

Wallenpaupack Area School District

COURSE: Science – The Diversity of Life

GRADE: Grades 10 - 12

LENGTH OF COURSE: 90 Days/84 Minutes Per Day

TEXT: To be determined

PUBLISHER:

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COURSE DESCRIPTION:

This course will provide you with an enjoyable and informative hands-on overview of the biological kingdoms, including microorganisms, plants and animals. Students will learn about life's diversity, form, function, and importance. Students will be asked to care for organisms during the semester

AREAS OF STUDY:

CURRICULUM WRITING TEAM:

George Howanitz

DATE OF REVISION:

2002

Wallenpaupack Area School District

Course: Science – The Diversity of Life

Grade Level: 10-12

Unit: Unifying Themes

PA Standard: 3.1.
3.1.12.A
3.1.12.C
3.1.12.E

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|---|--|
| Topics: | Skills: |
| The Five Kingdoms of Life | <p>Analyze and describe the function, interaction and relationship among subsystems and the system itself</p> <p>Compare and contrast several systems that could be applied to solve a single problem</p> <p>Evaluate the causes of a system's inefficiency</p> <p>Assess and apply recurring patterns in natural and technological systems</p> <p>Compare & contrast structure and function relationships as they relate to patterns</p> <p>Evaluate fundamental science and technology concepts and their development over time</p> <p>Analyze how models, systems and technologies have changed over time</p> |
| Activities: | Performance Assessments: |
| <p>Characteristics of organisms in the Five Kingdoms</p> <p>Care of organisms</p> <p>Contrast historical taxonomic levels</p> <p>Organism Journals</p> <p>Bacteria Lab</p> <p>Protist Lab</p> <p>Plant Lab</p> <p>Organism Lab (Student Designs)</p> <p>Zoo Activity (Class Trip)</p> <p>Compare & Contrast organisms in the five kingdoms of life</p> <p>Various microscope labs</p> | <p>Laboratory performance</p> <p>Teacher observations</p> <p>Evaluation of presentations</p> <p>Tests/Quizzes</p> <p>Power Point Project</p> <p>Care of organism</p> <p>Journal</p> |

Wallenpaupack Area School District

Course: Science – The Diversity of Life

Grade Level: 10-12

Unit: Inquiry and Design

PA Standard: 3.2
3.2.12.A
3.2.12.B
3.2.12.C

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|---|---|
| Topics: | Skills: |
| The Five Kingdoms of Life | <p>Know and use the ongoing scientific processes to continually improve and better understand how things work</p> <p>Critically evaluate the status of existing theories</p> <p>Evaluate experimental data correctly within experimental limits</p> <p>Judge that conclusions are consistent and logical with experimental conditions</p> <p>Interpret results of experimental research to predict new information or improve a solution</p> <p>Generate questions about objects, organisms, and/or events that can be answered through scientific investigations</p> <p>Design an investigation with adequate control and limited variables to investigate a question</p> <p>Evaluate the significance of experimental information in answering the question</p> <p>Project additional questions from a research study that could be studied</p> |
| Activities: | Performance Assessments: |
| <p>Characteristics of organisms in the Five Kingdoms</p> <p>Care of organisms</p> <p>Contrast historical taxonomic levels</p> <p>Organism Journals</p> <p>Bacteria Lab</p> <p>Protist Lab</p> <p>Plant Lab</p> <p>Organism Lab (Student Designs)</p> <p>Zoo Activity (Class Trip)</p> <p>Compare & Contrast organisms in the five kingdoms of life</p> <p>Various microscope labs</p> | <p>Laboratory performance</p> <p>Teacher observations</p> <p>Evaluation of presentations</p> <p>Tests/Quizzes</p> <p>Power Point Project</p> <p>Care of organism</p> <p>Journal</p> |

Wallenpaupack Area School District

Course: Science – The Diversity of Life

Grade Level: 10-12

Unit: Biological Sciences

PA Standard: 3.3
3.3.12.A
3.3.12.B
3.3.12.C
3.3.12.D

| Topics: | Skills: |
|---|--|
| <p>The Five Kingdoms of Life</p> | <p>Identify and explain interactions among organisms Explain and analyze the relationship between structure and function at the molecular, cellular, and organ-system level Describe and explain structural and functional relationships in each of the five (or six) kingdoms Explain significant biological diversity in each of the biomes Identify and describe factors affecting metabolic function Evaluate relationships between structure and functions of different anatomical parts given their structure Describe potential impact of genome research on the biochemistry and physiology of life Analyze gene expression at the molecular level Explain birth defects Examine human history by describing the progression from early hominids to modern humans Apply the concept of natural selection as central concept in illustrating evolution theory</p> |
| Activities: | Performance Assessments: |
| <p>Characteristics of organisms in the Five Kingdoms Care of organisms Contrast historical taxonomic levels Organism Journals Bacteria Lab Protist Lab Plant Lab Organism Lab (Student Designs) Zoo Activity (Class Trip) Compare & Contrast organisms in the five kingdoms of life Various microscope labs</p> | <p>Laboratory performance Teacher observations Evaluation of presentations Tests/Quizzes Power Point Project Care of organism Journal</p> |

Wallenpaupack Area School District

Course: Science – The Diversity of Life

Grade Level: 10-12

Unit: Technological Devices

PA Standard: 3.7
3.7.12.A

| Topics: | Skills: |
|---|--|
| The Five Kingdoms of Life | Select and safely apply appropriate tools, materials, and processes necessary to solve complex problems that could result in more than one solution Evaluate and use technological resources to solve complex multi-step problems |
| Activities: | Performance Assessments: |
| Characteristics of organisms in the Five Kingdoms Care of organisms Contrast historical taxonomic levels Bacteria Lab Protist Lab Plant Lab Organism Lab (Student Designs) Compare & Contrast organisms in the five kingdoms of life Diversity of Life CD-Rom | Laboratory performance Teacher observations Evaluation of presentations Power Point Project Care of organism |

Wallenpaupack Area School District

Course: Science – The Diversity of Life

Grade Level: 10-12

Unit: Unifying Themes

PA Standard: 3.1
3.1.12.A
3.1.12.C
3.1.12.E

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|--|---|
| <p>Topics: Ecology/Biodiversity</p> | <p>Skills: Analyze and describe the function, interaction and relationship among subsystems and the system itself Compare and contrast several systems that could be applied to solve a single problem Evaluate the causes of a system's inefficiency Assess and apply recurring patterns in natural and technological systems Compare & contrast structure and function relationships as they relate to patterns Evaluate fundamental science and technology concepts and their development over time Analyze how models, systems and technologies have changed over time Explain how correlation of variables does not necessarily imply causation</p> |
| <p>Activities: Biodiversity Challenge Mapping activity Microscope Labs Research project comparing/contrasting organisms that look related but are not</p> | <p>Performance Assessments: Laboratory performance Teacher observations Evaluation of presentations Tests/Quizzes Journal Performance in groups Projects</p> |

Wallenpaupack Area School District

Course: Science – The Diversity of Life

Grade Level: 10-12

Unit: Inquiry and Design

PA Standard: 3.2
3.2.12.A
3.2.12.B
3.2.12.C

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|--|---|
| <p>Topics:</p> <p>Ecology/Biodiversity</p> | <p>Skills:</p> <p>Know and use the ongoing scientific processes to continually improve and better understand how things work</p> <p>Critically evaluate the status of existing theories</p> <p>Evaluate experimental data correctly within experimental limits</p> <p>Judge that conclusions are consistent and logical with experimental conditions</p> <p>Interpret results of experimental research to predict new information or improve a solution</p> <p>Generate questions about objects, organisms, and/or events that can be answered through scientific investigations</p> <p>Design an investigation with adequate control and limited variables to investigate a question</p> <p>Evaluate the significance of experimental information in answering the question</p> <p>Project additional questions from a research study that could be studied</p> |
| <p>Activities:</p> <p>Biodiversity Challenge</p> <p>Mapping activity</p> <p>Microscope Labs</p> <p>Research project comparing/contrasting organisms that look related but are not</p> | <p>Performance Assessments:</p> <p>Laboratory performance</p> <p>Teacher observations</p> <p>Evaluation of presentations</p> <p>Tests/Quizzes</p> <p>Journal</p> <p>Performance in groups</p> <p>Projects</p> |

Wallenpaupack Area School District

Course: Science – The Diversity of Life

Grade Level: 10-12

Unit: Biological Sciences

PA Standard: 3.3
3.3.12.A

| Topics: | Skills: |
|---|---|
| Ecology/Biodiversity | Identify and explain interactions among organisms Explain and analyze the relationship between structure and function at the molecular, cellular, and organ-system level Describe and explain structural and functional relationships in each of the five (or six) kingdoms Explain significant biological diversity in each of the biomes |
| Activities: | Performance Assessments: |
| Biodiversity Challenge Mapping activity Microscope Labs Research project comparing/contrasting organisms that look related but are not | Laboratory performance Teacher observations Evaluation of presentations Tests/Quizzes Journal Performance in groups Projects |

Wallenpaupack Area School District

Course: Science – The Diversity of Life

Grade Level: 10-12

Unit: Ecosystems and their interactions

PA Standard: 4.6
4.6.12.A
4.6.12.C

| Topics: | Skills: |
|---|--|
| Ecology/Biodiversity | Analyze the relationships among components of an ecosystem Evaluate the efficiency of energy flow within an ecosystem Explain limiting factors and their impact on carrying capacity Understand how biological diversity impacts the stability of an ecosystem Analyze the positive or negative impacts of outside influences on an ecosystem Analyze the effects of substances that move through natural cycles Analyze the effects of natural occurrences and their effects on ecosystems Analyze the effects of human action on an ecosystem |
| Activities: | Performance Assessments: |
| Biodiversity Challenge Mapping activity Microscope Labs Research project comparing/contrasting organisms that look related but are not | Laboratory performance Teacher observations Evaluation of presentations Tests/Quizzes Journal Performance in groups Projects |

Wallenpaupack Area School District

Course: Science – The Diversity of Life

Grade Level: 10-12

Unit: Threatened, endangered, and extinct species

PA Standard: 4.7
4.7.12.A
4.7.12.B
4.7.12.C

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|---|---|
| <p>Topics: Ecology/Biodiversity</p> | <p>Skills: Examine and explain what happens to an ecosystem as biological diversity changes Explain the relationship between species' loss and bio-diversity Examine and explain how a specialized interaction between two species may affect the survival of both species Predict how human or natural action can produce change to which organisms cannot adapt Identify species that became extinct through natural causes and explain how that occurred Identify a species that became extinct due to human actions and explain what occurred Identify and explain how a species' increase, decline, or elimination affects the ecosystem and/or human social, cultural, and economic structures Explain why natural populations do not remain constant Analyze management strategies regarding threatened or endangered species Identify laws, agreements, or treaties at national or international levels regarding threatened or endangered species Analyze the role of zoos and wildlife preserves on species that have been identified as threatened or endangered Examine the influence of wildlife management in preserving different species in PA</p> |
| <p>Activities: Mapping activity Microscope Labs Guest Speakers Trip to zoo Wildlife Preserve activity Adopt an endangered animal</p> | <p>Performance Assessments: Laboratory performance Teacher observations Evaluation of presentations Tests/Quizzes Journal Performance in groups Projects</p> |

Wallenpaupack Area School District

Course: Science – The Diversity of Life

Grade Level: 10-12

Unit: Unifying Themes

PA Standard: 3.1
3.1.12.A
3.1.12.C
3.1.12.E

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|--|--|
| <p>Topics:</p> <p>Agriculture</p> | <p>Skills:</p> <p>Analyze and describe the function, interaction and relationship among subsystems and the system itself Compare and contrast several systems that could be applied to solve a single problem Evaluate the causes of a system's inefficiency Assess and apply recurring patterns in natural and technological systems Compare & contrast structure and function relationships as they relate to patterns Evaluate fundamental science and technology concepts and their development over time Analyze how models, systems and technologies have changed over time</p> |
| <p>Activities:</p> <p>Virtual farm Build the perfect farm Compare / Contrast the farms of today with those 100 years ago Visit a farm Guest speaker Crop raising</p> | <p>Performance Assessments:</p> <p>Laboratory performance Teacher observations Evaluation of presentations Tests/Quizzes Journal Performance in groups Projects</p> |

Wallenpaupack Area School District

Course: Science – The Diversity of Life

Grade Level: 10-12

Unit: Inquiry and Design

PA Standard: 3.2
3.2.12.A
3.2.12.B
3.2.12.C

| | |
|--|---|
| <p>Topics:</p> <p>Agriculture</p> | <p>Skills:</p> <p>Know and use the ongoing scientific processes to continually improve and better understand how things work</p> <p>Critically evaluate the status of existing theories</p> <p>Evaluate experimental data correctly within experimental limits</p> <p>Judge that conclusions are consistent and logical with experimental conditions</p> <p>Interpret results of experimental research to predict new information or improve a solution</p> <p>Generate questions about objects, organisms, and/or events that can be answered through scientific investigations</p> <p>Design an investigation with adequate control and limited variables to investigate a question</p> <p>Evaluate the significance of experimental information in answering the question</p> <p>Project additional questions from a research study that could be studied</p> |
| <p>Activities:</p> <p>Virtual farm</p> <p>Build the perfect farm</p> <p>Compare / Contrast the farms of today with those 100 years ago</p> <p>Visit a farm</p> <p>Guest speaker</p> <p>Crop raising</p> | <p>Performance Assessments:</p> <p>Laboratory performance</p> <p>Teacher observations</p> <p>Evaluation of presentations</p> <p>Tests/Quizzes</p> <p>Journal</p> <p>Performance in groups</p> <p>Projects</p> |

Wallenpaupack Area School District

Course: Science – The Diversity of Life

Grade Level: 10-12

Unit: Biological Sciences

PA Standard: 3.3
3.3.12.B

| Topics: | Skills: |
|---|---|
| Agriculture | Identify and describe factors affecting metabolic function Evaluate relationships between structure and functions of different anatomical parts given their structure Describe potential impact of genome research on the biochemistry and physiology of life |
| Activities: | Performance Assessments: |
| Virtual farm Build the perfect farm Compare / Contrast the farms of today with those 100 years ago Visit a farm Guest speaker Crop raising | Laboratory performance Teacher observations Evaluation of presentations Tests/Quizzes Journal Performance in groups Projects |

Wallenpaupack Area School District

Course: Science – The Diversity of Life

Grade Level: 10-12

Unit: Technology Education

PA Standard: 3.6
3.6.12.A

| Topics: | Skills: |
|---|---|
| Agriculture | Analyze and solve a complex production process problem using biotechnologies Evaluate and apply biotechnical processes to complex plant and animal production methods Apply knowledge of agricultural science to solve or improve a biochemical related problem |
| Activities: | Performance Assessments: |
| Virtual farm Build the perfect farm Compare / Contrast the farms of today with those 100 years ago Visit a farm Guest speaker Crop raising | Laboratory performance Teacher observations Evaluation of presentations Tests/Quizzes Journal Performance in groups Projects |

Wallenpaupack Area School District

Course: Science – The Diversity of Life

Grade Level: 10-12

Unit: Agriculture and Society

PA Standard: 4.4
4.4.12.A
4.4.12.B
4.4.12.C
4.4.12.D

| Topics: | Skills: |
|--|---|
| Agriculture | <p>Define the components of an agriculture system that would result in a minimal waste of resources</p> <p>Identify the diversity in crop production and analyze the advantages and disadvantages of such diversity</p> <p>Research and analyze environmental practices related to agricultural systems</p> <p>Analyze the effects of agricultural practices on the economy</p> <p>Analyze the impact of nutrient management laws on PA agriculture</p> <p>Assess the role of agriculture cooperatives</p> <p>Investigate how bio-engineered crops may influence the food supply</p> <p>Analyze the use of specific bacteria for the control of agricultural pests</p> <p>Evaluate the use of feed additives in shifting metabolism to increase muscle mass and reduce fat in farm animals</p> <p>Analyze the costs and benefits of agriculture research practices in society</p> <p>Research the use of by-products that are the results of agriculture production</p> <p>Analyze the role of research, development, and technology as it relates to the food and fiber system</p> |
| Activities: | Performance Assessments: |
| <p>Virtual farm</p> <p>Build the perfect farm</p> <p>Compare / Contrast the farms of today with those 100 years ago</p> <p>Visit a farm</p> <p>Guest speaker</p> <p>Crop raising</p> | <p>Laboratory performance</p> <p>Teacher observations</p> <p>Evaluation of presentations</p> <p>Tests/Quizzes</p> <p>Journal</p> <p>Performance in groups</p> <p>Projects</p> |

Wallenpaupack Area School District

Course: Science – The Diversity of Life

Grade Level: 10-12

Unit: Unifying Themes

PA Standard: 3.1
3.1.12.A
3.1.12.C
3.1.12.E

| | |
|---|--|
| <p>Topics:</p> <p>Integrated pest management</p> | <p>Skills:</p> <p>Analyze and describe the function, interaction and relationship among subsystems and the system itself Compare and contrast several systems that could be applied to solve a single problem Evaluate the causes of a system's inefficiency Assess and apply recurring patterns in natural and technological systems Compare & contrast structure and function relationships as they relate to patterns Evaluate fundamental science and technology concepts and their development over time Analyze how models, systems and technologies have changed over time</p> |
| <p>Activities:</p> <p>Guest Speaker Compare pest management practices yesterday versus today Power Point project "Raid" Lab Chemical Lab Microscope Labs</p> | <p>Performance Assessments:</p> <p>Lab performance Quizzes/Tests Projects Teacher observations Journal</p> |

Wallenpaupack Area School District

Course: Science – The Diversity of Life

Grade Level: 10-12

Unit: Biological Sciences

PA Standard: 3.3
3.3.12.B
3.3.12.C
3.3.12.D

| Topics: | Skills: |
|---|--|
| Integrated pest management | Identify and describe factors affecting metabolic function Evaluate relationships between structure and functions of different anatomical parts given their structure Describe potential impact of genome research on the biochemistry and physiology of life Analyze gene expression at the molecular level Explain birth defects Apply the concept of natural selection as central concept in illustrating evolution theory |
| Activities: | Performance Assessments: |
| Guest Speaker Compare pest management practices yesterday versus today Power Point project "Raid" Lab Chemical Lab Microscope Labs | Lab performance Quizzes/Tests Projects Teacher observations Journal |

Wallenpaupack Area School District

Course: Science – The Diversity of Life
Unit: Integrated Pest Management

Grade Level: 10-12
PA Standard: 4.5
 4.5.12.A
 4.5.12.B
 4.5.12.C

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| <p>Topics:</p> <p>Integrated pest management</p> | <p>Skills:</p> <p>Analyze the threshold limits of pests and the need for intervention in a managed environment</p> <p>Design and explain an integrated pest management plan that uses a range of pest controls</p> <p>Research world wide integrated pest management systems and evaluate the level of impact</p> <p>Research and analyze the international regulations that exist related to integrated pest management</p> <p>Explain the dynamics of integrated pest management practices and their relative effects upon society</p> <p>Identify historic events affecting integrated pest management and cite the practices used</p> <p>Research and analyze the long term effects of pest management practices on the environment</p> |
| <p>Activities:</p> <p>Guest Speaker</p> <p>Compare pest management practices yesterday versus today</p> <p>Power Point project</p> <p>“Raid” Lab</p> <p>Chemical Lab</p> <p>Microscope Labs</p> | <p>Performance Assessments:</p> <p>Lab performance</p> <p>Quizzes/Tests</p> <p>Projects</p> <p>Teacher observations</p> <p>Journal</p> |