Wallingford Public Schools - HIGH SCHOOL COURSE OUTLINE	

Course Title: Wildlife Biology 4	**Course Number**: 8303
Department: Agricultural Education	**Grade(s)**: 12
Level(s): Academic	**Credit(s)**: 2

Course Description
Senior year course work continues to build a foundation for students interested in wildlife biology. Topics studied include; forest ecology, field ornithology, wildlife research techniques, whitetail deer ecology, and conservation biology. Students will have an opportunity to explore current trends in agriculture. Students will continue to participate in the Lyman Hall Chapter of the national organization, FFA. Students will complete the development of their portfolio and further develop skills to prepare for future careers in wildlife biology.

Required Instructional Materials	**Completion/Revision Date**
Sufficient Hands-on Materials	Approved by Board of Education October 15, 2007

Mission Statement of the Curriculum Management Team
The mission of the Career and Technical Education Curriculum Management Team is to ensure that students, as a result of their experiences in K-12, will demonstrate transferable skills, knowledge, and attributes for successful life management, employment, career development, post-secondary educational opportunities, and life long learning.

Enduring Understandings for the Course
- Self-reflection of learning experiences, in and out of school, fosters the development of a life long learner. Life long learners are able to apply and refine skills as they prepare for their post-high school endeavors.
- The forest is a complex assemblage of interacting and evolving chemical, physical and biological processes.
- Bird species survival and movements are a reflection of man's impacton land use.
- Field research involves raising questions, developing a hypothesis and a plan(s), analyzing data, and drawing conclusions to either support or refute the hypothesis and to document new understanding.
- The research process requires the use of a variety of resources to ensure validity.
- Organization is critical to the acquisition, application, and evaluation of data is essential to making informed decisions.
- Critical examination and evaluation of data is essential to making informed decisions.
- Recognizing a diversity of viewpoints benefits all.
- Writing is a tool used for thinking and learning.
- The relationship between organisms and their ecosystem affects the organisms ability to survive.
- Fish survival is dependent upon the interaction of the physical, chemical and biological characteristics of water.

LEARNING STRAND

1.0 Transferable Skills

ENDURING UNDERSTANDING(S)	ESSENTIAL QUESTION(S)
• Self-reflection of learning experiences, in and out of school, fosters the development of a life long learner. Life long learners are able to apply and refine skills as they prepare for their post-high school endeavors.	• What is the importance of maintaining a portfolio? • What are the qualities of an effective oral presentation? • What safety precautions do I have to follow? • What can I do differently next time? • What does a cooperative group require to function successfully? • How can I assess the situation and implement change? • What are the characteristics of an organized person? What do I need to do to be more organized? • How can I manage informational research, organize the information, and present it professionally? • What is a leader?

LEARNING OBJECTIVES The students will:	
1.1 Demonstrate public speaking skills using appropriate visuals and tailoring the presentation to specific audiences. 1.2 Communicate in writing about a topic using different formats applying relevant vocabulary, supporting evidence, and clear logic. 1.3 Self-assess transferable skills and reflect on areas of strength and weakness. 1.4 Identify and use the appropriate tools and equipment safely. 1.5 Work cooperatively with fellow peers, teachers, and employers to complete a task. 1.6 Apply problem solving skills to critically approach a situation and work through the steps to solve the problem. 1.7 Develop organizational skills that assist with data collection, data analysis and synthesis. 1.8 Apply research skills to collect information, summarize the findings and to cite the sources used. 1.9 Recognize leadership skills such as: motivating others, negotiating,	**INSTRUCTIONAL SUPPORT MATERIALS** • See other learning strands for integration **SUGGESTED INSTRUCTIONAL STRATEGIES** • See other learning strands for integration **SUGGESTED ASSESSMENT METHODS** • See other learning strands for integration

participating in meetings, gaining confidence, and gaining self-awareness, etc.

1.10   Apply computer-based tools such as PowerPoint, Word, Excel, and Access, to organize and present information.

1.11 Demonstrate self expression and creativity through different projects.

1.12 Develop a positive attitude and become an independent learner in order to prepare for the future.

1.13 Organize and maintain a four year portfolio including a compilation of student products and reflections.

1.14 Document SAE (Supervised Agricultural Experience) monthly. This includes recording hours, expenses, income, tasks and applied skills.

LEARNING STRAND

2.0 Forest Ecology
- Approximately 4 weeks

ENDURING UNDERSTANDING(S)	ESSENTIAL QUESTION(S)
• The forest is a complex assemblage of interacting and evolving chemical, physical and biological processes.	• What causes living and nonliving things to change? • How do changes in nonliving things affect living organisms? • How are living organisms linked to each other and their environment? • How do human activities impact and alter the environment?

LEARNING OBJECTIVES The students will:

2.1 Explain biological and forest succession.
2.2 Identify stages of forest succession.
2.3 Explore the impact of individuals on the forest.
2.4 Identify elements of an ecosystem.
2.5 Identify biotic and abiotic factors and their effect on the ecosystem.
2.6 Conduct field work including observations, interpretation and identification of plant and animal taxa.
2.7 Determine the role of weather on tree composition and growth.

INSTRUCTIONAL SUPPORT MATERIALS
- Digital camera
- Forest tools including:
  - Clinometer
  - Merritt Hypsometer
  - Haga Altimeter
- *New Haven County Soil Survey*, USDA, Soil Conservation Service, 1975.
- Microsoft Access database

SUGGESTED INSTRUCTIONAL STRATEGIES
- Visit Vietnam Memorial Park in Tyler Mill, Wallingford
- Field assessment of biotic and abiotic conditions
- Determine site index of a tree
- Model how to use different forest tools
- Identify plant and animal species
- Research climatic history of site
- Analyze soil samples
- Record human modification of the site
- Interview resources to develop history of the site
- Create a database of field observations
- Define and illustrate related terminology
- Lab exercises
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SUGGESTED ASSESSMENT METHODS
- Prepare a photographic collection of
  - Fauna
  - Flora
  - Biotic factors

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- Write and design an eight chapter book including chapters on:
    - Introduction
    - Soils
    - Micro-organisms
    - Fauna
    - Flora
    - Human Activity
    - Climate
    - Summary of data collected
- Portfolio products may include:
    - Skill sheet
    - Book on forest ecology data
    - Report prepared with Microsoft Access
- Prepare a report of field observations using Microsoft Access

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LEARNING STRAND	
3.0 Field Ornithology	
• Approximately 4 weeks	

ENDURING UNDERSTANDING(S)	ESSENTIAL QUESTION(S)
• Bird species survival and movements are a reflection of man's impact on land use.	• What characteristics are used to identify birds? • In what habitats are birds found? • What types of field trip notes are valuable to study population trends?

LEARNING OBJECTIVES – The students will:	INSTRUCTIONAL SUPPORT MATERIALS

3.1 Identify birds by sight, sound and habitat.
 3.2 Connect species of birds with their habitats.
 3.3 Organize and record appropriate and detailed field observations in a journal.
 3.4 State the habitat variations that occur when birds are migrating.
 3.5 Observe species behavior.
 3.6 Compose a web page highlighting a neo-tropical bird species.
	• Microsoft FrontPage
	 • Binoculars
	 • Field notebooks
	 • *Eastern Birds*, Houghton Mifflin Company, 1980.
	
	 SUGGESTED INSTRUCTIONAL STRATEGIES
	 • Field trips to appropriate sites
	 • Creation of a web page documenting a Connecticut passerine species
	 • Define terminology associated with identification of birds
	 • Model how to organize and record appropriate field observations
	 • Create a PowerPoint presentation depicting the life history of a passerine
	
	 SUGGESTED ASSESSMENT METHODS
	 • Field journal with daily observations
	 • Web page on a Connecticut species
	 • Portfolio products may include:
	     • Skill sheet
	     • Field journal
	     • PowerPoint presentation
	 • Identify species from field observations
	 • Classroom exercise using field notes
	 • Daily field trip summaries written in field journal

LEARNING STRAND	
4.0 Wildlife Research	
• Approximately 4 weeks	

ENDURING UNDERSTANDING(S)	**ESSENTIAL QUESTION(S)**
• Field research involves raising questions, developing a hypothesis and a plan(s), analyzing data, and drawing conclusions to either support or refute the hypothesis and to document new understanding.	• What steps are required to investigate a scientific question? • How do you collect data and analyze data that will either support or refute your hypothesis? • What information is needed to draw conclusions? • How do you communicate procedures and results? •

LEARNING OBJECTIVES – The students will:
 4.1 Develop and communicate the findings of two research projects.
 4.2 State the objective of the research project.
 4.3 Summarize previous research completed on a similar project.
 4.4 Develop a hypothesis.
 4.5 Collect field data.
 4.6 Analyze data collected.
 4.7 Formulate conclusions.
 4.8 Create a presentation from materials collected.
 4.9 Interpret field notes
	INSTRUCTIONAL SUPPORT MATERIALS
	 • Wildlife game camera
	 • *Mammals*, Houghton Mifflin Company, 1995.
	 • Internet
	 • *Handbook of North American Birds, Volume 4*, Yale University Press, 1988.
	 • *Birds of Prey in Connecticut,* Rainbow Press, 1990.
	
	 SUGGESTED INSTRUCTIONAL STRATEGIES
	 • Observe red-tailed hawk populations
	 • Internet research on red-tailed hawk populations
	 • Investigate and use techniques to assess mammal populations
	 • Model and guide students through first research project. The second research project is more open-ended as students apply skills learned during the guided research project.
	
	 SUGGESTED ASSESSMENT METHODS
	 • Prepare a scientific paper comparing student field data collected and analyzed with previous research
	 • Oral presentation of field work
	 • Portfolio products include:
	      • Skill sheet
	      • Write up of research projects

LEARNING STRAND

5.0 Current Trends in Agriculture
  • Approximately 4 weeks

ENDURING UNDERSTANDING(S)
  • The research process requires the use of a variety of resources to ensure validity.
  • Organization is critical to the acquisition, application, and evaluation of information.
  • Critical examination and evaluation of data is essential to making informed decisions.
  • Recognizing a diversity of viewpoints benefits all.
  • Writing is a tool used for thinking & learning.

ESSENTIAL QUESTION(S)
  • Why do I research?
  • What is the best way to persuade an audience?
  • What are the benefits of using multiple media to locate information?
  • How do I know my information is reliable (accurate, unbiased, current, and appropriate)?
  • How does organizing the results of my research help me to use it?
  • How does the consideration of different viewpoints influence how I think & act?
  • What am I trying to achieve through my writing? Presentation?
  • What are the qualities of an effective oral presentation?
  • How can a visual enhance an oral presentation?

LEARNING OBJECTIVES – The students will:
5.1 Develop a central research position related to a current trend in agriculture.
5.2 Generate questions related to the topic.
5.3 Locate & retrieve information that is stored in print (books, magazines, etc.) as well as in digital forms (Internet, databases, videos, etc.) to support the position presented as well as the opposing view.
5.4 Evaluate validity of sources to authenticate research.
5.5 Organize ideas and information logically and effectively using note cards and outlining.
5.6 Use the writing process to compose a research position paper that is focused, organized, elaborated, supported and edited for standard English conventions.
5.7 Revise written pieces to demonstrate improvement.
5.8 Use MLA citation for textual support.
5.9 Persuade audience during an oral presentation with accompanying visuals.

INSTRUCTIONAL SUPPORT MATERIALS
  • Access to print and non-print sources
  • Assorted trade magazines and journals
  • Presentation materials

SUGGESTED INSTRUCTIONAL STRATEGIES
  • Collaborate with library media specialists to help assist with research
  • Create a PowerPoint presentation or design a tri-fold board as a visual aid for the oral presentation
  • Create an informational hand-out to "call to action" information for the audience
  • After student presentations, students select one topic to write "a letter to the editor" by agreeing or disagreeing with the position presented
  • Model and assist students through the research process
  • Model appropriate Internet searching techniques
  • Peer review and feedback
  • Provide due dates of individual parts (note

	cards, outline, rough draft, etc.) of research project
	• Conferencing with teacher
	
	SUGGESTED ASSESSMENT METHODS
	• Rubrics for presentation, paper, and visual
	• Checklist for research process
	• Self and peer assessments
	• Portfolio products may include:
	   • Skill sheet
	   • Persuasive research paper and outline
	   • Photo of visual and student
	   • Informational "call to action" hand-out
	   • Writing sample "letter to the editor"

LEARNING STRAND

6.0 Whitetail Deer (WTD) Ecology
- Approximately 4 weeks

ENDURING UNDERSTANDING(S)	ESSENTIAL QUESTION(S)
• The relationship between organisms and their ecosystem affects the organisms ability to survive.	• Why is the whitetail deer important? • What contributes to the success of the whitetail deer population? • How does man and man's activities influence deer populations? • How can habitats be modified to increase deer survival? • What are the effects of deer overpopulation?

LEARNING OBJECTIVES – The students will:	INSTRUCTIONAL SUPPORT MATERIALS
6.1 List factors used in determining land capability classes. 6.2 Interpret topographic maps. 6.3 Use a pantograph to draw a map. 6.4 Explain the interrelationship between the WTD and the forests. 6.5 Explain carrying capacity and the factors used to determine carrying capacity. 6.6 Identify food plants of the WTD using a dichotomous key. 6.7 Compare soils types with wildlife productivity. 6.8 Analyze skulls to determine the age of the deer 6.9 Differentiate between carrying capacity and population density. 6.10 Explain historical aspects of whitetail deer management. 6.11 Determine soils land capability classes. 6.12 Demonstrate quarter sampling techniques.	• *Fruit and Twig Key to Trees and Shrubs,* Dover Publications, Inc., 1959. • *Soil Survey of New Haven County,* USDA, Soil Conservation Service, 1975. • *The Deer of North America,* Wildlife Management Institute, Washington, DC, 1965. • *American Wildlife Plants,* Martin, Zim and Nelson, Dover Press, 1961. • Pantagraph • Topographic maps • Deer skulls • Internet access **SUGGESTED INSTRUCTIONAL STRATEGIES** • Select a site to determine deer populations near Wallingford • Define terms associated with white-tailed deer management • Use a dichotomous key to identify deer foods • Determine age of whitetail deer using lower jaws • Use quarter sampling techniques to determine number of trees per acre and food supply • Prepare a tri-fold board on whitetail deer requirements, research results and management suggestions • Analysis of soils and determination of land capability classes

	SUGGESTED ASSESSMENT METHODS
	• Prepare a field research map
	• Collection of 10 important deer foods
	• Grade lab exercises
	• Rubric for tri-fold board presentation
	• Portfolio product may include
	    • Skill sheet
	    • Rubric of tri-fold board project
	    • Lab exercises

LEARNING STRAND

7.0 Fisheries Science
- Approximately 4 weeks

ENDURING UNDERSTANDING(S)	ESSENTIAL QUESTION(S)
• Fish survival is dependent upon the interaction of the physical, chemical and biological characteristics of water.	• What is required for fish survival? • What are the characteristics of a desirable Connecticut pond? • What is involved in managing a Connecticut pond? • How can a pond be modified to improve fish growth and survival?

LEARNING OBJECTIVES – The students will:

7.1 Compare stream and pond growth factors for food insects and fish.
7.2 Compare and contrast the characteristics and properties of lakes.
7.3 Demonstrate safe practices during field and laboratory investigations.
7.4 Plan and implement investigative procedures.
7.5 Determine owner's objective for the pond.
7.6 Classify organisms using dichotomous keys.
7.7 Analyze temperature information, chemical tests and turbidity of a pond.
7.8 Construct a map of a pond.
7.9 Calculate gallons of water in a pond.
7.10 Evaluate pond characteristics for fish survival.

INSTRUCTIONAL SUPPORT MATERIALS

- *Freshwater Fishes of Connecticut*, Connecticut Department of Environmental Protection, 1996.
- *A Guide to Lankes and Ponds of Connecticut*, Connecticut Department of Environmental Protection, 1987.
- *The Trophic Classsifcations of Seventy Connecticut Lakes,* Connecticut Department of Environmental Protection, 1982.
- *Pond Life,* Golden Press 1987.
- *Aquatic Entomology, Jones and Bartlett Publishers,* 1981.
- Plane table
- Alidade
- Ekman dredge
- Boat
- Thermometers
- Plankton nets
- Angling equipment
- Range Pole
- Tape measure

SUGGESTED INSTRUCTIONAL STRATEGIES

- Collect samples and construct information sheets of:
    - Fish
    - Plants
    - Foods
- Map out the surface of a pond
- Add contours to surface map
- Define fisheries terminology
- Fill out informational sheet on pond characteristics

	• Prepare an evaluation of the pond to support the owner's objectives
	• Prepare an informational sheet for public fishing opportunities
	
	<u>SUGGESTED ASSESSMENT METHODS</u>
	• Assessment of lab exercises
	• Map rubric
	• Flora and fauna collections with informational sheet
	• Portfolio product may include:
	    • Skill sheet
	    • Map rubric
	    • Map
	    • Owner's evaluation
	    • Public information sheet