Seymour Public Schools Curriculum

Environmental Science

Narrative……
Many environmental problems are global problems. Within the biosphere, all living things exist in a delicate relationship with each other and nonliving things, necessary for their survival. The study of this topic will assist students in the understanding of such balance.

Grade: 11-12	Subject: Unit 1: Environmental Science Curriculum – A Global Perspective
Standard	Recommendations for Teachers of Environmental Science.
Enduring Understanding	To indentify environmental problems and values which are important in making decisions about the environment.
Essential Questions	• How do current environmental problems relate to the sustainability of human populations?
Content Standard:	
Performance Expectations (Student outcomes)	The students will: • Identify environmental problems and values. • Explain how the population crisis and consumption crisis contribute to environmental problems. • Distinguish between renewable and nonrenewable resource.

Strategies/Modes (examples)	Materials/Resources (examples)	Assessments (examples)
Demonstrate, model, and instruct.	Textbook, workbook, outside publications, posters, and other teacher generated materials.	Perform observational labs, Common formative assessments, summative assessments, numerous across curriculum reading and response assignments.

Environmental Science

Seymour Public Schools Curriculum

Narrative…….
The environment is so complex and interconnected that scientists do not yet completely understand how it works. This becomes clear to us when human actions have unexpected affects on the environment.

Grade: 11-12	Subject: Unit 2: Environmental Science Curriculum – Living Things in Ecosystems
Standard	Recommendations for Teachers of.
Enduring Understanding	Compare and contrast biotic and abiotic factors in ecosystems.
Essential Questions	• How does the environment influence the diversity of life on Earth?
Content Standard:	
Performance Expectations (Student outcomes)	The students will: • Distinguish between biotic and abiotic factors in an ecosystem • Define the levels of biological organization • Differentiate between habitat and niche.

Strategies/Modes (examples)	Materials/Resources (examples)	Assessments (examples)
Demonstrate, model, and instruct.	Textbook, workbook, outside publications, posters, and other teacher generated materials.	Perform observational labs, Common formative assessments, summative assessments, numerous across curriculum reading and response assignments.

Seymour Public Schools Curriculum

Environmental Science

Narrative…….
Just as a car cannot run without fuel, and organism cannot survive without energy. How organisms meet this need for energy greatly affects the structure of ecosystems. The ultimate source of all energy is the sun.

Grade: 11-12	Subject: Unit 3: Environmental Science Curriculum – How Ecosystems Work
Standard	Recommendations for Teachers.
Enduring Understanding	To trace the transfer of energy from the sun to producers and from producers to consumers.
Essential Questions	• What interactions occur between the living and nonliving portions of the biosphere? • How do the water, carbon, and nitrogen cycles affect ecosystems?
Content Standard:	
Performance Expectations (Student outcomes)	The students will: • Describe the roles of producers and consumers. • Trace energy transfers. • Differentiate between different types of consumers.

Strategies/Modes (examples)	Materials/Resources (examples)	Assessments (examples)
Demonstrate, model, and instruct.	Textbook, workbook, outside publications, posters, and other teacher generated materials.	Perform observational labs, Common formative assessments, summative assessments, numerous across curriculum reading and response assignments.

Seymour Public Schools Curriculum

Environmental Science

Narrative…….
Earth is covered by hundreds of types of ecosystems, grouped into a few biomes. Each biome contains many ecosystems and they are named for their plant and animal life. Each biome have distinctive climates and organisms.

Grade: 11-12	Subject: Unit 4: Environmental Science Curriculum – Types of Ecosystems
Standard	Recommendations for Teachers.
Enduring Understanding	To distinguish and identify different types of ecosystems, the role of producers and consumers and the factors the affect the environment.
Essential Questions	• What are the similarities and differences between different types of ecosystems? • How do producers and consumers affect these biomes? • What factors shape the characteristics of these ecosystems?
Content Standard:	
Performance Expectations (Student outcomes)	The students will: • Define biome. • Compare and contrast the worlds biomes. • Describe plant and animal adaptation in each biome. • Compare survival adaptations in different biomes.

Strategies/Modes (examples)	Materials/Resources (examples)	Assessments (examples)
Demonstrate, model, and instruct.	Textbook, workbook, outside publications, posters, and other teacher generated materials.	Perform observational labs, Common formative assessments, summative assessments, numerous across curriculum reading and response assignments.

Seymour Public Schools Curriculum

Environmental Science

Narrative…….
Surface and groundwater are an extremely important resource that has a far reaching global impact. In order to protect these vital resources we must explore and understand their characteristics..

Grade: 11-12	Subject: Unit 5: Environmental Science Curriculum – Surface and Groundwater Characteristics
Standard	Recommendations for Teachers.
Enduring Understanding	To understand the characteristics and global importance of surface and groundwater.
Essential Questions	• How important are groundwater and surface water? • What is the difference between surface and groundwater? • What are the characteristics of surface and groundwater?
Content Standard:	
Performance Expectations (Student outcomes)	The students will: • Describe the hydrologic cycle. • The importance, availability, and renewal surface and groundwater. • Investigate sustainability and depletion of aquifers. • Research possible solutions to water shortages.

Strategies/Modes (examples)	Materials/Resources (examples)	Assessments (examples)
Demonstrate, model, and instruct.	Textbook, workbook, outside publications, posters, and other teacher generated materials.	Perform observational labs, Common formative assessments, summative assessments, numerous across curriculum reading and response assignments.

Seymour Public Schools Curriculum

Environmental Science

Narrative…….
In the last thirty years developed countries have made enormous strides in cleaning up water supplies. However, some of the water is still dangerously polluted and more advanced method of treatment must be made available..

Grade: 11-12	Subject: Unit 6: Environmental Science Curriculum – Water and Wastewater Treatment Processes
Standard	Recommendations for Teachers.
Enduring Understanding	To understand the importance of preserving and preventing water source pollution.
Essential Questions	• How contaminated surface and ground water sources are identified? • How to prevent aquifers and surface water from being contaminated? • What are the major water pollutants and their sources? • How do we remediate polluted water sources? • How do we treat and purify waste water from point and nonpoint discharges?
Content Standard:	
Performance Expectations (Student outcomes)	The students will: • Identify contaminated water sources. • Explore ways to prevent water contamination. • Identify major water pollutants and their sources. • Discuss remediation alternatives. • Discover methods treating and purifying waste water.

Strategies/Modes (examples)	Materials/Resources (examples)	Assessments (examples)
Demonstrate, model, and instruct.	Textbook, workbook, outside publications, posters, and other teacher generated materials.	Perform observational labs, Common formative assessments, summative assessments, numerous across curriculum reading and response assignments.

Seymour Public Schools Curriculum

Environmental Science

Narrative…….
Clean air consists mostly of nitrogen and oxygen gases. When harmful substances enter the atmosphere, the result is air pollution. Most air pollution is the result of human activities, but pollutants can come from natural sources and can cause serious health problems..

Grade: 11-12	Subject: Unit 7: Environmental Science Curriculum – Air Pollution
Standard	Recommendations for Teachers.
Enduring Understanding	To define, explore sources, and identify methods of reducing air pollution.
Essential Questions	• What are the major sources primary air pollutants? • What is the difference of primary and secondary pollutants? • What are the methods of reducing air pollution? • How does air pollution affect humanity?
Content Standard:	
Performance Expectations (Student outcomes)	The students will: • Identify primary sources of air pollution. • Distinguish between different types of pollutants. • Discuss and explore methods of reducing air pollution. • Describe possible health effects of air pollution,

Strategies/Modes (examples)	Materials/Resources (examples)	Assessments (examples)
Demonstrate, model, and instruct.	Textbook, workbook, outside publications, posters, and other teacher generated materials.	Perform observational labs, Common formative assessments, summative assessments, numerous across curriculum reading and response assignments.

Seymour Public Schools Curriculum

Environmental Science

Narrative…….
One thing that makes life possible on Earth is the atmosphere, an thin layer of gases that surrounds it. It is made up of nitrogen, oxygen, and small concentrations of other gases. Climate is determined by a variety of factors that affect biodiversity in a given biome.

Grade: 11-12	Subject: Unit 8: Environmental Science Curriculum – Atmosphere and Climate
Standard	Recommendations for Teachers.
Enduring Understanding	To explain how the atmosphere makes life possible on Earth and how climate affects the distribution of life.
Essential Questions	• How does the atmosphere make life possible on Earth? • How does the climate affect biodiversity?
Content Standard:	
Performance Expectations (Student outcomes)	The students will: • Explain how the atmosphere makes life possible on Earth. • Define, compare and contrast photosynthesis, and cellular respiration. • Define climate, the factors that determine it. • Explain what causes the seasons. • Discuss the greenhouse effect and the ozone shield and their affects on Earth.

Strategies/Modes (examples)	Materials/Resources (examples)	Assessments (examples)
Demonstrate, model, and instruct.	Textbook, workbook, outside publications, posters, and other teacher generated materials.	Perform observational labs, Common formative assessments, summative assessments, numerous across curriculum reading and response assignments.

Seymour Public Schools Curriculum

Environmental Science

Narrative…….

The growth of cities as people move from rural to urban areas is known as urbanization and is occurring most rapidly in developing countries. Many countries have had trouble coping with their rapidly growing population causing inadequate infrastructures and decreasing job opportunities. This is the reason why good decisions on land use are necessary.

Grade: 11-12	Subject: Unit 9: Environmental Science Curriculum – Land and its Use
Standard	Recommendations for Teachers.
Enduring Understanding	To understand how urban crisis and suburban sprawl affect land use and how public land is used.
Essential Questions	• What is suburban sprawl? • How does mass transit affect sprawl? • How do human use non urban lands?
Content Standard:	
Performance Expectations (Student outcomes)	The students will: • Define suburban sprawl. • Describe the urban crisis. • Explain how human activities affect land use. • Explain how public land is used.

Strategies/Modes (examples)	Materials/Resources (examples)	Assessments (examples)
Demonstrate, model, and instruct.	Textbook, workbook, outside publications, posters, and other teacher generated materials.	Perform observational labs, Common formative assessments, summative assessments, numerous across curriculum reading and response assignments.

Seymour Public Schools Curriculum

Environmental Science

Narrative…….
All living things need food. Food production is not increasing as rapidly as population, therefore we are experiencing a global food shortage. The study of this topic will assist students in understanding that as the earth's population increases, alternative forms of food production must be explored.

Grade: 11-12	Subject: Unit 10: Environmental Science Curriculum – Food
Standard	Recommendations for Teachers.
Enduring Understanding	To understand the causes and consequences of food shortages and alternative ecologically sound methods to increase global food production.
Essential Questions	• Why is it so difficult to produce adequate amounts of food? • How can we increase productivity?
Content Standard:	
Performance Expectations (Student outcomes)	The students will: • Explain the reasons for food shortages. • Describe the advantages and disadvantages of the green revolution. • Discuss new alternative for food production.

Strategies/Modes (examples)	Materials/Resources (examples)	Assessments (examples)
Demonstrate, model, and instruct.	Textbook, workbook, outside publications, posters, and other teacher generated materials.	Perform observational labs, Common formative assessments, summative assessments, numerous across curriculum reading and response assignments.

Seymour Public Schools Curriculum

Environmental Science

Narrative…….
The earth has a limited amount of arable land which is decreasing every year. The shortage of fertile agricultural land threatens are ability for self-sustainability. To increase our arable land, we must be able to find ways to conserve our soil, control the role of pests in our environment and limit the levels of pesticides.

Grade: 11-12	Subject: Unit 11: Environmental Science Curriculum – Soil and Pesticide Control
Standard	Recommendations for Teachers.
Enduring Understanding	To identify arable soil, methods to prevent erosion, and the role of pesticides.
Essential Questions	• What is arable soil? • How to prevent soil erosion? • What are the different types of soil usage? • Why is pest control necessary? • How do insects become resistant to pesticides? • How does pesticides migration affect other ecosystems? • What are alternatives to pesticides?
Content Standard:	
Performance Expectations (Student outcomes)	The students will: • Describe arable soil. • Describe methods of preventing soil erosion. • Compare and contrast different types of soil usage. • Explain why pest control is necessary. • Explore natural alternatives to pesticides.

Strategies/Modes (examples)	Materials/Resources (examples)	Assessments (examples)
Demonstrate, model, and instruct.	Textbook, workbook, outside publications, posters, and other teacher generated materials.	Perform observational labs, Common formative assessments, summative assessments, numerous across curriculum reading and response assignments.

Seymour Public Schools Curriculum

Environmental Science

Narrative…….
The term biodiversity refers to the number and variety of species on Earth. Many scientists believe that there 13 million species living on Earth, but the number of known species as of the year 2000 is about 1.6 million. Because the human population is growing so rapidly we are causing other species to become extinct at an accelerating rate.

Grade: 11-12	Subject: Unit 12: Environmental Science Curriculum – Biodiversity
Standard	Recommendations for Teachers.
Enduring Understanding	To explain how humans are causing extinctions of other species and the importance of preserving biodiversity.
Essential Questions	• How do humans affect other species? • Why is it important to preserve biodiversity? • What efforts have been made to prevent extinctions?
Content Standard:	
Performance Expectations (Student outcomes)	The students will: • Explain how humans are causing extinctions of other species. • Understand the Importance of biodiversity. • Describe the main provisions of the Endangered Species Act. • Define endangered and threatened species. • Describe worldwide efforts to prevent extinctions.

Strategies/Modes (examples)	Materials/Resources (examples)	Assessments (examples)
Demonstrate, model, and instruct.	Textbook, workbook, outside publications, posters, and other teacher generated materials.	Perform observational labs, Common formative assessments, summative assessments, numerous across curriculum reading and response assignments.

Environmental Science

Narrative…….

Seymour Public Schools Curriculum

The average American uses about twice as much energy as the average European. Our fossil fuel supplies are dwindling while our appetite for energy is increasing. To achieve a sustainable energy future, we must develop new energy sources and use every available energy source as efficiently as possible.

Grade: 11-12	Subject: Unit 13: Environmental Science Curriculum – Energy
Standard	Recommendations for Teachers.
Enduring Understanding	To explain how our energy sources are dwindling and to explore alternatives.
Essential Questions	• Why are our fossil fuel sources of energy dwindling? • What are the available alternatives?
Content Standard:	
Performance Expectations (Student outcomes)	The students will: • Explain how fossil fuels are used to produce electricity. • Explain how major sources of energy are dwindling. • Explain nuclear energy and its advantages and disadvantages. • Describe methods of conserving energy. • Describe several alternative energy sources.

Strategies/Modes (examples)	Materials/Resources (examples)	Assessments (examples)
Demonstrate, model, and instruct.	Textbook, workbook, outside publications, posters, and other teacher generated materials.	Perform observational labs, Common formative assessments, summative assessments, numerous across curriculum reading and response assignments.

Seymour Public Schools Curriculum

Environmental Science

Narrative…….
Every year hazardous waste is generated by individuals and industry and the amount increases every year. Waste can be either be biodegradable or non biodegradable. Most of the individual waste is sent to landfills which are reaching their capacity thus creating another problem in its disposal. Some of the waste is created by industry as chemical and biological pollutants.

Grade: 11-12	Subject: Unit 14: Environmental Science Curriculum – Hazardous Waste
Standard	Recommendations for Teachers.
Enduring Understanding	To explain how hazardous waste is disposed of and to explore ways to reduce the amount of waste in general.
Essential Questions	• What is hazardous waste? • What are some chemical and biological pollutants? • How do we dispose of hazardous waste? • How do we reduce hazardous waste? • How do we deal with hazardous waste?
Content Standard:	
Performance Expectations (Student outcomes)	The students will: • Define hazardous waste. • Identify chemical and biological pollutants. • Explain how hazardous waste is disposed of. • Describe ways to reduce hazardous waste. • Define hazardous waste and ways to deal with it.

Strategies/Modes (examples)	Materials/Resources (examples)	Assessments (examples)
Demonstrate, model, and instruct.	Textbook, workbook, outside publications, posters, and other teacher generated materials.	Perform observational labs, Common formative assessments, summative assessments, numerous across curriculum reading and response assignments.

Seymour Public Schools Curriculum

Environmental Science

Narrative…….
The earth's human population is approaching 7 billion and climbing fast. Many scientists believe that this rapid growth is a fundamental cause of many environmental problems. The biotic potential for the human population is 6% per year and it is limited by food, water, and shelter supplies known as limiting resources.

Grade: 11-12	Subject: Unit 15: Environmental Science Curriculum – Population Growth
Standard	Recommendations for Teachers.
Enduring Understanding	To describe the factors that affect population size and the problems stemming from its growth.
Essential Questions	• What affects and limits population growth? • What factors have led to changes in human population? • What are the stages in population growth? • What are the problems stemming from population growth?
Content Standard:	
Performance Expectations (Student outcomes)	The students will: • Describe the factors that affect population size. • Explain why population grows and what limits its growth. • Identify the factors that have led to changes in human population. • Describe the stages in population growth. • Describe the problems of population growth.

Strategies/Modes (examples)	Materials/Resources (examples)	Assessments (examples)
Demonstrate, model, and instruct.	Textbook, workbook, outside publications, posters, and other teacher generated materials.	Perform observational labs, Common formative assessments, summative assessments, numerous across curriculum reading and response assignments.

Seymour Public Schools Curriculum

Environmental Science

Narrative…….
The earth's human population is approaching 7 billion and climbing fast. Many scientists believe that this rapid growth is a fundamental cause of many environmental problems. The biotic potential for the human population is 6% per year and it is limited by food, water, and shelter supplies known as limiting resources.

Grade: 11-12	Subject: Unit 16: Environmental Science Curriculum – Environmental Regulations in the U.S.
Standard	Recommendations for Teachers.
Enduring Understanding	To describe and discuss environmental laws and regulations that influence local, state, and national policy.
Essential Questions	• What are the federal departments and agencies responsible for environmental laws and regulations? • How are these laws and regulations enforced? • How do they influence local, state, and national policies? • What does the future hold?
Content Standard:	
Performance Expectations (Student outcomes)	The students will: • Identify federal departments and agencies responsible for environmental laws and regulations. • Recognize landmark environmental legislation such as the CWA, CAA, SDWA, and CERCLA. • Discuss enforcement options. • Describe the role of local, state, and federal government on such policies.

Strategies/Modes (examples)	Materials/Resources (examples)	Assessments (examples)
Demonstrate, model, and instruct.	Textbook, workbook, outside publications, posters, and other teacher generated materials.	Perform observational labs, Common formative assessments, summative assessments, numerous across curriculum reading and response assignments.

Seymour Public Schools Curriculum

Environmental Science

Narrative…….
The goals of environmental science go beyond understanding how we interact with the environment. They also include ways of living that permit humans and other species to survive and prosper in the future. This is what we call a sustainable future which can only be achieved if we can find ways to preserve and expand our environmental resources.

Grade: 11-12	Subject: Unit 17: Environmental Science Curriculum – A Sustainable Future
Standard	Recommendations for Teachers.
Enduring Understanding	To investigate ways of living that will allow the survival and prosperity of humans and other species. Also, to understand that the solutions to our environmental problems require individual and group action.
Essential Questions	• What are the ways that survival and prosperity of humans and other species can occur? • How can individuals and groups solve environmental problems?
Content Standard:	
Performance Expectations (Student outcomes)	The students will: • Describe the result of the Earth Summit. • Describe international agreements related to the environment. • Explain how environmental impact statements are prepared. • Describe the role of citizens and local governments in environmental decisions.

Strategies/Modes (examples)	Materials/Resources (examples)	Assessments (examples)
Demonstrate, model, and instruct.	Textbook, workbook, outside publications, posters, and other teacher generated materials.	Perform observational labs, Common formative assessments, summative assessments, numerous across curriculum reading and response assignments.