### Course/Subject: Fisheries
### Grade: 11 & 12
### Zoology and Ecology of Fish, Reptiles, and Amphibians
### Suggested Timeline: 5-6 weeks

#### Grade Level Summary
This semester course focuses on the identification of various shellfish, warm and cold finfish species, boating and boating safety. Students will look at different waterways and habitats. Emphasis will be placed on conservation, habitat evaluation, environmental analysis, game fish management, and possible careers. Projects and laboratory exercises will be the major forms of assessment within the course.

#### Grade Level Units
- **Unit 1: Zoology and Ecology of Fish, Reptiles, and Amphibians**
- **Unit 2: Marine Mammals, Birds, Reptiles, and Amphibians**
- **Unit 3: PA Fishing Regulations and Tactics**
- **Unit 4: Conservation Management**

#### Unit Title
Zoology and Ecology of Fish, Reptiles, and Amphibians

#### Unit Summary
This unit will look at all the cold blooded animals such as fish, reptiles, and amphibians. It will explore their physical features, reproduction, and habitat.

#### Unit Essential Questions:
1. What are key characteristics that easily identify fish, reptiles, and amphibians?
2. How does habitat impact a fish, reptile or amphibian life cycle?

#### Key Understandings:
1. Freshwater fish
2. Anadromous and Diadromous fish
3. Saltwater fish and Fauna

#### Focus Standards Addressed in the Unit:

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#### Important Standards Addressed in the Unit:
### Misconceptions:  Proper Conceptions:

1. Fish live in either freshwater or saltwater.  
1. There are several species of fish that can live in saltwater and freshwater.

### Knowledge & Concepts  Skills & Competencies  Dispositions & Practices

<table>
<thead>
<tr>
<th>Fish, reptile and amphibian</th>
<th>Identify the basic anatomy of animals.</th>
<th>Persistence</th>
</tr>
</thead>
<tbody>
<tr>
<td>Identification</td>
<td>Identification through physical</td>
<td>Curiosity</td>
</tr>
<tr>
<td>Reproduction</td>
<td>characteristics</td>
<td></td>
</tr>
<tr>
<td>Habitat</td>
<td>Determine reproduction habits and</td>
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<td></td>
<td>quantities</td>
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<tr>
<td></td>
<td>Identify and locate ideal habit</td>
<td></td>
</tr>
</tbody>
</table>

### Academic Vocabulary:

- Freshwater
- Anatomy
- Spawn
- Roe
- Milt
- Bullhead
- Barbell
- Dorsal fin
- Pectoral fin
- Adipose fin
- Hatchery stock
- Anadromy
- Kelt
- Jacks
- Steelhead
- Ichthyology
- Leptocephali
- Elver
- Hermaphrodite
- Bivalve
- Antenna
- Compound eye
- Pelvic fin
- Anal fin
- Laterally compressed
- Hybrid
- Darter
- Tapetum lucidum
- Aerated water
- Race
- Aquaculturist
- School
- Char
- Cannibalistic
- Caviar
- Scute
- Fauna
- Cartilaginous fish
- Egg case
- Torpedo
- Pelagic
- Billfish
- Flatfish
- swimmeret
- diadromous fish
- anadromous fish
- catadromous fish
- iteroparous fish
- redd
- alevin
- yolk sac
- yolk-sac fry
- yokl
- fry
- fingerling
- smolt
- bargeing
- wild stock
- sinistral fish
- dextral fish
- camouflage
- isospondylous fish
- demersal spawner
- larva
- smelt

### Assessments:

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

### Differentiation:

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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 fish, reptiles, amphibians, birds and marine mammals found in the environment.

Additional Resources:
- Video clips
- Articles
- Personal Accounts
- Fish and Wildlife Principles of Zoology and Ecology 3rd edition
- Pa Fishing Digest rules and regulations book

Created By:
Troy Summey
### Course/Subject: Fisheries
Grade: 11 & 12

### Marine mammals, Birds, Reptiles and Amphibians

### Suggested Timeline:
5-6 weeks

### Grade Level Summary
This semester course focuses on the identification of various shellfish, warm and cold finfish species, boating and boating safety. Students will look at different waterways and habitats. Emphasis will be placed on conservation, habitat evaluation, environmental analysis, game fish management, and possible careers. Projects and laboratory exercises will be the major forms of assessment within the course.

### Grade Level Units
- Unit 1: Zoology and Ecology of Fish, Reptiles, and Amphibians
- Unit 2: Marine Mammals, Birds, Reptiles and Amphibians
- Unit 3: PA Fishing Regulations and Tactics
- Unit 4: Conservation Management

### Unit Title
Marine Mammals, Birds, Reptiles and Amphibians

### Unit Summary
This unit looks at wildlife that attributes and affects fisheries. Marine mammals, birds, reptiles and amphibians all play critical roles in sustaining balanced fisheries. This unit will look at identification and the role this wildlife plays on fisheries.

### Unit Essential Questions:
1. How do marine mammals, waterfowl, reptiles, and amphibians add to the balance of fisheries?
2. What would those fisheries look like if they were to get out of balance?

### Key Understandings:
1. Marine mammals
2. Waterfowl
3. Reptile and amphibians

### Focus Standards Addressed in the Unit:

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<th>Proper Conceptions:</th>
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<tr>
<td>1. Birds, mammals, reptiles and amphibians have no impact on fisheries</td>
<td>1. Marine mammals and waterfowl rely on healthy fisheries for more than just food</td>
</tr>
<tr>
<td></td>
<td>2. A balance is required to sustain healthy fisheries</td>
</tr>
</tbody>
</table>

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<th>Skills &amp; Competencies</th>
<th>Dispositions &amp; Practices</th>
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<tr>
<td>● Species identification&lt;br&gt;● Habitat&lt;br&gt;● Reproduction&lt;br&gt;● Diet&lt;br&gt;● Impact on ecosystem</td>
<td>● Recognize the importance of wildlife and forestry as it relates to natural resources management.&lt;br&gt;● impacts of invasive species on ecosystems&lt;br&gt;● native and nonnative species identification&lt;br&gt;● identify through physical appearance&lt;br&gt;● classification</td>
<td>● persistence&lt;br&gt;● curiosity</td>
</tr>
</tbody>
</table>

**Academic Vocabulary:**

| marine mammal<br>finfeet<br>pinniped<br>crustacean<br>mollusk<br>shellfish<br>white coat<br>manatee<br>oceanology<br>oceanologist<br>blowhole<br>cetacean<br>blubber<br>chorion<br>allantois<br>amnion<br>amniotic fluid<br>caiman<br>iguana<br>terrapin<br>turtle<br>keel | baleen whale<br>whalebone<br>toothed whale<br>krill<br>krill<br>dolphin<br>cuttlefish<br>pod<br>waterfowl<br>avian<br>oviparous<br>incubation<br>viviparous<br>ornithology<br>skink<br>gecko<br>ecdysis<br>viper<br>elapid<br>Jacobson’s organ<br>Constrictor<br>Plastron<br>Tortoise<br>Neotenic | ornithologist<br>down<br>plumage<br>lamellae<br>duckling<br>dabbling duck<br>molt<br>gosling<br>girt<br>gizzard<br>cygnet<br>ectotherm<br>endotherm<br>reptile<br>amphibian<br>metamorphosis<br>amniote egg<br>embryonic membranes<br>herpetologist<br>tympanum<br>nare<br>tadpole<br>polliwog<br>eft |

**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 fish, reptiles, amphibians, birds and marine mammals found in the environment.

Additional Resources:
- Video clips
- Articles
- Personal Accounts
- Fish and Wildlife Principles of Zoology and Ecology 3rd edition
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Created By:
Troy Summey
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Unit Title
Pa fishing regulations and tactics

Unit Summary
This unit looks into the rules and regulations of fishing in Pennsylvania. Students will study the laws and creel limits pertaining to Pennsylvania waters. This unit will also look at the tactics for harvesting fish.

Unit Essential Questions:
1. Why are laws and creel limits put in place and why do they differ from area to area and state to state?

Key Understandings:
1. Pa fish laws
2. Pa game species and nongame species
3. Fishing tactics

Focus Standards Addressed in the Unit:

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<td>Analyze the structure of laws associated with natural resource systems.</td>
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</table>
### Important Standards Addressed in the Unit:

- **NRS.02.01.02.c**: Evaluate the impact and effectiveness of agencies associated with natural resources system.
- **NRS.02.02.01.c**: Evaluate how the availability of natural resources can be improved through changes to human activity.

### Misconceptions:

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<th>Proper Conceptions</th>
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<tbody>
<tr>
<td>1. You are a Pennsylvania resident so you can fish in any waters for any fish.</td>
<td>1. Resident or Non-resident once you have reached the age of 16, you must possess a fishing license and special stamps for trout and salmon.</td>
</tr>
<tr>
<td>2. You may kill snakes because you don’t like them.</td>
<td>2. In Pa you are only allowed to harvest 1 venomous snake per year with proper permit.</td>
</tr>
</tbody>
</table>

### Knowledge & Concepts

- PA Fishing regulations and laws
- Game fish
- Nongame fish
- Rod and reel fishing
- Fly fishing
- Cast netting
- Gill netting
- History of conservation in Pennsylvania.
- Different methods of sustainable agriculture

### Skills & Competencies

- Identify game fish
- Use fishing tackle to target game fish
- Determine areas to target fish
- Understand and follow all fishing laws
- Read and understand the fishing rules and regulations handbook
- Explain the importance of management and planning of resources.
- Assess the impacts of invasive species on ecosystems

### Dispositions & Practices

- Curiosity

### Academic Vocabulary:

- Law
- Regulation
- Creel limit
- Possession limit
- Invasive species
- Inland waters
- Artificial bait
- Lure
- Catch and release
- Harvest
- Lake
- River
- Stream
- Trout/salmon stamp
- Game species
- Baitfish
- Fly
- Barbless
- Foul hook
- Panfish
- Migratory fish
- Hatchery
- Gill net
- Cast net
- Rod and reel
- Treble hook
- Barb

### Assessments:

- Test
- Quizzes
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Differentiation:
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Created By:
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**Unit Title**

Conservation and Management

**Unit Summary**

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

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**Unit Essential Questions:**

1. Why are the earth’s natural resources a precious commodity?
2. How do you/we need to conserve and manage them, so future generations can enjoy them as well?

**Key Understandings:**

1. Responsible management of fisheries and wildlife resources
2. Conservation of natural resources
3. Human connection to fisheries and natural resources

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<td>history of conservation in Pennsylvania.</td>
<td>Identify sources of point and non-point pollution</td>
<td>Ethical behavior and civic responsibility</td>
</tr>
<tr>
<td>renewable and non-renewable natural resources</td>
<td>Explain the importance of management and planning of resources</td>
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<tr>
<td>fisheries as it relates to natural resources management</td>
<td>Assess the impacts of invasive species on ecosystems</td>
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<tr>
<td>water quality, air quality, and waste management within ecosystems.</td>
<td>Compare and contrast different methods of sustainable agriculture</td>
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<td>Compare and contrast the impact of conventional and alternative energy sources on the environment.</td>
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<td>Erosion</td>
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<tr>
<td>Soil conservation</td>
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<td>Toxic waste</td>
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<td>Biodegradable</td>
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<td>Overgrazing</td>
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<td>Acid precipitation</td>
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<tr>
<td>Decomposer</td>
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<tr>
<td>Nonbiodegradable</td>
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<tr>
<td>Point source pollution</td>
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<tr>
<td>Nonpoint source pollution</td>
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<td>Multiple use</td>
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<tr>
<td>Oversight</td>
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<td>Poaching</td>
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<td>Riparian zone</td>
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<td>Silt load</td>
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