identify, analyze, and relate the internal (Earth system) and external (astronomical) conditions that contribute to global climate change.
CH 13	SC.912.E.7.8:	Explain how various atmospheric, oceanic, and hydrologic conditions in Florida have influenced and can influence human behavior, both individually and collectively.
CH 13	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.
CH 13	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.
CH 13	SC.912.L.17.4:	Describe changes in ecosystems resulting from seasonal variations, climate change and succession.
CH 13	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.

Ch 14

CH 14	SC.912.L.17.12:	Discuss the political, social, and environmental consequences of sustainable use of land.
CH 14	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.

Ch 15

CH 15	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.

Nassau County School Board

ESSENTIAL QUESTION: 1. What are the different layers that make up Earth? 2. What forces shape and change the surface of the earth? 3. Why is the ocean important for the entire planet? 4. Where do your daily resources come from? 5. What are the major ways that humans use land?		**District Resources:** HMH Environmental Science Chapter 11, 12, 13, 14, 15
CONCEPTS/CONTEN	**LEARNING TARGETS/SKILLS**	**KEY TERMINOLOGY**
WATER (Ch 11)	SECTION 11.1 ∉ Describe the distribution of Earth's water resources. ∉ Explain why fresh water is one of Earth's limited resources. ∉ Describe the distribution of Earth's surface water. ∉ Describe the relationship between groundwater and surface water in a watershed. SECTION 11.2 ∉ Identify patterns of global water use. ∉ Explain how water is treated so that it can be used for drinking. ∉ Identify how water is used in homes, in industry, and in agriculture. ∉ Describe how dams and water diversion projects are used to manage freshwater resources. ∉ Identify five ways that water can be conserved. SECTION 11.3 ∉ compare point-source pollution and nonpoint-source pollution. ∉ Classify water pollutants by five types. ∉ Explain why groundwater pollution is difficult to clean up. ∉ Describe the major sources of ocean pollution, and explain the effects of pollution on ecosystems. ∉ Describe six major laws designed to improve water quality in the United States.	1. water cycle 2. evaporation 3. condensation 4. precipitation 5. Salinity 6. Freshwater 7. porosity 8. permeability 9. recharge zone 10. potable 11. dam 12. reservoir 13. desalination 14. water pollution 15. wastewater 16. eutrophication 17. surface water 18. watershed

		19. groundwater 20. aquifer
AIR (Ch12)	SECTION 12.1 ● Name five primary air pollutants and give sources for each. ● Name the two major sources of air pollution in urban areas. ● Describe the way in which smog forms. ● Explain the way in which a thermal inversion traps air pollution. SECTION 12.2 ● Describe three short-term effects and three long-term effects of air pollution on human health. ● Explain what causes indoor air pollution and how it can be prevented. ● Describe three human health problems caused by noise pollution. ● Describe solutions to energy waste caused by light pollution. SECTION 12.3 ● Explain the causes of acid precipitation. ● Explain how acid precipitation affects plants, soils, and aquatic ecosystems. ● Describe three ways that acid precipitation affects humans. ● Describe ways that countries are working together to solve the problem of acid precipitation	1. air pollution 2. primary pollution 3. secondary pollutant 4. smog 5. temperature inversion 6. sick-building syndrome 7. noise pollution 8. acid precipitation 9. pH 10. acid shock 11. ozone Layer 12. troposphere 13. stratosphere 14. mesosphere 15. exosphere 16. thermosphere 17. ionosphere 18. radiation 19. light pollution 20. El Nino

		21. La Nina 22. climate 23. Kyoto Protocol
ATMOSPHERE AND CLIMATE CHANGE (Ch 13)	SECTION 13.1 ∉ Explain the difference between weather and climate. ∉ Identify four factors that determine climate. ∉ Explain why different parts of Earth have different climates. ∉ Explain what causes the seasons. SECTIOON 13.2 ∉ Explain how the ozone layer shields Earth from much of the sun's harmful radiation. ∉ Explain how chlorofluorocarbons damage the ozone layer. ∉ Explain the process by which the ozone hole forms. ∉ Describe the damaging effects of ultraviolet radiation. ∉ Explain why the threat to the ozone layer is still continuing today. SECTION 13.3 ∉ Explain why Earth's atmosphere is like the glass in a greenhouse. ∉ Explain why the carbon dioxide content of the atmosphere is increasing. ∉ Identify one possible explanation for the increase in average global temperature. ∉ Describe what a warmer Earth might be like.	1. climate 2. latitude 3. El Niño 4. La Niña 5. ozone layer 6. chlorofluorocarbons (CFCs) 7. ozone hole 8. polar stratospheric clouds 9. greenhouse gases 10. global warming 11. Kyoto Protocol
LAND (Ch 14)	SECTION 14.1 ● Distinguish between urban and rural land. ● Describe three major ways in which humans use land. ● Explain the concept of ecosystem services. SECTION 14.2 ● Describe the urban crisis, and explain what people are doing to deal with it. ● Explain how urban sprawl affects the environment. ● Explain how open spaces provide urban areas with environmental benefits. ● Explain the heat-island effect. ● Describe how people use a geographic information system as a tool for land-	1. urban 2. rural 3. ecosystem services 4. urbanization 5. infrastructure 6. urban sprawl 7. heat island

	use planning. SECTION 14.3 ● Explain the benefits of preserving farmland. ● Describe two ways that rangeland can be managed sustainably. ● Describe the environmental effects of deforestation. ● Explain the function of parks and of wilderness areas.	8. land-use planning 9. geographic information system (GIS) 10. overgrazing 11. deforestation 12. reforestation 13. wilderness 14. mineral 15. ore mineral 16. subsurface mining 17. surface mining 18. placer deposit 19. subsidence 20. reclamation
FOOD AND AGRICULTURE (Ch 15)	SECTION 15.1 ● Identify the major causes of malnutrition. ● Compare the environmental costs of producing different types of food. ● Explain how poverty is a major cause of malnutrition. ● Explain the importance of the green revolution. SECTION 15.2 ● Distinguish between traditional and modern agricultural techniques. ● Describe fertile soil. ● Describe the need for soil conservation. ● Explain the benefits and environmental impacts of pesticide use. ● Explain what is involved in integrated pest management. ● Explain how genetic engineering is used in agriculture. SECTION15.3	1. famine 2. malnutrition 3. diet 4. yield 5. topsoil 6. erosion 7. desertification 8. compost 9. pesticide

	• Explain how overharvesting affects the supply of aquatic organisms used for food. • Describe the current role of aquaculture in providing seafood. • Describe the importance of livestock in providing food and other products	10. genetic engineering 11. domesticated 12. overharvesting 13. aquaculture 14. livestock 15. GMO 16. clone
Scales		**Sample Progress Monitoring and Assessment Activities**
4.0 *Knowledge Utilization*	**IN ADDITION TO SCORE 3.0, IN –DEPTH INFERENCES AND APPLICATIONS THAT GO BEYOND WHAT WAS TAUGHT** Student(s) will be able to: **I CAN** · Differentiate the layering of the Earth & the interaction between the layers · Relate the internal systems of Earth & external systems to the global climate change to land mass change · Describe and provide examples of how similar investigations conducted in many parts of the world result in the same outcome. · Describe heat as the energy transferred by convection, conduction, and radiation, and explain the connection of heat to change in temperature or states of matter. Cite evidence that the ocean has had a significant influence on climate change by absorbing, storing, and moving heat, carbon and water.	• Earth's Layers Modelling Lab (W,I,C,O,R) • Heat Transfer Lab (W,I,C,O,R)

3.0 *Analysis* (Learning Goal)	Student(s) will be able to: **I CAN** · Describe the layers of Earth, the interactions among them, the functional use of models in science and the scientific explanation for the origin of life on Earth · Analyze how specific geologic processes and features are expressed in Florida and elsewhere. · Explain theories that may contribute the difference of climatic change in our Earth's History. · Differentiate and describe the various interactions among Earth Systems, including atmosphere, cryosphere, geosphere and biosphere Analyze the movement of matter and energy through the different biogeochemical cycles, including water and carbon.	• Flat Earth vs Round Earth (W,I,C,O,R) • Cornell Notes on Plate Tectonics (W, O,R) • Plate Boundaries and Stresses (W,I,C,O,R) • Biogeochemical Cycles Diagrams (W,O,R) • Carbon and water cycle practice (W,OR) • Oceans and the Carbon Cycle (W,I,C,O,R) • Ocean Currents (W,I,O,R)
2.0 *Comprehension*	Student(s) will be able to: I CAN · Analyze collected data sets, the scientific theory of Plate Tectonics & identify related major processes using features of the moving plates. · Connect surface features to surface process that are responsible for formation · Record information & ideas accurately & coherently · Describe the factors that regulated Geographical Time climatic changes and the effects on life · Identify the processes of erosion, weathering & deposition · Connect surface features to surface processes that are responsible for their formation. · Describe heat as the energy transferred by convection, conduction, and radiation, and explain the connection of heat to change in temperature or states of matter.	• Draw and Label the layers of the Earth (W,O,R) • Cornell Notes on BLAH and OMEGA (W, O,R) • Cornell Notes on Alfred Wegener (W, O,R) • Cornell Notes on Rocks and the Rock Cycle (W,O,R) • Ring of Fire Activity (W,I,C,O,R) • Cornell notes on The Ocean (W,I,C,O,R) • Cornell notes on Freshwater Resources (W,I,C,O,R) • Energy transfer review and

	However, the student exhibits major errors or omissions regarding the more complex ideas and processes.	practice. (W,I,C,O,R)
1.0 *Retrieval*	**WITH HELP** **A partial understanding of some of the simpler details and processes**	

Suggested Resource

Science Based Novel: There's an Owl in the Shower by Jean Craighead George

Quicklab- Deep Ocean Currents- Textbook p.78 or use Convection demonstration

Exploration Lab- Beaches- Textbook p. 89 or use **Stream Table Lab** (ex; https://serc.carleton.edu/NAGTWorkshops/intro/activities/23422.html , How to make a stream table https://nagt.org/nagt/teaching_resources/teachingmaterials/9271.html)

Quicklab- Make Every Breath Count- Textbook p.125 (elodea sourced through HMSH)

Quicklab- Measuring Dissolved Oxygen- Textbook p.288

Water Filtration Kit- Provided by the District or **Exploration Lab: Ground Filters**- Textbook 301

Air pollution Flinn Lab Kit- Provided by the District

Semester 2

Unit 5 - Mineral & Energy Resources

Weeks 27-32 (6 weeks)

UNIT/ORGANIZING PRINCIPLE:	Suggested PACING: CH 16 = 2wks, CH 17 = 1wk ,
Human impact on the environment	**CH 18 =1wk, CH 19 = 2wks,**
	TOTAL = 6 weeks (Traditional 45-50min classes)

STANDARDS:

EMBEDDED THROUGHOUT	SC.912.L.17.15:	Discuss the effects of technology on environmental quality.
EMBEDDED THROUGHOUT	SC.912.L.17.20:	Predict the impact of individuals on environmental systems and examine how human lifestyles affect sustainability.

Ch 16

CH 16	SC.912.L.17.12:	Discuss the political, social, and environmental consequences of sustainable use of land.
CH 16	SC.912.L.17.16:	Discuss the large-scale environmental impacts resulting from human activity, including waste spills, oil spills, runoff, greenhous gases, ozone depletion, and surface and groundwater pollution.

Ch 17

CH 17	SC.912.E.6.6:	Analyze past, present, and potential future consequences to the environment resulting from various energy production technologies.
CH 17	SC.912.L.17.11:	Evaluate the costs and benefits of renewable and nonrenewable resources, such as water, energy, fossil fuels, wildlife, and forests.
CH 17	SC.912.L.17.16:	Discuss the large-scale environmental impacts resulting from human activity, including waste spills, oil spills, runoff, greenhous gases, ozone depletion, and surface and groundwater pollution.

CH 17	SC.912.L.17.19:	Describe how different natural resources are produced and how their rates of use and renewal limit availability.

Ch 18

CH 18	SC.912.E.6.6:	Analyze past, present, and potential future consequences to the environment resulting from various energy production technologies.
CH 18	SC.912.E.7.7:	Identify, analyze, and relate the internal (Earth system) and external (astronomical) conditions that contribute to global climate change.
CH 18	SC.912.L.17.11:	Evaluate the costs and benefits of renewable and nonrenewable resources, such as water, energy, fossil fuels, wildlife, and forests.
CH 18	SC.912.L.17.16:	Discuss the large-scale environmental impacts resulting from human activity, including waste spills, oil spills, runoff, greenhous gases, ozone depletion, and surface and groundwater pollution.

Ch 19

CH 19	SC.912.L.17.12:	Discuss the political, social, and environmental consequences of sustainable use of land.
CH 19	SC.912.L.17.14:	Assess the need for adequate waste management strategies.
CH 19	SC.912.L.17.16:	Discuss the large-scale environmental impacts resulting from human activity, including waste spills, oil spills, runoff, greenhous gases, ozone depletion, and surface and groundwater pollution.

ESSENTIAL QUESTION:	**District Resources:**
1. How can technology impact the environment? 2. How does your use of resources impact the environment? 3. What makes a material biodegradable? 4. What are environmental problems caused by landfills? 5. How do consumers have the power to reduce solid waste?	HMH Environmental Science Chapter 16, 17, 18, and 19

CONCEPTS/ CONTENT	**LEARNING TARGETS/SKILLS**	**KEY TERMINOLOGY**

MINING AND MINERAL RESOURCES (Ch 16)	SECTION 16.1 ∉ Define the term mineral. ∉ Explain the difference between a metal and a nonmetal, and give two examples of each. ∉ Describe three processes by which ore minerals form. SECTION 16.2 ∉ Describe the manner in which mining companies explore for new mineral deposits. ∉ Describe three methods of subsurface mining. ∉ Describe two methods of surface mining. ∉ Define placer deposit, and explain how placer deposits form. ∉ Describe the steps that take place in smelting an ore. SECTION 16.3 ∉ Describe seven important potential environmental consequences of mining. ∉ Name four federal laws that relate to mining and reclaiming mined land. ∉ Define the term reclamation. ∉ Describe two ways in which state governments regulate mining.	1. mineral 2. ore mineral 3. subsurface mining 4. surface mining 5. placer deposit 6. smelting 7. subsidence 8. reclamation
NONRENEWABLE ENERGY (Ch 17)	SECTION 17.1 ∉ List five factors that influence the value of a fuel. ∉ Explain how fuels are used to generate electricity in an electric power plant. ∉ Identify patterns of energy consumption and production in the world and in the United States. ∉ Explain how fossil fuels form and how they are used. ∉ Compare the advantages and disadvantages of fossil-fuel use. ∉ List three factors that influence predictions of fossil-fuel production.	1. fossil fuels 2. petroleum 3. nuclear energy 4. fracking 5. renewable energy 6. nonrenewable energy 7. hydroelectric energy 8. solar energy

	SECTION 17.2 ∉ Describe nuclear fission. ∉ Describe how a nuclear powerplant works. ∉ List three advantages and three disadvantages of nuclear energy.	9. biomass fuel 10. geothermal energy 11. alternative energy 12. fuel cell 13. energy efficiency 14. Law of Conservation of Energy
RENEWABLE ENERGY (Ch 18)	SECTION 18.1 ∉ List six forms of renewable energy, and compare their advantages and disadvantages. ∉ Describe the differences between passive solar heating, active solar heating, and photovoltaic energy. ∉ Describe the current state of wind energy technology. ∉ Explain the differences in biomass fuel use between developed and developing nations. ∉ Describe how hydroelectric energy, geothermal energy, and geothermal heat pumps work. SECTION 18.2 ∉ Describe three alternative energy technologies. ∉ Identify two ways that hydrogen could be used as a fuel source in the future. ∉ Explain the difference between energy efficiency and energy conservation. ∉ Describe two forms of energy- efficient transportation. ∉ Identify three ways that you can conserve energy in your daily life.	1. renewable energy 2. passive solar heating 3. active solar heating 4. biomass fuel 5. hydroelectric energy 6. geothermal energy 7. alternative energy 8. fuel cell 9. energy efficiency 10. energy conservation

WASTE (Ch 19)	SECTION 19.1 ∉ Name one characteristic that makes a material biodegradable. ∉ Identify two types of solid waste. ∉ Describe how a modern landfill works. ∉ Name two environmental problems caused by landfills. SECTION 19.2 ∉ Identify three ways you can produce less waste. ∉ Describe how you can use your consumer buying power to reduce solid waste. ∉ List the steps that an item must go through to be recycled. ∉ List two benefits of composting. ∉ Name one advantage and one disadvantage to producing degradable plastics. SECTION 19.3 ∉ Name two characteristics of hazardous waste. ∉ Describe one law that governs hazardous waste. ∉ Describe two ways to treat hazardous waste safely.	1. point-source pollution 2. nonpoint-source pollution 3. solid waste 4. biodegradable 5. landfill 6. sustainability 7. recycling 8. compost 9. hazardous waste
Scales		**Sample Progress Monitoring and Assessment Activities**
4.0 *Knowledge Utilization*	**IN ADDITION TO SCORE 3.0, IN –DEPTH INFERENCES AND APPLICATIONS THAT GO BEYOND WHAT WAS TAUGHT** Student(s) will be able to: **I CAN** ● 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. ● Evaluate how environment and personal health are interrelated.	● The Environment and your Health Project_____(W,I,C,O,R)

3.0 *Analysis* (Learning Goal)	Students will be able to: ● Analyze strategies for prevention, detection, and treatment of communicable and chronic diseases. **I CAN** ● Analyze past, present, and potential future consequences to the environment resulting from various energy production technologies. ● Investigate and discuss how humans affect and are affected by geological systems and processes by describing the possible long-term consequences (costs and benefits) that increased human consumption (e.g. mining and extraction techniques off-shore drilling petrochemical refining) has placed on the environment (e.g. pollution, health, habitat destruction) and the impact on future energy production. ● Identify, analyze, and relate the internal (Earth system) and external (astronomical) conditions that contribute to global climate change. ● Explain the possible natural (e.g. increased global temperature, wildfires, volcanic dust) and anthropogenic mechanisms (e.g. air pollution, acid rain, greenhouse gases, burning of fossil fuels) and the effects of these mechanisms on global climate change. ● Explain how various atmospheric, oceanic, and hydrologic conditions in Florida have influenced and can influence human behavior, both individually and collectively. ● Describe and discuss the conditions that bring about floods, droughts, wildfires, thunderstorms, hurricanes, rip currents, and tsunamis and how these conditions can influence human behavior (e.g. energy alternatives, conservation, migration, storm preparedness).	

	● Discuss the need for adequate monitoring of environmental parameters when making policy decisions.	
2.0 *Comprehension*	Student(s) will be able to: **I CAN** ● Evaluate the impact of biotechnology on the individual, society and the environment, including medical and ethical issues ● Evaluate the costs and benefits of renewable and nonrenewable resources, such as water, energy, fossil fuels, wildlife, and forests. ● Discuss the political, social, and environmental consequences of sustainable use of land. ● Evaluate how environment and personal health are interrelated. ● Assess the need for adequate waste management strategies. ● Discuss the effects of technology on environmental quality. ● Describe how human population size and resource use relate to environmental quality. ● Describe how different natural resources are produced and how their rates of use and renewal limit availability. **However, the student exhibits major errors or omissions regarding the more complex ideas and processes.**	
1.0 *Retrieval*	**WITH HELP** **A partial understanding of some of the simpler details and processes**	
Suggested Resources		

Environmental Science Standards (CPALMS)

Environmental Science Honors Standards (CPALMS)

Science Based Novel: The Boy Who Harnessed the Wind (high school edition ISBN 978-0-06-173033-7) by William Kamkwamba

Quicklab- Conserving Energy- Textbook p.438

Exploration Lab- Your Household Energy Consumption- Textbook p.454

Exploration Lab- Blowing in the Wind- Textbook p.478

Exploration Lab- Out of Sight/Out of Mind- Textbook p. 506

Inquiry Lab- Lead Poisoning and Mental Ability- Textbook p.531

Zika Virus Activity https://pulitzercenter.org/builder/lesson/lesson-plan-understanding-zika-virus-17235

Quicklab-Think Globally, Act Locally- Textbook p.546

Pesticides and Hermaphrodite Alligators video https://www.youtube.com/watch?v=zf6cL0ehDSk

Sustainable Seafood Guide- http://www.seafoodwatch.org/

Exploration Lab- Organizing a Sustainable Product Guide- Textbook p.555

Semester 2

Unit 6 - Our Health and Our Future & Final Project/Exam
Weeks 33-36 (4 weeks)

UNIT/ORGANIZING PRINCIPLE:	**Suggested PACING: CH 20 = 1wk, CH 21 = 1wk , Final Project/Exam Review = 1wk, EXAM Week = 1wk TOTAL = 4 weeks (Traditional 45-50min classes)**
Human impact on the environment	

STANDARDS:

EMBEDDED THROUGHOUT	SC.912.L.17.15:	Discuss the effects of technology on environmental quality.
EMBEDDED THROUGHOUT	SC.912.L.17.20:	Predict the impact of individuals on environmental systems and examine how human lifestyles affect sustainability.

Ch 20

CH 20	SC.912.E.7.8:	Explain how various atmospheric, oceanic, and hydrologic conditions in Florida have influenced and can influence human behavior, both individually and collectively.
CH 20	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.
CH 20	SC.912.L.16.10:	Evaluate the impact of biotechnology on the individual, society and the environment, including medical and ethical issues.

Ch 21

CH 21	SC.912.L.17.13:	Discuss the need for adequate monitoring of environmental parameters when making policy decisions.

ESSENTIAL QUESTION:	**District Resources:**
1. How does the environment impact your health? 2. What are zoonotic diseases? 3. How can you prevent tropical pandemics?	HMH Environmental Science 20, and 21

4. What are environmental diseases?	

CONCEPTS /CONTENT	LEARNING TARGETS/SKILLS	KEY TERMINOLOGY
HUMAN HEALTH (Ch 20)	SECTION 20.1 ∉ List five pollutants, their sources, and their possible effects on human health. ∉ Explain how scientists use toxicology and epidemiology. ∉ Explain how pollution can come from both natural sources and human activities. ∉ Describe the relationship between waste, pollution, and human health. SECTION 20.2 ∉ Explain why the environment is an important factor in the spread of some diseases. ∉ List two changes to the environment that can lead to the spread of infectious diseases. ∉ Explain what scientists mean when they say that certain viruses are emerging.	1. toxicology 2. dose 3. dose-responsive curve 4. epidemiology 5. risk assessment 6. particulates 7. pathogen 8. host

ECONOMICS, POLICY, AND THE FUTURE (Ch 21)	SECTION 21.1 ∉ Describe some of the challenges to achieving sustainability. ∉ Describe several agreements relating to the environment. ∉ Explain how economics and environmental science are related. ∉ Compare two ways that governments influence economics. ∉ Give an example of a private effort to address environmental problems. SECTION 21.2 ∉ Describe two major developments in U.S. environmental history. ∉ Give examples of three federal agencies that have environmental responsibilities. ∉ Explain the purpose of Environ-mental Impact Statements. ∉ Give an example of how citizens can affect environmental policy at each level of government—local, state, and national. ∉ Evaluate the media as a source of information about the environment. SECTION 21.3 ∉ Give examples of individuals who have influenced environmental history. ∉ Identify ways in which the choices that you make as an individual may affect the environment.	1. lobbying 2. Policy 3. Act 4. Law 5. economics 6. sustainability 7. Kyoto Protocol 8. Clean Air Act 9. Clean Water Act
Scales		**Sample Progress Monitoring and Assessment Activities**
4.0 *Knowledge Utilization*	**IN ADDITION TO SCORE 3.0, IN –DEPTH INFERENCES AND APPLICATIONS THAT GO BEYOND WHAT WAS TAUGHT** Student(s) will be able to: **I CAN**	● ● The Environment and your Health Project_____(W,I,C,O,R)

	● 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. ● Evaluate how environment and personal health are interrelated. Students will be able to: ● Analyze strategies for prevention, detection, and treatment of communicable and chronic diseases. **CAN** ● Analyze past, present, and potential future consequences to the environment resulting from various energy production technologies. ● Investigate and discuss how humans affect and are affected by geological systems and processes by describing the possible long-term consequences (costs and benefits) that increased human consumption (e.g. mining and extraction techniques off-shore drilling petrochemical refining) has placed on the environment (e.g. pollution, health, habitat destruction) and the impact on future energy production. ● Identify, analyze, and relate the internal (Earth system) and external (astronomical) conditions that contribute to global climate change. ● Explain the possible natural (e.g. increased global temperature, wildfires, volcanic dust) and anthropogenic mechanisms (e.g. air pollution, acid rain, greenhouse gases, burning of fossil fuels) and the effects of these mechanisms on global climate change. ● Explain how various atmospheric, oceanic, and hydrologic conditions in Florida have influenced and can influence human behavior, both individually and collectively. ● Describe and discuss the conditions that bring about floods, droughts, wildfires, thunderstorms, hurricanes, rip currents, and tsunamis and	
3.0 *Analysis* (Learning Goal)		

	how these conditions can influence human behavior (e.g. energy alternatives, conservation, migration, storm preparedness). ● Discuss the need for adequate monitoring of environmental parameters when making policy decisions.	
2.0 *Comprehension*	Student(s) will be able to: **I CAN** ● Evaluate the impact of biotechnology on the individual, society and the environment, including medical and ethical issues ● Evaluate the costs and benefits of renewable and nonrenewable resources, such as water, energy, fossil fuels, wildlife, and forests. ● Discuss the political, social, and environmental consequences of sustainable use of land. ● Evaluate how environment and personal health are interrelated. ● Assess the need for adequate waste management strategies. ● Discuss the effects of technology on environmental quality. ● Describe how human population size and resource use relate to environmental quality. ● Describe how different natural resources are produced and how their rates of use and renewal limit availability.	
1.0 *Retrieval*	**However, the student exhibits major errors or omissions regarding the more complex ideas and processes.** **WITH HELP** **A partial understanding of some of the simpler details and processes**	
Suggested Resources		

Nassau County School Board

Environmental Science Standards (CPALMS)

Environmental Science Honors Standards (CPALMS)

Quicklab- Conserving Energy- Textbook p.438

Exploration Lab- Your Household Energy Consumption- Textbook p.454

Exploration Lab- Blowing in the Wind- Textbook p.478

Exploration Lab- Out of Sight/Out of Mind- Textbook p. 506

Inquiry Lab- Lead Poisoning and Mental Ability- Textbook p.531

Zika Virus Activity https://pulitzercenter.org/builder/lesson/lesson-plan-understanding-zika-virus-17235

Quicklab-Think Globally, Act Locally- Textbook p.546

Pesticides and Hermaphrodite Alligators video https://www.youtube.com/watch?v=zf6cL0ehDSk

Sustainable Seafood Guide- http://www.seafoodwatch.org/

Exploration Lab- Organizing a Sustainable Product Guide- Textbook p.555