### Grade Level Summary

This course focuses on the observation and identification of various species of mammals, birds, reptiles, amphibians, and plants of Pennsylvania. Emphasis will be placed on conservation, habitat evaluation, environmental analysis, game management, and possible careers. Projects and laboratory exercises will be the major forms of assessment within the course including the monitoring of wildlife and wildlife habitats. Students will study whitetail deer, hunting regulations, tracking, and more!

### Grade Level Units


### Unit Title

**Zoology and Ecology Basics**

### Unit Summary

This unit looks into the basics of zoology and ecology. It will look at the various biomes there are in North America and the wildlife that inhabits them. The unit will also look at the impact that agriculture has on wildlife. Wildlife is a resource that must be managed and the last part of this unit looks at endangered species and legislation that protects them.

### Unit Essential Questions:

- What in your lifetime has mankind done to protect wildlife? What has mankind to destroy wildlife?

### Key Understandings:

- Principles of zoology
- Principles of ecology
- Relationship between wildlife and agriculture
- Biomes of North America
- Wildlife resources

### Focus Standards Addressed in the Unit:

<table>
<thead>
<tr>
<th>Standard Number</th>
<th>Standard Description</th>
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</thead>
<tbody>
<tr>
<td>NRS.01.01.01.b</td>
<td>Assess the characteristics of a natural resource to determine its classification.</td>
</tr>
<tr>
<td>NRS.01.01.02.a</td>
<td>Summarize the components that comprise all ecosystems.</td>
</tr>
</tbody>
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### Important Standards Addressed in the Unit:

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<td>CC.3.5.11-12.B.</td>
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<tr>
<td>CC.1.2.11–12.K</td>
<td>Determine or clarify the meaning of unknown and multiple-meaning words and phrases based on grade-level reading and content, choosing flexibly from a range of strategies and tools.</td>
</tr>
<tr>
<td><strong>CC.1.2.11–12.L</strong></td>
<td>Read and comprehend literary nonfiction and informational text on grade level, reading independently and proficiently.</td>
</tr>
<tr>
<td><strong>CC.1.4.11–12.A</strong></td>
<td>Write informative/explanatory texts to examine and convey complex ideas, concepts, and information clearly and accurately.</td>
</tr>
<tr>
<td><strong>CC.1.4.11–12.S</strong></td>
<td>Draw evidence from literary or informational texts to support analysis, reflection, and research, applying grade-level reading standards for literature and literary nonfiction.</td>
</tr>
<tr>
<td><strong>CC.1.4.11–12.V</strong></td>
<td>Conduct short as well as more sustained research projects to answer a question (including a self generated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation.</td>
</tr>
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<td><strong>CC.1.4.11–12.W</strong></td>
<td>Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the strengths and limitations of each source in terms of the task, purpose, and audience; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and overreliance on any one source and following a standard format for citation.</td>
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<table>
<thead>
<tr>
<th>Misconceptions:</th>
<th>Proper Conceptions:</th>
</tr>
</thead>
<tbody>
<tr>
<td>• A species that goes extinct has no effect on an ecosystem.</td>
<td>• When an animal goes extinct the balance of the ecosystem is changed and takes many years to offset the change.</td>
</tr>
<tr>
<td>• Natural disasters kill off everything and leave areas worthless.</td>
<td>• Floods and fires actually redeposit nutrients back into the soil and promote new growth.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Knowledge &amp; Concepts</strong></th>
<th><strong>Skills &amp; Competencies</strong></th>
<th><strong>Dispositions &amp; Practices</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>• basic anatomy of animals</td>
<td>• Identify the basic anatomy of animals</td>
<td>• Curiosity</td>
</tr>
<tr>
<td>• Functions of the animal body systems and system components.</td>
<td>• Classify animals</td>
<td>• Active learning</td>
</tr>
<tr>
<td>• renewable and non-renewable natural resources</td>
<td>• Explain the law of conservation of matter</td>
<td></td>
</tr>
<tr>
<td>• Animal reproduction</td>
<td>• Define the laws of energy</td>
<td></td>
</tr>
<tr>
<td>• Animal growth</td>
<td>• Distinguish among food chain, food webs, and food pyramids</td>
<td></td>
</tr>
<tr>
<td>• Animal behavior and habits</td>
<td>• Identify farming practices and their impact on the environment</td>
<td></td>
</tr>
<tr>
<td>• laws of energy</td>
<td>• Identify biomes of north America</td>
<td></td>
</tr>
<tr>
<td>• food chain</td>
<td>• Identify endangered species</td>
<td></td>
</tr>
<tr>
<td>• impact of agriculture on the ecosystem</td>
<td>• Identify environmental factors that contribute to extinction of organisms</td>
<td></td>
</tr>
<tr>
<td>• biological succession</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• biomes of north America</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• U.S. Endangered species act</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Academic Vocabulary:**

- Biology
- Botany
- Zoology
- Fauna
- Taxonomy
- Kingdom
- Phylum
- Class
- Order
- Family
- Genus
- Species
- chromatid
- centromere
- metaphase
- centrioles
- spindles
- anaphase
- telophase
- gametes
- meiosis
- homologous chromosomes
- homologue
- ecology
- Population
- Community
- Ecosystem
- Biosphere
- Ecosphere
- Ecologist
- Habitat
- Biological succession
- Primary succession
- Secondary succession
- Pioneers
- Climax community
- Vertebrate
- Vertebrata
- Simple stomach
- Ruminant
- Rumen
- Crop
- Gizzard
- Mitosis
- Interphase
- Prophase
- Fossil fuel
- Nitrogen fixation
- Nitrogen-fixing bacteria
- Denitrification
- Nitrogen cycle
- Water cycle
- Transpiration
- Food chain
- Producer
- Herbivore
- Primary consumer
- secondary consumer
- carnivores
- decomposer
- food web
- food pyramid
- naturalist
- stewardship
- extinct
- endangered species
- threatened species
- habitat
- organism
- law of conservation of matter
- industrial waste
- surface water
- aquatic species
- pollutant
- groundwater
- solid waste
- pesticide
- insecticide
- herbicide
- rodenticide
- hazardous materials
- petroleum
- energy
- first law of energy
- radiant energy
- chemical energy
- kinetic energy
- thermal energy
- electrical energy
- second law of energy
- elemental cycle
- deciduous forest biome
- strata
- canopy
- understory
- shrub layer
- herb layer
- forest floor
- temperate rain forest
- coniferous forest biome
- conifer
- Organism

- Niche
- Competitive advantage
- Competitive exclusion
- Principle
- Range of tolerance
- Biome
- Freshwater biome
- Plankton
- Phytoplankton
- Zooplankton
- Turbid
- Lotic habitat
- Lentic habitat
- Thermal stratification
- Wetland
- Marine biome
- Salinity
- Intertidal zone
- Continental shelf
- Neritic zone
- Oceanic zone
- Marine biologist
- Limnologist
- Estuary
- Terrestrial biome
- Desert biome
- Tundra biome
- Grassland biome
- Alien species
- Nonadaptive behavior
- Biotic potential
- biologist

Assessments:
- Test
- Quizzes
- Projects
- Homework
- Classwork (worksheets, group work, lab work, etc)

Differentiation:
- Book work
- Lecture
- Demonstrations
- Video clips
- Hands on learning
- IEP accommodations

Interdisciplinary Connections:
- This unit and all units in this course relate very closely to science, in particularly biology. Students will look at zoology and ecology of mammals and birds found in the environment.
**Additional Resources:**
- Video clips
- Articles
- Personal Accounts
- Fish and Wildlife Principles of Zoology and Ecology 3rd edition
- Pa Hunting Digest rules and regulation book
- Pa Fishing Digest rules and regulations book

**Created By:**
Troy Summey
Course/Subject: Wildlife  
Grade: 10, 11, & 12  
Suggested Timeline: 4-5 weeks

Grade Level Summary

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Grade Level Units


Unit Title
Zoology and Ecology of Mammals

Unit Summary
This unit breaks down mammals into sub categories to better understand them. Such categories of mammals will include gnawing, hoofed, predatory, marine, and unusual mammals. Each part will break down the mammals and give descriptive details to identify them. The type of biomes that these mammals can be found will also be provided in this section.

Unit Essential Questions:
- How important is each mammal to the ecosystem?  
  What would happen if you removed just one mammal from the food chain?

Key Understandings:
- Hoofed mammals
- Gnawing mammals
- Predatory mammals
- Marine mammals
- Other mammals

Focus Standards Addressed in the Unit:

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<td>Apply identification techniques to determine the species of wildlife or insect.</td>
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**Misconceptions:**
- Antlers and horns are the same thing.
- Mammals are only on land

**Proper Conceptions:**
- Antlers regrow each year where as horns continue to grow for the life of the animal.
- There are several species of whales, dolphins and seals that give birth in or around water.

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<tr>
<td>Characteristics of mammals</td>
<td>Recognize the importance of wildlife and forestry as it relates to natural resources management</td>
<td>Persistence</td>
</tr>
<tr>
<td>Food chain</td>
<td>Assess the impacts of invasive species on ecosystems</td>
<td>Curiosity</td>
</tr>
<tr>
<td>Hoofed mammal identification</td>
<td>Identify physical characteristics that distinguish mammals from other animals</td>
<td></td>
</tr>
</tbody>
</table>
| Gna
ing mammal identification | Identification of mammal from physical appearance | |
| Predatory mammal identification | Classification of mammals | |

**Academic Vocabulary:**
- Mammal
- Mammary gland
- Vertebrate
- Rodent
- Primary consumer
- Secondary consumer
- Taxonomist
- Nocturnal
- Hibernate
- Vole
- Carrying capacity
- Evolution
- Estivation
- Pika
- Predator
- Puma
- Cloven hoofed
- Javelin
- Ruminant
- Rumen
- Cud
- Symbiosis
- Pronghorn
- Buck
- Doe
- Antler
- Bull
- Cow
- Calf
- Fawn
- Rut
- Velvet
- crustacean
- mollusk
- shellfish
- white coat
- manatee
- oceanology
- oceanologist
- blowhole
- cetacean
- blubber
- baleen whale
- whalebone
- toothed whale
- krill
- dolphin
- cuttlefish
- Ocelot
- Margay
- Jaguarondi
- Jaguar
- Dog
- Vixen
- Gestation
- Omnivore
- Carrion
- Delayed digestion
- Photoperiod
- Musk
- Ungulate

- Bison
- Ram
- Ewe
- Lamb
- Billy goat
- Nanny goat
- Kid
- Peccary
- Boar
- Sow
- Marine mammal
- Finfeet
- Pinniped

- Pod
- Marsupial
- Marsupium
- Placenta
- Uterus
- Placental mammal
- Prehensile
- Insectivore
- Metabolism
- Prolific
- Carapace

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**Grade Level Units**

- Zoology and Ecology Basics
- Zoology and Ecology of Mammals
- Zoology and Ecology of Birds
- Conservation and Management

**Unit Title**

Zoology and Ecology of Birds

**Unit Summary**

This unit looks at the zoology and ecology of birds in North America. Students will examine the physical appearance, diet, breeding, and distribution of birds throughout North America.

**Unit Essential Questions:**

- Without birds, what would the ecosystem look, sound and be like?

**Key Understandings:**

- Waterfowl
- Game birds
- Birds of prey
- Songbirds

**Focus Standards Addressed in the Unit:**

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**Misconceptions:**

**Proper Conceptions:**

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<td>● Characteristics of birds&lt;br&gt; ● Food chain&lt;br&gt; ● Game bird identification&lt;br&gt; ● Song bird identification&lt;br&gt; ● Predatory bird identification&lt;br&gt; ● Water fowl identification</td>
<td>● Recognize the importance of wildlife and forestry as it relates to natural resources management&lt;br&gt; ● Assess the impacts of invasive species on ecosystems&lt;br&gt; ● Identify physical characteristics that distinguish birds&lt;br&gt; ● Identification of birds from physical appearance&lt;br&gt; ● Classification of birds&lt;br&gt; ● Identify birds by their song/sound&lt;br&gt; ● Recognize the importance of water quality, air quality, and waste management within ecosystems</td>
<td>● Persistence&lt;br&gt; ● Curiosity</td>
</tr>
</tbody>
</table>

**Academic Vocabulary:**

| Waterfowl<br> Avian<br> Oviparous<br> Incubation<br> Viviparous<br> Ornithology<br> Ornithologist<br> Down<br> Plumage<br> Lamellae<br> Duckling<br> Dabbling duck<br> Molt<br> Gosling<br> Grit<br> Gizzard<br> Cygnet<br> Frontal shield<br> Nightjar | gallinaceous<br> clutch<br> polygamous<br> polygynous<br> monogamous<br> plume<br> covey<br> catkin<br> scrape<br> wattle<br> beard<br> crop<br> squab<br> pigeon milk<br> fledge<br> scavenger<br> auklet<br> solitary<br> lobe | diurnal<br> eaglet<br> polyandry<br> aerie<br> color phase<br> kite<br> harrier<br> accipiter<br> kestrel<br> stoop<br> facial disk<br> pellet<br> territorial<br> conical bill<br> gregarious<br> tanager<br> dipper<br> shrive<br> Brood |
| Terrestrial | precocial | Parasitic bird |
| Swift | plover | Promiscuous |
| Nestling | phalarope | |
| Torpor | avocet | |
| Torpid | raptor | |
| Creeper | talons | |

**Assessments:**
- Test
- Quizzes
- Projects
- Homework
- Classwork (worksheets, group work, lab work, etc)

**Differentiation:**
- Book work
- Lecture
- Demonstrations
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Grade Level Units

Unit Title
Conservation and Management

Unit Summary
This unit looks at the conservation of natural resources in particular wildlife. In order for an ecosystem to support wildlife, there must be conservation of water, soil, and air. This unit will also look at the hunting rules and regulation in Pennsylvania and the management practices of the wildlife.

Unit Essential Questions:
- Why are the earth’s natural resources a precious commodity? How do you/we need to conserve and manage them so future generations can enjoy them as well?

Key Understandings:
- Responsible management of wildlife resources
- Conservation of natural resources
- Human connection to wildlife and natural resources

Focus Standards Addressed in the Unit:

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<tr>
<td>NRS.02.01.01.b</td>
<td>Analyze the structure of laws associated with natural resource systems.</td>
</tr>
<tr>
<td>NRS.02.01.01.a</td>
<td>Distinguish between the types of laws associated with natural resource systems.</td>
</tr>
<tr>
<td>NRS.02.01.01.c</td>
<td>Evaluate the impact of laws associated with natural resource systems.</td>
</tr>
<tr>
<td>NRS.02.02.01.a</td>
<td>Summarize the relationship between natural resources, ecosystems and human activity.</td>
</tr>
</tbody>
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<tr>
<td>NRS.02.01.02.c</td>
<td>Evaluate the impact and effectiveness of agencies associated with natural resources system.</td>
</tr>
<tr>
<td>NRS.02.02.01.c</td>
<td>Evaluate how the availability of natural resources can be improved through changes to human activity.</td>
</tr>
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</table>
**Misconceptions:**
- The government controls every aspect of game management.

**Proper Conceptions:**
- The state agency sets forth seasons and bag limits that are suggested by wildlife biologist. The federal government controls regulations regarding migratory bird management.

### Knowledge & Concepts
- History of conservation in Pennsylvania.
- Renewable and non-renewable natural resources.
- Wildlife and forestry as it relates to natural resources management.
- Water quality, air quality, and waste management within ecosystems.

### Skills & Competencies
- Identify sources of point and non-point pollution.
- Explain the importance of management and planning of resources.
- Assess the impacts of invasive species on ecosystems.
- Compare and contrast different methods of sustainable agriculture.
- Compare and contrast the impact of conventional and alternative energy sources on the environment.

### Dispositions & Practices
- Ethical behavior and civic responsibility.

### Academic Vocabulary:
- Erosion
- Soil conservation
- Toxic waste
- Biodegradable
- Overgrazing
- Acid precipitation
- Decomposer
- Nonbiodegradable
- Point source pollution
- Nonpoint source pollution
- Conservation
- Renewable resource
- Nonrenewable resource
- Silt
- Alluvial fan
- Nitrate
- Phosphate
- Algae
- Adaptive behavior
- Smog
- Electrostatic precipitator
- Biota
- Domestic
- Transpiration
- Watershed
- Intrinsic value
- Pristine
- Steward
- Ethics
Assessments:
- Test
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Differentiation:
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