Wallenpaupack Area School District
Planned Course Curriculum Guide

Science

*Science 9 Honors
Science 9 CCR

Course Description:

Science 9 *Honors and CCR – This course is taught with an emphasis on environmental and ecological concepts. An inquiry-based, hands-on approach is used when appropriate. Topics include science basics, ecosystems, biodiversity, species adaptations, agriculture, water resources, energy resources and environmental issues. There is also a strong focus on our local watershed and protecting our local ecosystem. The focal point of this course is to better prepare our high school students to investigate and understand these topics as they are related to the Pennsylvania STEELS.

Revision Date:

This curriculum was completed in the Fall of 2025 by Erin M'Liss Bonagura and Ryan Neenan.
Completion Date: 11/13/25

Wallenpaupack Area School District Curriculum	
COURSE: Science 9 *Honors and CCR	GRADE/S: 9th
UNIT 1: Science, Matter & Energy (Chapter 2)	TIMEFRAME: 8-10 classes

PA STEELS:

3.2.6-8.A

Develop models to describe the atomic composition of simple molecules and extended structures.

3.2.9-12.P

Develop and use models to illustrate that energy at the macroscopic scale can be accounted for as a combination of energy associated with the motions of particles (objects) and energy associated with the relative positions of particles (objects)

UNIT OBJECTIVES:

Students are expected to

- Describe how scientists observe nature and collect data.
- Identify, explain and analyze the parts of the scientific method.
- Understand the importance of a controlled experiment.
- Compare and contrast the scientific definition for theory and hypothesis.
- Utilize the Periodic Table to identify elements and their atomic make up.
- Explain the different properties of matter.
- Explore energy types, uses and resources.

INSTRUCTIONAL STRATEGIES/ACTIVITIES:

- Notes (PowerPoints, Outlines)
- Written Assignments / Worksheets (Based on Book/Chapter Questions)
- Projects
- Demonstration / Labs
- Small / Large Group Discussions
- Group Work
- Independent Work

ASSESSMENTS:

- CDTs (Diagnostic)
- Formative Assessments
- Summative Assessments

DIFFERENTIATED INSTRUCTION (Remediation/Extension) (Process, Product or Content)

Struggling Student – Remediation

Teacher /student individualized instruction to include...

- typed notes
- guided questions
- textbook review
- audio textbook

Advanced Student – Extension

Teacher /student individualized instruction to include...

*Student assignments are more in-depth, critical thinking incorporated increased independent work, and more challenging assessments.

RESOURCES:

Environmental Science: Sustaining Your World by Miller & Spoolman

VOCABULARY: atom, chemical change, compound, conservation of matter, controlled experiment, data, element, energy, hypothesis, ion, isotope, model, molecule, observation, organic, physical change, scientific law, scientific theory, scientific method

Wallenpaupack Area School District Curriculum	
COURSE: Science 9 *Honors and CCR	GRADE/S: 9th
UNIT 2: Ecosystems (Chapter 3)	TIMEFRAME: 8-10 classes

PA STEELS:

3.1.9-12.H Use mathematical representations to support claims for the cycling of matter and flow of energy among organisms in an ecosystem

3.1.9-12.K Develop a model to illustrate the role of photosynthesis and cellular respiration in the cycling of carbon among the biosphere, atmosphere, hydrosphere, and geosphere.

3.3.9-12.L Develop a quantitative model to describe the cycling of carbon among the hydrosphere, atmosphere, geosphere, and biosphere.

3.3.9-12.M Use a computational representation to illustrate the relationships among Earth systems and how those relationships are being modified due to human activity

UNIT OBJECTIVES:

Students are expected to

- Identify and explain the four spheres that support life.
- Describe nutrient cycles vital to life.
- Use diagrams to extract information about energy flow in ecosystems.
- Analyze the impact humans have on energy flow in different ecosystems.

INSTRUCTIONAL STRATEGIES/ACTIVITIES:

- Notes (PowerPoints, Outlines)
- Written Assignments / Worksheets (Based on Book/Chapter Questions)
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ASSESSMENTS:

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DIFFERENTIATED INSTRUCTION (Remediation/Extension) (Process, Product or Content)

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RESOURCES (Websites, Blogs, Videos, Whiteboard Resources, etc.):

Environmental Science: Sustaining Your World by Miller & Spoolman

VOCABULARY:

Geosphere, atmosphere, stratosphere, troposphere, hydrosphere, biosphere, greenhouse effect, organism, population, community, ecosystem, biotic factor, abiotic factor, trophic level, producer, photosynthesis, respiration, consumer, herbivore, carnivore, omnivore, decomposer, detritivore, detritus, food chain, food web, nutrient cycle (carbon, nitrogen, phosphorus), hydrologic cycle, surface runoff, groundwater, aquifer, specific heat, density, adhesion, cohesion, evaporation, condensation, transpiration, infiltration, precipitation, fossil fuels, fertilizer, nitrogen fixation, gravity.

Wallenpaupack Area School District Curriculum	
COURSE: Science 9 *Honors and CCR	GRADE/S: 9th
UNIT 3: Biodiversity (Chapter 4 + Chapter 7)	TIMEFRAME: 8-10 classes

PA STEELS:

3.1.9-12.I Use mathematical and/or computational representations to support explanations of factors that affect carrying capacity of ecosystems at different scales.

3.1.9-12.L Use mathematical representations to support and revise explanations based on evidence about factors affecting biodiversity and populations in ecosystems of different scales.

3.1.9-12.M Evaluate the claims, evidence, and reasoning that the complex interactions in ecosystems maintain relatively consistent numbers and types of organisms in stable conditions, but changing conditions may result in a new ecosystem.

3.1.9-12.N Design, evaluate, and refine a solution for reducing the impacts of human activities on the environment and biodiversity.

3.1.9-12.O Evaluate the evidence for the role of group behavior on individual and species' chances to survive and reproduce.

3.1.9-12.S Communicate scientific information that common ancestry and biological evolution are supported by multiple lines of empirical evidence.

3.1.9-12.T Construct an explanation based on evidence that the process of evolution primarily results from four factors: (1) the potential for a species to increase in number, (2) the heritable genetic variation of individuals in a species due to mutation and sexual reproduction, (3) competition for limited resources, and (4) the proliferation of those organisms that are better able to survive and reproduce in the environment.

3.1.9-12.W Construct an explanation based on evidence for how natural selection leads to adaptation of populations.

UNIT OBJECTIVES:

Students are expected to

- Differentiate between different types of biodiversity.
- Explore examples of evolution by natural selection
- Explain natural selection based on physical and behavioral adaptations.
- Evaluate an organism's adaptations.
- Analyze an organism's niche in the ecosystem.
- Describe speciation and the factors leading up to it.

INSTRUCTIONAL STRATEGIES/ACTIVITIES:

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- Projects
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ASSESSMENTS (Diagnostic/Benchmark/Formative/Summative):

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DIFFERENTIATED INSTRUCTION (Remediation/Extension) (Process, Product or Content)

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RESOURCES (Websites, Blogs, Videos, Whiteboard Resources, etc.):

Environmental Science: Sustaining Your World by Miller & Spoolman

VOCABULARY:
Biodiversity, diversity (species, genetic, ecosystem, functional), ecological niche, generalist species, specialist species, native species, nonnative/invasive species, keystone species, indicator species, biological evolution, natural selection, fossil, mutation, adaptation, speciation, geographic isolation, reproductive isolation, extinction, endemic species, biodiversity hotspot

Wallenpaupack Area School District Curriculum	
COURSE: Science 9 *Honors and CCR	GRADE/S: 9th
UNIT 4: Ecosystems & Species Interactions (Chapter 5)	TIMEFRAME: 8-10 classes

PA STEELS:

3.1.9-12.M Evaluate the claims, evidence, and reasoning that the complex interactions in ecosystems maintain relatively consistent numbers and types of organisms in stable conditions, but changing conditions may result in a new ecosystem.

3.1.9-12.O Evaluate the evidence for the role of group behavior on individual and species' chances to survive and reproduce.

3.1.9-12.T Construct an explanation based on evidence that the process of evolution primarily results from four factors: (1) the potential for a species to increase in number, (2) the heritable genetic variation of individuals in a species due to mutation and sexual reproduction, (3) competition for limited resources, and (4) the proliferation of those organisms that are better able to survive and reproduce in the environment.

3.1.9-12.X Evaluate the evidence supporting claims that changes in environmental conditions may result in (1)increases in the number of individuals of some species, (2) the emergence of new species over time, and (3) the extinction of other species.

3.3.9-12.N Construct an argument based on evidence about the simultaneous coevolution of Earth's systems and life on Earth.

UNIT OBJECTIVES:

Students are expected to

- Explore examples of coevolution.
- Describe different roles species can play in an ecosystem.
- Explain the different species' interactions or relationships.
- Compare and contrast types of ecological succession.

INSTRUCTIONAL STRATEGIES/ACTIVITIES:

- Notes (PowerPoints, Outlines)
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RESOURCES (Websites, Blogs, Videos, Whiteboard Resources, etc.):

Environmental Science: Sustaining Your World by Miller & Spoolman

VOCABULARY:
Interspecific competition, resource partitioning, predation, prey, predator, predator-prey relationship, coevolution, parasitism, mutualism, commensalism, ecological succession, resilience, population, carrying capacity, limiting factors, environmental resistance, population crash, mimicry, extinction, endangered species, threatened species, habitat fragmentation

Wallenpaupack Area School District Curriculum	
COURSE: Science 9 *Honors and CCR	GRADE/S: 9th
UNIT 5: Biomes (Chapter 6)	TIMEFRAME: 8-10 classes

PA STEELS:
3.1.9-12.V Create or revise a simulation to test a solution to mitigate the adverse impacts of human activity on biodiversity.

UNIT OBJECTIVES:

Students are expected to

- Utilize a biome map to identify them around the world.
- Describe key factors to determine a biome.
- Decipher between different types of biomes.
- Analyze human factors that disrupt the health of the biome.

INSTRUCTIONAL STRATEGIES/ACTIVITIES:

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RESOURCES (Websites, Blogs, Videos, Whiteboard Resources, etc.):

Environmental Science: Sustaining Your World by Miller & Spoolman

VOCABULARY:

Weather, climate, ocean currents, biome, desert, tropical, temperate, grassland, savannah, tundra, permafrost, forest, rain forest, boreal forest, taiga, aquatic life zones, marine life zones, estuary, coastal zone, open sea, watershed, eutrophication, oligotrophic, wetland

Wallenpaupack Area School District Curriculum	
COURSE: Science 9 *Honors and CCR	GRADE/S: 9th
UNIT 6: Agriculture (Chapter 9)	TIMEFRAME: 8-10 classes

PA STEELS:

3.4.9-12.A Analyze and interpret how issues, trends, technologies, and policies impact agricultural, food, and environmental systems and resources.

3.4.9-12.F Evaluate and communicate the effect of integrated pest management practices on indoor and outdoor environments.

3.4.9-12.G Analyze and evaluate how best resource management practices and environmental laws achieve sustainability of natural resources.

UNIT OBJECTIVES:

Students are expected to

- Understand, describe and analyze the following aspects of agriculture:
  - Geographic location effect on crops and livestock
  - Types of agriculture (organic, industrial, sustainable)
  - Equipment
  - Procedures
  - Integrated pest management
  - Processing (farm to consumer)

INSTRUCTIONAL STRATEGIES/ACTIVITIES:

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RESOURCES (Websites, Blogs, Videos, Whiteboard Resources, etc.):

Environmental Science: Sustaining Your World by Miller & Spoolman

VOCABULARY:
Food security, food insecurity, chronic malnutrition, overnutrition, industrialized agriculture, monoculture, polyculture, cross breeding, traditional agriculture, organic agriculture, green revolution, genetically modified organisms, aquaculture, rangeland, desertification, soil salinization, pest, invasive species, pesticide (synthetic, natural), integrated pest management

Wallenpaupack Area School District Curriculum	
COURSE: Science 9 *Honors and CCR	GRADE/S: 9th
UNIT 7: Water Resources & Pollution (Chapter 10)	TIMEFRAME: 10-12 classes

PA STEELS:
3.4.9-12.C Analyze and interpret how issues, trends, technologies, and policies impact watersheds and water resources.
3.4.9-12.G Analyze and evaluate how best resource management practices and environmental laws achieve sustainability of natural resources.
3.3.9-12.K Plan and conduct an investigation of the properties of water and its effects on Earth materials and surface processes.

UNIT OBJECTIVES (SWBATS):

Students are expected to

- Understand and explain the water cycle.
- Evaluate water conservation.
- Identify the major rivers and watersheds of Pennsylvania.
- Describe water pollution causes and solutions.
- Participate in the Lake Trip: lake history, hydroelectric power, watershed best management practices, limnology study, stream study, wetland study, wastewater treatment

INSTRUCTIONAL STRATEGIES/ACTIVITIES:

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RESOURCES (Websites, Blogs, Videos, Whiteboard Resources, etc.):

Environmental Science: Sustaining Your World by Miller & Spoolman

VOCABULARY:
Groundwater, water table, aquifer, reservoir, desalination, irrigation, water pollution, point source, nonpoint source, wastewater, cultural eutrophication, watershed, Colorado River, flood, floodplain, topography, elevation, sea level, contour lines, contour interval, wetland, bog, marsh, swamp, buffer zone, riparian zone, algae bloom, acid mine drainage, erosion, macroinvertebrates, limnology, best management practices

Wallenpaupack Area School District Curriculum	
COURSE: Science 9 *Honors and CCR	GRADE/S: 9th
UNIT 8: Resources (Chapters 12&13) & Waste (Chapter 17)	TIMEFRAME: 8-10 classes

PA STEELS:

3.3.9-12.O Construct an explanation based on evidence for how the availability of natural resources, occurrence of natural hazards, and changes in climate have influenced human activity

3.3.9-12.P Evaluate competing design solutions for developing, managing, and utilizing energy and mineral resources based on cost-benefit ratios

3.3.9-12.Q Create a computational simulation to illustrate the relationships among management of natural resources, the sustainability of human populations, and biodiversity.

UNIT OBJECTIVES:

Students are expected to

- Identify and describe types of resources (renewable, nonrenewable, alternative)
- Evaluate resource extraction methods.
- Analyze waste and elimination processes.

INSTRUCTIONAL STRATEGIES/ACTIVITIES:

- Notes (PowerPoints, Outlines)
- Written Assignments / Worksheets (Based on Book/Chapter Questions)
- Projects
- Demonstration / Labs
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RESOURCES (Websites, Blogs, Videos, Whiteboard Resources, etc.):

Environmental Science: Sustaining Your World by Miller & Spoolman

VOCABULARY:

Energy, crude oil, refining, hydraulic fracturing, natural gas, coal, nuclear fission, nuclear fusion, energy efficiency, cogeneration, hydrogen fuel cell, passive solar heating system, active solar heating system, solar thermal systems, photovoltaic cells, hydropower, wind power, biomass, biofuels, geothermal energy, hydrogen fuel cells, decarbonization, solid waste (industrial, municipal), integrated waste management, landfill, recycling, composting, e-waste, bioremediation, deep-well disposal