Science Planned Course – College Environmental Science Grades 11-12

Unit: **Ecosystems and their Interactions**

Content Standard: **Students will identify, evaluate, and analyze factors that determine and influence ecosystems.**

State Curriculum Standard: **4.2.12A Analyze the use of renewable and nonrenewable resources.**
4.2.12B Analyze factors affecting the availability of renewable and nonrenewable resources.
4.2.12C Analyze factors that influence the availability of natural resources.
4.6.12A Analyze the interdependence of an ecosystem.
4.6.12B Analyze the impact of cycles on the ecosystem.
4.6.12C Analyze how human action and natural changes affect the balance within an ecosystem.
4.7.12A Analyze biological diversity as it relates to the stability of an ecosystem.

Course Content	Student Performance	Resources	Assessments
A. Biomes. B. Ecosystems. C. Habitats. D. Populations. E. Census Techniques. F. Limiting Factors. G. Cycles in an Ecosystem. H. Photosynthesis. I. Pyramid of Biomass. J. Flow of Energy.	• Take notes from a variety of instructional presentations • Complete carefully all assigned reading activities • Complete all assigned laboratory investigations • Collection and analysis of data • Participate constructively in a variety of group activities • Participate constructively in class and group discussions • Demonstrate evaluative and critical thinking skills in both oral and written format • Thoughtfully view and analyze all video presentations	• Environmental Science: How the World Works and Your Place in it (LeBel 2002), Chapters 1.1, 1.6, 1.7 • Textbook supplementary materials • Teacher-developed notes and handouts • Video tapes / DVDs • Primary and secondary source readings • Maps, charts and graphs • Websites • Library services • Posters / visual aides	• Objective Tests • Projects/Presentations • Video Follow-up Activities • Study Guide • Lab Report Evaluation • Quizzes • Homework • Class Work

Science Planned Course – College Environmental Science Grades 11-12

Unit: **Energy: Past, Present, Future**

Content Standard: **Students will examine, identify and evaluate factors regarding use, availability and influences affecting renewable and nonrenewable resources.**

State Curriculum Standard: **4.2.12A Analyze the use of renewable and nonrenewable resources.**
4.2.12B Analyze factors affecting the availability of renewable and nonrenewable resources.
4.2.12C Analyze factors that influence the availability of natural resources.
4.2.12D Evaluate solid waste management practices.
4.3.12B Analyze the local, regional and national impacts of environmental health.
4.8.12A Explain how technology has influenced the sustainability of natural resources over time.
4.8.12B Analyze technology's role on natural resource sustainability.
4.9.12A Analyze environmental laws and regulations as they relate to environmental issues.

Course Content	Student Performance	Resources	Assessments
A. Fossil Fuel Formation and Availability. B. Fossil Fuel Uses. C. Environmental Effects From Fossil Fuel Use. D. Advantages/disadvantages of Fossil Fuel Use. E. Nuclear Energy Production. F. Nuclear Energy Advantages/Disadvantages. G. Forms of Renewable Energy and Uses. H. Advantages/Disadvantages of Renewable Resources. I. Alternate Energy Technology.	• Take notes from instructional presentations • Complete all assigned reading activities • Complete all assigned laboratory investigations • Collection and analysis of data • Participate constructively in assigned group activities • Participate constructively in class and group discussions • Demonstrate evaluative and critical thinking skills in both oral and written format • Thoughtfully view and analyze all video presentations	• Environmental Science:How the World Works and Your Place In It (LeBel 2002), Chapters 6.1, 6.2, 6.3, 6.6 • Textbook supplementary materials • Teacher developed notes and handouts • Video tapes and DVDs • Maps, charts and graphs • Websites • Library services • Posters/visual aids • Guest speaker • Newspaper • Field trip: municipal recycling center, landfill	• Objective tests • Essay tests • Projects/presentations • Video follow-up activities • Quizzes • Homework • Class work

Science Planned Course – College Environmental Science Grades 11-12

Unit: **Energy: Past, Present, Future**

Content Standard: **Students will examine, identify and evaluate factors regarding use, availability and influences affecting renewable and nonrenewable resources.**

State Curriculum Standard: **4.2.12A Analyze the use of renewable and nonrenewable resources.**
4.2.12B Analyze factors affecting the availability of renewable and nonrenewable resources.
4.2.12C Analyze factors that influence the availability of natural resources.
4.2.12D Evaluate solid waste management practices.
4.3.12B Analyze the local, regional and national impacts of environmental health.
4.8.12A Explain how technology has influenced the sustainability of natural resources over time.
4.8.12B Analyze technology's role on natural resource sustainability.
4.9.12A Analyze environmental laws and regulations as they relate to environmental issues.

Course Content	Student Performance	Resources	Assessments
J. Patterns of Energy Production and Consumption. K. Solid Waste Disposal Practices. L. Recycling Process and Regulations.	• Take notes from instructional presentations • Complete all assigned reading activities • Complete all assigned laboratory investigations • Collection and analysis of data • Participate constructively in assigned group activities • Participate constructively in class and group discussions • Demonstrate evaluative and critical thinking skills in both oral and written format • Thoughtfully view and analyze all video presentations	• Environmental Science:How the World Works and Your Place In It (LeBel 2002), Chapters 6.1, 6.2, 6.3, 6.6 • Textbook supplementary materials • Teacher developed notes and handouts • Video tapes and DVDs • Maps, charts and graphs • Websites • Library services • Posters/visual aids • Guest speaker • Newspaper • Field trip: municipal recycling center, landfill	• Objective tests • Essay tests • Projects/presentations • Video follow-up activities • Quizzes • Homework • Class work

Science Planned Course – College Environmental Science Grades 11-12

Unit: **Watersheds and Wetlands**

Content Standard: **Students will examine, identify, evaluate and analyze abiotic and biotic factors that influence aquatic ecosystems**

State Curriculum Standard: **4.1.12A Categorize stream order in a watershed.**
4.1.12B Explain the relationships that exist within watershed in the United States.
4.1.12C Analyze the parameters of a watershed.
4.1.12D Analyze the complex and diverse ecosystems of wetlands.
4.7.12A Analyze biological diversity as it relates to the stability of an ecosystem.
4.9.12A Analyze environmental laws and regulations as they relates to environmental issues.

Course Content	Student Performance	Resources	Assessments
A. Watersheds and Wetlands of PA. B. Stream Order. C. Influence of Water Cycle on Aquatic Ecosystem. D. Riparian Zone. E. Influence of Water's Physical Properties on Aquatic Ecosystems. F. Influence of Water's Chemical Properties on Aquatic Ecosystems. G. Aquatic Organism Identification. H. Aquatic Organism Life Cycles. I. Aquatic Organism Adaptations.	• Take notes from instructional presentations • Complete carefully all assigned reading activities • Complete all assigned laboratory investigations • On site recognition of common macro invertebrates • On site recognition of common aquatic plants • Collection and analysis of data • Participate constructively in assigned group activities • Participate constructively in class and group discussions • Demonstrate evaluative and critical thinking skills in both oral and written format • Thoughtfully view and analyze all videos	• Environmental Science: How the World Works and Your Place In It (LeBel 2002), Chapters 4.1, 4.2, 4.3, 4.4, 4.7, 4.9 • Textbook supplementary materials • Teacher developed notes and handouts • Video tapes and DVDs • Maps, charts and graphs • Websites • Library services • Posters/visual aids • Guest speaker • Newspaper • PA Fishing Regulations • Field Trip: watershed management, development, state forest, farmland, surface mining	• Objective Tests • Projects/Presentations • Video Follow-up Activities • Study Guide • Lab Report Evaluations • Quizzes • Homework • Class Work

Science Planned Course – College Environmental Science Grades 11-12

Unit: **Watersheds and Wetlands**

Content Standard: **Students will examine, identify, evaluate and analyze abiotic and biotic factors that influence aquatic ecosystems**

State Curriculum Standard: **4.1.12A Categorize stream order in a watershed.**
4.1.12B Explain the relationships that exist within watershed in the United States.
4.1.12C Analyze the parameters of a watershed.
4.1.12D Analyze the complex and diverse ecosystems of wetlands.
4.7.12A Analyze biological diversity as it relates to the stability of an ecosystem.
4.9.12A Analyze environmental laws and regulations as they relates to environmental issues.

Course Content	Student Performance	Resources	Assessments
I. Aquatic Organism Habitats J. Aquatic Plant Identification. K. Importance of Wetlands. L. Dynamics of a Wetland.	• Take notes from instructional presentations • Complete carefully all assigned reading activities • Complete all assigned laboratory investigations • On site recognition of common macro invertebrates • On site recognition of common aquatic plants • Collection and analysis of data • Participate constructively in assigned group activities • Participate constructively in class and group discussions • Demonstrate evaluative and critical thinking skills in both oral and written format • Thoughtfully view and analyze all videos	• Environmental Science: How the World Works and Your Place In It (LeBel 2002), Chapters 4.1, 4.2, 4.3, 4.4, 4.7, 4.9 • Textbook supplementary materials • Teacher developed notes and handouts • Video tapes and DVDs • Maps, charts and graphs • Websites • Library services • Posters/visual aids • Guest speaker • Newspaper • PA Fishing Regulations • Field Trip: watershed management, development, state forest, farmland, surface mining	• Objective Tests • Projects/Presentations • Video Follow-up Activities • Study Guide • Lab Report Evaluations • Quizzes • Homework • Class Work

Science Planned Course – College Environmental Science Grades 11-12

Unit: **Agriculture, Soil, and Society**

Content Standard: **Students will examine, identify, evaluate and analyze agricultural science and its relationship to society.**

State Curriculum Standard: **4.4.12A Analyze the management practices in the agriculture business.**
4.4.12B Describe how agricultural science has influenced biotechnology.
4.4.12C Analyze and research the social, political and economic factors that affect the agricultural systems.
4.4.12D Analyze the research and development activities as they relate to agriculture.
4.5.12A Research integrated pest management systems.
4.5.12B Research and analyze integrated pest management practices globally.
4.5.12C Analyze the historical significance of integrated pest management on society.
4.7.12A Analyze biological diversity as it relates to the stability of an ecosystem.
4.8.12A Explain how technology has influenced the sustainability of natural resources over time.
4.8.12B Analyze technology's role on natural resource sustainability.
4.8.12D Analyze the international implications of environmental occurrences.
4.9.12A Analyze environmental laws and regulations as they relate to environmental issues.

Course Content	Student Performance	Resources	Assessments
A. Feeding the World's Populations. B. Political and Societal Factors of Agriculture and Food. C. Soil types and their Composition. D. Soil Erosion and its Effects on Agriculture. E. Land Degradation and its Effects on Agriculture. F. Soil Conservation. G. Traditional Agriculture Methods.	• Take notes from instructional presentations • Complete all assigned reading activities • Complete all assigned laboratory investigations • Collection and analysis of data • Participate constructively in assigned group activities • Participate constructively in class and group discussions • Demonstrate evaluative and critical thinking skills in both oral and written format • Thoughtfully view and analyze all video presentations	• Environmental Science: How the World Works and Your Place in it (LeBel 2002), Chapters 3.3, 3.6, 3.8,3.10, 3.12 • Supplementary soils resources • Teacher developed notes and handouts • Video tapes and DVD's • Maps, charts, and graphs • Websites • Library services • Posters/Visual aids • Guest Speakers • Newspaper • PA Agricultural regulations • Classroom field trip outdoors	• Objective tests • Essay tests • Projects/presentations • Video follow-up activities • Quizzes • Homework • Class work

Science Planned Course – College Environmental Science Grades 11-12

Unit: **Agriculture, Soil, and Society**

Content Standard: **Students will examine, identify, evaluate and analyze agricultural science and its relationship to society.**

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4.5.12A Research integrated pest management systems.
4.5.12B Research and analyze integrated pest management practices globally.
4.5.12C Analyze the historical significance of integrated pest management on society.
4.7.12A Analyze biological diversity as it relates to the stability of an ecosystem.
4.8.12A Explain how technology has influenced the sustainability of natural resources over time.
4.8.12B Analyze technology's role on natural resource sustainability.
4.8.12D Analyze the international implications of environmental occurrences.
4.9.12A Analyze environmental laws and regulations as they relate to environmental issues.

Course Content	Student Performance	Resources	Assessments
H. Modern Agriculture Methods. I. Positive and Negative Factors of Organic and Inorganic Fertilizers. J. Genetically Modified Crops. K. Principles of IPM. L. Advantages/disadvantage IPM.	• Take notes from instructional presentations • Complete all assigned reading activities • Complete all assigned laboratory investigations • Collection and analysis of data • Participate constructively in assigned group activities • Participate constructively in class and group discussions • Demonstrate evaluative and critical thinking skills in both oral and written format • Thoughtfully view and analyze all video presentations	• Environmental Science: How the World Works and Your Place in it (LeBel 2002), Chapters 3.3, 3.6, 3.8,3.10, 3.12 • Supplementary soils resources • Teacher developed notes and handouts • Video tapes and DVD's • Maps, charts, and graphs • Websites • Library services • Posters/Visual aids • Guest Speakers • Newspaper • PA Agricultural regulations • Classroom field trip outdoors	• Objective tests • Essay tests • Projects/presentations • Video follow-up activities • Quizzes • Homework • Class work

Science Planned Course – College Environmental Science Grades 11-12

Unit: **Environmental Health**

Content Standard: **Students will identify, evaluate, and analyze factors that determine and influence environmental health issues.**

State Curriculum Standard: **4,3,12A Analyze the complexity of environmental health issues.**
4.3.12B Analyze the local, regional and national impacts of environmental health.
4.3.12C Analyze the need for a healthy environment.
4.8.12A Explain how technology has influenced the sustainability of natural resources over time
4.8.12B Analyze technology's role on natural resource sustainability.
4.8.12C Analyze how pollution has changed in quality, variety and toxicity as the United States developed its industrial base.
4.9.12A Analyze environmental laws and regulations as they relate to environmental issues.

Course Content	Student Performance	Resources	Assessments
A. Environmental Health Issues Worldwide. B. Pollution Prevention and Control. C. Health Effects of Invisible Pollutants. D. Disposal Methods of Toxic and Hazardous Wastes. E. Point and Non Point Sources Of Water Pollution. F. Goals of Clean Water Act. G. Elements of Municipal Sewage Treatment. H. Elements of Municipal Water Treatment On-Site. I. Septic Systems Components and Operation. J. Chronic Disease and Environmental Pollutants.	• Take notes from a variety of instructional presentations • Complete carefully all assigned reading activities • Complete all assigned laboratory investigations • Collection and analysis of data • Participate constructively in a variety of group activities • Participate constructively in class and group discussions • Demonstrate evaluative and critical thinking skills in both oral and written format • Thoughtfully view and analyze all video presentations	• Environmental Science: How the World Works and Your Place in it (LeBel 2002), Chapters 4.12, 5.1, 5.3, 5.4 • Textbook supplementary materials • Teacher-developed notes and handouts • Video tapes / DVDs • Primary and secondary source readings • Maps, charts and graphs • Websites • Library services • Posters / visual aides	• Objective Tests • Projects/Presentations • Video Follow-up Activities • Study Guide • Lab Report Evaluation • Quizzes • Homework • Class Work

Science Planned Course – College Environmental Science Grades 11-12

Unit: **Management Strategies for Biodiversity**

Content Standard: **Describe, examine, analyze, and evaluate management strategies for organism biodiversity**

State Curriculum Standard: **4.2.12A Analyze the use of renewable and nonrenewable resources**
4.2.12B Analyze factors affecting the availability of renewable and nonrenewable resources
4.7.12A Analyze biological diversity as it relates to the stability of an ecosystem
4.7.12B Examine the effects of extinction, both natural and human caused, on the environment
4.7.12C Analyze the effects of threatened, endangered, or extinct species on human and natural systems
4.8.12A Explain how technology has influenced the sustainability of natural resources over time
4.8.12B Analyze technology's role on natural resource sustainability
4.9.12A Analyze environmental laws and regulations as they relate to environmental issues.

Course Content	Student Performance	Resources	Assessments
A. Effects of Biodiversity on an Ecosystem. B. Species, Ecosystem, and Genetic Biodiversity. C. Keystone Species. D. Symbiotic Relationships Between Organisms. E. Extinction, Natural Vs Human. F. How Extinction Effects Nature Systems. G. Hunting. H. International Trade and Poaching (Laws). I. Preserving / Reintroducing Wildlife.	• Take notes from instructional presentations • Complete carefully all assigned reading activities • Complete all assigned laboratory investigations • Collection and analysis of data • Participate constructively in class and group discussions • Demonstrate evaluative and critical thinking skills in both oral and written format • Thoughtfully view and analyze all videos	• Environmental Science: How the World Works and Your Place in it (LeBel 2002), Chapters 1.10, 1.11, 1.14, 1.15 • Textbook supplementary materials • Teacher developed notes and handouts • Videotapes and DVD's • Maps, charts, and graphs • Websites • Library Services • Posters/Visual aids • Guest Speaker • Newspaper • Supplemental forestry material (PSU, etc…) • Museum fieldtrip	• Objective Tests • Projects/ Presentations • Video Follow-up Activities • Study Guide • Lab Report Evaluations • Quizzes • Homework • Class work

Science Planned Course – College Environmental Science Grades 11-12

Unit: **Management Strategies for Biodiversity**

Content Standard: **Describe, examine, analyze, and evaluate management strategies for organism biodiversity**

State Curriculum Standard: **4.2.12A Analyze the use of renewable and nonrenewable resources**
4.2.12B Analyze factors affecting the availability of renewable and nonrenewable resources
4.7.12A Analyze biological diversity as it relates to the stability of an ecosystem
4.7.12B Examine the effects of extinction, both natural and human caused, on the environment
4.7.12C Analyze the effects of threatened, endangered, or extinct species on human and natural systems
4.8.12A Explain how technology has influenced the sustainability of natural resources over time
4.8.12B Analyze technology's role on natural resource sustainability
4.9.12A Analyze environmental laws and regulations as they relate to environmental issues.

Course Content	Student Performance	Resources	Assessments
J. Land use (Urbanization). K. Forest Management. L. Use of Natural Resources: Parks, Preserves. I. Mining. J. Endangered Species.	• Take notes from instructional presentations • Complete carefully all assigned reading activities • Complete all assigned laboratory investigations • Collection and analysis of data • Participate constructively in class and group discussions • Demonstrate evaluative and critical thinking skills in both oral and written format • Thoughtfully view and analyze all videos	• Environmental Science: How the World Works and Your Place in it (LeBel 2002), Chapters 1.10, 1.11, 1.14, 1.15 • Textbook supplementary materials • Teacher developed notes and handouts • Videotapes and DVD's • Maps, charts, and graphs • Websites • Library Services • Posters/Visual aids • Guest Speaker • Newspaper • Supplemental forestry material (PSU, etc…) • Museum fieldtrip	• Objective Tests • Projects/ Presentations • Video Follow-up Activities • Study Guide • Lab Report Evaluations • Quizzes • Homework • Class work

Science Planned Course – College Environmental Science Grades 11-12

Unit: **Air Quality**

Content Standard: **Students will examine, identify, evaluate, and analyze major sources of air pollution and describe the effects of the major air pollutants.**

State Curriculum Standard: **4.3.12A: Analyze the complexity of environmental health issues.**
4.3.12B: Analyze the local, regional and national impacts of environmental health.
4.3.12C: Analyze the need for a healthy environment.
4.8.12C: Analyze how pollution has changed in quality, variety, and toxicity as the United States developed its industrial base.
4.9.12A: Analyze environmental laws and regulations as they relate to environmental issues.

Course Content	Student Performance	Resources	Assessments
A. History of Pollution. B. Clean Air Act of 1970. C. Indoor Air Pollution. D. Compounds That Cause Air Pollution. E. Air Pollution Formation. F. Health Affects of Air Pollution. G. Effects on Plants. H. Clean Air Technology. I. Car Emissions.	• Take notes from instructional presentations • Complete all assigned reading activities • Complete all assigned laboratory investigations • Collection and analysis of data • Participate constructively in assigned group activities • Participate constructively in class and group discussions • Demonstrate evaluative and critical thinking skills in both oral and written format • Thoughtfully view and analyze all video presentations	• Environmental Science: How the World Works and Your Place In It (LeBel 2002) Chapters 2.4, 2.5, 2.6, 2.14, 2.15 • Textbook supplementary materials • Teacher developed notes and handouts • Video tapes and DVDs • Maps, charts and graphs • Websites • Library services • Posters/visual aids • Guest speaker • Newspaper	• Objective tests • Essay tests • Projects/presentations • Video follow-up activities • Quizzes • Homework • Class work