THE DEVELOPMENT OF A WISCONSIN BASED SUPPLEMENTARY CURRICULUM FOR THE NATIONAL WILD TURKEY FEDERATION'S 'WILD ABOUT TURKEY' EDUCATION BOX

by

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ABSTRACT

This research project involved the development of a Wisconsin based curriculum for the National Wild Turkey Federation's, "Wild About Turkey" education box. The existing lesson plans were correlated to Wisconsin State Academic Standards in Environmental Education as well as the specific disciplines the lessons were intended for. The program plan made the new background information for the education box place-based to the state of Wisconsin. A curriculum development team was organized and developed additional lessons to support the curriculum already established in the education box. Upon completion of the new curriculum, sixteen lessons were established in grades K-12, in all major disciplines. In addition, all new lessons were correlated to Wisconsin State Academic Standards in their specific discipline as well as Environmental Education.

Upon completion of the supplement, it was distributed to a field test panel for revisions and corrections. The final version was delivered to the National Wild Turkey Federation headquarters in Edgefield, South Carolina.
CHAPTER ONE
THE PROBLEM AND ITS SETTINGS

PROBLEM STATEMENT

The purpose of this project is to develop, evaluate, and disseminate a supplementary environmental education curriculum based on the wild turkey in cooperation with the National Wild Turkey Federation.

SUBPROBLEMS

1. Investigate and evaluate the current curriculum for the National Wild Turkey Federation’s Turkey Education Box.

2. Investigate and evaluate the current use of the box in classrooms where it has been distributed previously in Wisconsin.

3. Develop and design a supplementary Environmental Education curriculum in correlation with the Wisconsin EE standards for use with the National Wild Turkey Federation’s Turkey Education Box.

4. Field test the environmental education curriculum with teachers who used the box in the past and with teachers who had no prior experience with the box.

5. Revise the curriculum based on the field test results.
DELIMITATIONS

1. The Turkey Education Box from the National Wild Turkey Federation is the resource.

2. Initially only lesson plans from the box will be evaluated and redesigned.

3. The curriculum will focus on the wild turkey as its main topic.

4. The study will not evaluate teacher knowledge or background knowledge on the wild turkey or environmental education.

5. The revised curriculum will focus on the Wisconsin turkey population.

DEFINITION OF TERMS

Evaluate - refers to how the current Turkey Education Box is being used, and what its curriculum contains, and how well it works in current classroom situations.

Redesign - is to develop and put into effect and practice, lessons that deal specifically with the wild turkey and environmental education.

NWTF- National Wild Turkey Federation, a non-profit organization that supports the proper management of the wild turkey. The federation also supports education of the turkey in the classroom.
Turkey Education Box - contains basic lessons and materials to educate students about the wild turkey.

Environmental Education Principles - based on the Tblisi declaration, they include knowledge, skills, values, awareness, and participation.

ASSUMPTIONS

1. There is a need to enhance the environmental education curriculum accompanying the NWTF Turkey Education Box.

2. A variety of disciplines will be addressed through the new curriculum.

3. The curriculum materials will encompass K-12 education.

4. Utilization of the box will enhance teacher and student knowledge of both environmental education and the wild turkey.

5. The further development of a curriculum for the National Wild Turkey Federation’s Turkey Education Box will enhance and increase its use.
IMPORTANCE OF THE STUDY

The National Wild Turkey Federation (NWTF) created and has distributed Turkey Education Boxes since 1985. The goal was to educate students about the wild turkey and incorporate curriculum related to the turkey in various disciplines. The preparation and idea behind the box were well intended but curriculum plans included with the box are weak.

Working with the NWTF provides a platform for a partnership with environmental education and the Department of Natural Resources (DNR) that can be positive. The NWTF looks forward to working on enhancing the box for Wisconsin. In an interview with the NWTF’s education coordinator, the importance is such that:

“The redesign of the Turkey Education Box in Wisconsin may be used as a model for other states” (personal interview, Christine Rolka, 8-2001).

The Turkey Education Box can be more effectively utilized through development of a complete environmental education curriculum. It is also important to localize the information of the box to Wisconsin. The wild turkey is becoming a part of Wisconsin culture. The wild turkey is an excellent example of a wildlife success story. The native population in Wisconsin disappeared by the 1850’s. The reintroduction of the turkey has been extremely successful and turkey are now found in 56 counties. This magnificent bird can stimulate student interest in learning topics from a variety of disciplines.
CHAPTER TWO
LITERATURE REVIEW

The focus of this project is to develop a Wisconsin based supplementary curriculum for the National Wild Turkey Federation's "Wild About Turkey" education box. To accomplish this, the following areas of the literature were reviewed;

- Environmental Education Infusion
- Place Based Education
- Designing and Implementing a Useful Questionnaire
- Wild Turkey Ecology and Reintroduction
- The National Wild Turkey Federation's Turkey Education Box

Environmental Education Infusion

In 1977 the Tblisi Declaration was written. The declaration stated that there was a need to educate people about the environment. The declaration was general in nature of application, allowing for further development. Hungerford, Peyton, and Wilke felt that "Curriculum developers and practitioners need a set of intermediate or subgoals which are more definitive than the general Tblisi goals usually described for EE." (1980)

This later led to the subgoals developed for EE; awareness, knowledge, values, citizen action skill, and citizen action participation.

The lawmakers in the state of Wisconsin have long felt EE is important. In 1983 legislation was passed "Establishing a requirement that every school district develop and implement a written, sequential curriculum plan incorporating instruction in environmental education into all subject area curriculum plans" (Wisconsin Model Academic Standards, 1).
The goal of this requirement was to infuse EE into the current curriculum. This later became state law in 1990. The goal of this requirement was similar to those specified in the Tblisi Declaration, to create citizens who are aware of the environment and can make sound decisions as to the future of it.

Place Based Education

Using resources within the community is the foundation of placed-based education. Being able to connect the classroom to these resources is critical. These resources may include local industry, a park, natural areas or waterways and wildlife. Knapp writes:

"Promoting a sense of community in schools and other organizations is an important challenge for educators" (1999) p. 29.

The importance of bringing something from within the community into the classroom is crucial to spark interest. The current Turkey Education Box is full of interesting facts about the turkey population in South Carolina. This is great for southern states but hardly applicable or interesting to those in Wisconsin. By utilizing the theory behind placed-based education, the intention of this study is to provide supplementary materials for those using the box in the Wisconsin. This should provide a higher sense of ownership to those learning about the turkey. According to John Elder (1999), this sense of ownership will provide more meaning for the students and will result in a higher learning curve.

Designing and Implementing a Useful Questionnaire

Creation of a questionnaire that is useful to the researcher is crucial in the successful implementation of this study. The proper procedure must be adhered to, in order to obtain valid data. This includes several factors starting with locating appropriate individuals to survey. Upon locating the subject, a formal introduction needs to be made. This is done in order to determine willingness and usefulness of the participant. This introduction should be type written, followed by a phone call. The questionnaire then can be designed and validated, followed by administration to participants. Follow-up is also suggested to thank the participant and to reconfirm answers or questions. It is also
necessary in order to clear up any areas in the questionnaire where respondents didn’t provide a clear response. (Leedy, 1995)

The design of the questionnaire itself is important. Questions must be clear and concise. “The ease with which the questionnaire can be used by the respondent is an important consideration” (DeMaio, 1983) p8.

The organization must be simple in nature and not lead to frustrations and confusions on the respondents’ part. Answers must be able to be quantified and analyzed so that recommendations can be made. At all times it must be made clear what the researcher is intending to do. Giving participants the complete overview is important so that they may see what you are intending to accomplish. Following the questionnaire, a follow-up letter should be disseminated to participants thanking them for their involvement.

Wild Turkey Ecology and Reintroduction

The Wild Turkey has been a part of American history since Colonial times. Due to our ancestors’ overuse and undermanagement of our resources, the turkey population in the mid 1800’s was nearing extinction. The United States contains five sub-species of wild turkeys that are unique to various habitats. Wisconsin has the eastern wild turkey (meleagris galapovo silvestris) which is partial to forest habitat (Dickson, 1992). The turkeys in Wisconsin were not abundant to begin with due to Wisconsin having vast prairies in the South and uninterrupted forests in the North. Throughout the modern development and destruction of our native landscape, the state has an abundance of small lots of fields and woods. This arrangement provides the Eastern turkey with edge habitat that it flourishes in. Edges are areas where fields and woodlots meet.

Since 1887 groups including the DNR made efforts to reintroduce the wild turkey. DNR staff released pen raised turkeys in southwest and western Wisconsin in habitat that was suitable to the bird (Kyro 2001). Due to the practices in which these birds were raised, they did not succeed and succumbed to disease and predators quite easily. In 1976 in cooperation with the Missouri Department of Natural Resources, 45 turkeys were
released in Vernon County Wisconsin in exchange for ruffed grouse. The turkeys flourished and subsequent trappings and releases were made. (See Appendix B.) In 1983 the first spring hunting season was established. Today Wisconsin issues over 150,000 spring permits to hunters. The population of the turkey is near 400,000 and continues to rise as they establish themselves further and further north, contrary to original management beliefs. The Wisconsin story is unique in practice but mirrors the trends in turkey population throughout the U.S. Currently, there are turkey populations in all 48 lower states and Hawaii. The popularity of the bird continues to rise. Due to this and its storied history, it can serve as an excellent educational tool.

The National Wild Turkey Federation's Turkey Education Box

The National Wild Turkey Federation (NWTF) is dedicated to the survival of the various sub-species of wild turkeys. A part of the NWTF is the Jake’s (A Jake is an immature male turkey) program. Jake’s are children and young adults interested in the wild turkey. A Jake’s coordinator helped create the ‘Turkey Education Box’. This box was intended to be distributed to educational facilities throughout turkey range in an effort to help educate students about the turkey. The box itself is a wild turkey relocation box that is like the ones used in actual turkey relocation projects throughout the United States. The box contains an assortment of teaching aides for the classroom. These aides include visual and audio material. (See Appendix A.) There are also a limited number of project wild lesson plans included. The box also comes equipped with a CD-ROM and audio compact disk.

Conclusion

By utilizing a local wildlife resource such as the turkey, students are more likely to be interested in learning. The recent success of the turkey can be examined to show how a variety of resources can be utilized to reach a common goal like the turkey population. Citizens can actually make a difference in the culture of an entire state as is evident from
the turkey reintroduction. These events provide an excellent opportunity to incorporate it into the classroom. Not only can students see how citizens have acted upon their love for the environment, they can participate as well through art, bird watching, hunting, and habitat enhancement projects. Turkey education clinics and the Jake’s program in the NWTF provide a wealth of opportunities for students to take action. The Turkey Education Box and the story behind the turkey will enable students to transfer this interaction into other important environmental issues as well by providing an example of how to accomplish environmental actions.
CHAPTER THREE
METHODS

PROBLEM STATEMENT
The purpose of this project is to develop, evaluate and disseminate a supplementary environmental education curriculum based on the wild turkey, in cooperation with the National Wild Turkey Federation.

Subproblem One

Investigate and evaluate the current curriculum for the National Wild Turkey Federation’s Turkey Education Box.

a) Locate a turkey education box from a state or local NWTF chapter. (Summer 2001)
b) Investigate and inventory what the box contains and what it is trying to accomplish according to state education standards. (Summer 2001)
c) Obtain the author of the current education box’s lesson plans as well as permission from the NWTF. (Summer 2001)
d) Inform the current authors of the box and the NWTF of the researchers’ intent to revise the curriculum and attempt to get their support. (Summer 2001)

Subproblem Two

Investigate and evaluate the current use of the box in classrooms where it has been previously distributed.

a) Identify Wisconsin educators that have the box by obtaining information from state and local NWTF chapters. (Summer 2001)
b) Create a questionnaire to obtain input on the value of the box and recommendations for change from teachers using the education box. (Fall 2001)

c) Identify changes in the box and its curriculum recommended by the teachers completing the questionnaire. (Fall 2001)

Subproblem Three

Develop and design a supplementary Environmental Education curriculum for use with the National Wild Turkey Federation’s Turkey Education Box.

a) Establish a panel of educators based in a variety of disciplines who could aid in designing lessons for the education box. (Fall 2001)

b) Inservice the panel on the scope and sequence of the proposed project development. (Winter-Spring 2002)

b) Create both student and teacher written resources related directly to the curriculum. (Spring-Summer 2002)

Subproblem Four

Field-test the Environmental Education curriculum with teachers who used the box in the past and with teachers who had no prior experience with the box.

a) Identify teachers willing to participate in the field test, teachers who have experience with the box, and teachers with no prior experience. This population of teachers should be able to evaluate all supplemental materials in the upcoming school semester. (Summer 2002)
b) Distribute the supplement to selected teachers as well as the education box where applicable. (Fall 2002)

c) Create and administer a questionnaire to evaluate the effectiveness of the supplemental materials. (Winter 2003)

Subproblem Five

Revise the curriculum based on the field test results.

A) Analyze the questionnaire. (Spring 2003)
B) Revise the curriculum based on teachers’ needs in the field test. (Spring 2003)
C) Distribute results to the NWTF and provide recommendations for dissemination of the box and assorted curriculum. (Summer 2003)
CHAPTER FOUR
RESULTS

Subproblem one

Investigate and evaluate the current curriculum for the National Wild Turkey Federation's Turkey Education Box.

A Turkey Education Box was obtained by contacting the local regional director of the National Wild Turkey Federation (NWTF). Scott Slajus, the regional director for north central Wisconsin, delivered two education boxes to the author. Upon receiving the boxes, they were inventoried and reviewed. (See Appendix A) The box contained a wide variety of materials including posters, videos, and lesson plans. It also contained a cdRom that had six additional lessons from Project Wild. In addition to these lessons were supplemental materials to aid in teaching information about the wild turkey such as fact sheets on the various subspecies of turkeys and general turkey background knowledge. The information given was in regards to the state of South Carolina. South Carolina is where the national headquarters of the NWTF is located. There were no references in the boxes to any state standards addressed.

The author of the information contained in the box was from the South Carolina Department of Natural Resources (SCDNR). Steve Bates was the education development program coordinator from within the department. His development of the program was devised through teachers with whom he had contact. I contacted him via telephone and confirmation was given to modify the information within the box. (See Appendix B.) Project Wild was the second author of information within the box. The only Project Wild lesson to be modified was “Turkey Trouble.” Attempts were made via telephone and email to contact Project Wild. Al Stenstrup is the director of Project Wild in Wisconsin and permission was granted to modify the lesson for within the box to meet Wisconsin concerns.
The above contact information was obtained through Christine Rolka of the NWTF. Christine is the education development director for the Federation. After designing the subproblems and methods for the project, it was sent to her. She voiced support and enthusiasm for the project and a desire to participate in its development. Through Christine's support a WEEB grant was written in association with this author's subproblems in the fall of 2001. This caused a slight delay in the actions of further development of the project. The proposal was denied in the spring of 2002, primarily for lack of support of the project affecting students in the state of Wisconsin. Subsequently Christine obtained a grant through the NWTF which allowed continuation of the project. (See Appendix C.) The project now had to adhere to the requests as outline in the grant to receive funding upon completion of the project.

Subproblem Two

Investigate and evaluate the current use of the box in classrooms where it has been previously distributed.

Education Boxes are distributed through NWTF regional directors. Regional directors contact chapter presidents who then located schools in which to disseminate the boxes. Each chapter is allowed two boxes per year. Chapter presidents are the only ones knowledgeable as to where the boxes are distributed, no written records are kept. A letter was written and sent to all chapter presidents in the fall of 2001 requesting information as to the distribution of the boxes, over 100 letters were sent. (See Appendix D.) One response came back causing a problem with further development of this subproblem. In association with the author's advisor, Rick Wilke, it was decided to abandon the subproblem and develop a panel of teachers from a variety of disciplines to evaluate the box, and based on their personal backgrounds, to develop lessons that they would use in accordance with the box.
Subproblem Three

Develop and design a supplementary Environmental Education curriculum for use with the National Wild Turkey Federation's Turkey Education Box.

As stated previously, the background information contained within the box was primarily based on South Carolina history and data. After receiving permission to modify this information, the author revised the document. Permission was also given from the Wisconsin Department of Natural Resources to use the publication, “Wild Turkey: Ecology and Management in Wisconsin.” The new document contains information pertinent to Wisconsin educators in regards to the wild turkey in Wisconsin. (See Appendix E.)

Upon revising the sequence for the project and receiving the grant, it was necessary to identify teachers to aid in the development of the variety of lesson plans to be developed in the various disciplines. A letter was sent outlining the request for these teachers. (See Appendix F.) Seven teachers were identified in discipline areas that coordinated with the already established lessons. The following disciplines were identified; art, english, math, social studies, technology education, and science. In addition one k-6 teacher was also identified. The credentials for these teachers contains a wide variety of experience. (See Appendix F.) The teaching panel was brought together in the spring of 2002 and given instructions on what they were required to do for the project as well as the grant. (See Appendix F.) Teachers were required to analyze each established lesson in the box that associates with their curriculum, they then identified state standards within their discipline that the lesson met. (See Appendix E.) Upon completion of this, they were then to enhance the curriculum within their discipline by creating at least one new lesson plan. These new lessons were established to create a better rounded box that encompassed a wider variety of state standards both in their discipline area as well as in environmental education. The Project Wild lesson “Turkey Trouble” was also modified
to associate better with Wisconsin implications. Science and EE standards were addressed as well. (See Appendix E.) The author then took the lessons and identified EE standards that were met. Upon completion of all lessons, a review was made to establish a well rounded use of EE standards through the box. Illustrations and graphics were then added. Permission from the NWTF was given to use their pictures. Neil Paisley a wildlife biologist located in Sandhill also contributed photos. All remaining photos were taken by the author. The completed lessons were then assembled with the aid of Jordan Tack, a senior at Lincoln High School, who specialized in graphic design and layout. (See Appendix E.)

**Subproblem Four**

Field-test the Environmental Education curriculum with teachers who used the box in the past and with teachers who had no prior experience with the box.

The Wisconsin NWTF distributes approximately 200 boxes each fall to local chapters around the end of October. The author wrote a state superfund grant that was approved for $920 to cover supplemental publication as well as postage for the field test. Several logistic problems were identified that made the field test more complicated. First, only the chapter presidents know where the boxes will end up and no records are kept; therefore, there was no easy way to distribute the supplement to these teachers. Supplements could be sent to state chapter presidents, but in discussions with NWTF district supervisor Charlie Burke, that was decided to be an unreliable method. Boxes are delivered directly from National to the chapter presidents in a way that did not allow National at this time to add the supplements into the boxes. Therefore, the field test would have to be narrowed. Teachers were located through the author's contacts. Twenty-seven contacts were made through the EE master's program. The author than received a list of NWTF chapter presidents and made as many matches as possible. In all twenty-five copies of the supplement where made at a cost of $650.00. Of the twenty-five supplements, ten where distributed to the contacts, seven where given to the panel
members, with the remaining going to the authors advisor and the NWTF.
Accompanying the curriculum the author developed a simple questionnaire to allow feedback from the field-test. (See Appendix G).

**Subproblem Five**

Revise the curriculum based on the field test results.

Results from the questionnaire indicated that supplement was well designed (see Appendix G.) Due to the size of the field test not all lessons were tested in the classroom. Some minor grammatical errors were identified and the practicality of some of the lessons for urban schools were questioned. Corrections were made and the final curriculum was delivered to Christine Rolka. The author as part of the original grant requirement received from the NWTF presented his work at the 2003 Wisconsin Society of Science Teachers (WSST) in March. Twenty-five additional boxes and supplements were distributed to participants funded by a third and final NWTF state superfund grant. Further implications of the supplement will be up to the decision of the NWTF national office. Scott Slajus, regional director of the NWTF, identified the state of Wisconsin Turkey stamp fund as a possible source for monies to fund additional distribution to schools.
CHAPTE R FIVE
CONCLUSIONS AND RECOMMENDATIONS

Subproblem one: Investigate and evaluate the current curriculum for the National Wild Turkey Federation’s Turkey Education Box.

Before attempting to evaluate a curriculum, it is important to become comfortable with it. Not only in reviewing the materials but applying them into the classroom. When evaluating a new curriculum, the reader should have prior experience with the subject in this case the wild turkey. It is also important to view other curriculums that are similar in nature, Project KEEP and Project WILD both provide excellent benefits for this. When reviewing the materials, ensure that they are up to date and find out if the authors are anticipating any future changes to the curriculum. It is also important to learn to what extent the contents of the materials are used within a classroom. Inventory what grade levels as well as disciplines are addressed by the curriculum. This will ensure a broad spectrum of what is addressed and can pinpoint strengths and weaknesses. Coordinate the curriculum to state standards if not already completed.

As part of one of the initial goals of the project, it was important to gain permission of the authors of the established curriculum. Permission is required to make revisions of published articles. This permission is necessary early on in the project in order to ensure successful completion. Contacting the highest available person responsible for the publications should be the first priority. In the case of this study’s curriculum several authors were cited. Initial contact should be made by a telephone call directly to the person. This should be followed by a letter and a follow-up phone call. Persistence is a key in contacting others who may not be as concerned with the welfare of the project. It is also very important to ask for written documentation regarding using curriculum and making it perfectly clear what the information will be used for. Have the original author address these subjects in this letter giving permission.
Subproblem Two: Investigate and evaluate the current use of the box in classrooms where it has been previously distributed.

Ensuring current use of a curriculum without incentive for the test group is a difficult undertaking. This is compounded when the current distribution of the curriculum is not documented. It is recommended that when investigating this subject that the evaluator provide an incentive for teachers to respond as they are pressed for time. It is also recommended that the owners of the curriculum keep accurate records as to the whereabouts of resources such as the Turkey Education Box for tracking purposes.

Subproblem Three: Develop and design a supplementary Environmental Education curriculum for use with the National Wild Turkey Federation's Turkey Education Box

To successfully coordinate a panel of educators for the purpose of developing and designing new curriculum, it is important that the teachers are financially compensated for their work. Due to the increasing work-load and responsibilities placed on teachers, paid responsibilities take precedence. Funding can be secured through a variety of resources including the district. However, in a project such as this, which does not involve the district directly, funding may be difficult to secure. Outside funds through grants are the best avenue to search. Private organizations directly related to the project and its development are also important. When writing a grant of this nature, it is important to develop a sense of ownership on the part of the organization. This can be done by displaying clearly the benefits for them.

When looking for a panel of educators, diversity is important. It may be easiest to find coworkers that one knows on a first name basis; however, they may not be the most qualified. It is recommended that the panel be a group of well rounded teachers with whom the lead teacher will be able to have frequent face to face contact. The panel then needs to be organized so that they are very clear of the intent on the project. The coordinator must have the utmost flexibility to meet with teachers outside of the school day to assure proper completion of the project. In describing the project to the panel,
give the teachers ownership. Have them develop something that will be useful for them in the classroom as well. If it is useful for them, then it will be useful for other teachers in their discipline in other schools. Familiarize the teachers with environmental education standards.

**Subproblem Four:** Field-test the Environmental Education curriculum with teachers who used the box in the past and with teachers who had no prior experience with the box.

Dissemination of curriculum is time consuming and expensive. It is recommended that the field test study be small and concise. In the case of this curriculum, resources were secured through additional grants. Coordinating the normal distribution of materials from the organization may be the best bet to ensure a wider test group. Ensure that the test group is responsible and willing to participate. Letting them know that they are getting something in return is also important. In this case it was the supplement and the education box. To obtain their feedback, provide the test group an easy to read and complete questionnaire with a self addressed stamped envelope. Allow the test group ample time to review the materials and set a deadline for completion of the questionnaire.

**Subproblem Five:** Revise the curriculum based on the field test results.

Ensuring that the field test was successful can be based on responses to the questionnaire. Follow up letters and phone conversations to participants is important to maximize the number of returned questionnaires. If the questionnaire was well written, then this step will be easy. Complete the recommendations for revisions while coordinating with the original panel members to ensure compatibility. Revisions should also be based on input from sources outside the teaching profession such as project coordinators, advisors and biologists who are well versed in the subjects.
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1981

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CONTENTS OF THE NATIONAL WILD TURKEY FEDERATION WILD ABOUT TURKEY EDUCATION BOX

The box itself is a weatherproof cardboard box designed for holding captured birds, transporting them and then releasing them into new areas.

Contents: Classroom set of pencils
Classroom set of bookmarks
Classroom set of 12” rulers
Turkey breast feather
10 minute video divided into 2 segments
- RETURN OF THE WILD TURKEY (about conservation and history)
- ROLL CALL (sounds and video of the turkey)
Push button yelper call to imitate turkey sounds except gobble
Bulletin board materials
- 5 pictures of birds including make female and young
- feather facts, information put on tail feathers intended to create a fan
- border
Poster- turkey facts, also found on cdROM
CdROM- the cd rom can be used to store printable materials. The materials used to be all paper and they moved it to this cd.

Project WILD folder
A turkey trouble teachers guide and supplement contains info on
Introduction
History
Classification
Physical characteristics
Mating, nesting and brooding
Habitat
Moratality factors
Management
Turkey restoration
Turkey lore
Turkey crossword puzzle
Resources (contacts in turkey biology)
NWTF info
Books

Additional Video
Project WILD activities
TURKEY TROUBLE grades 10-12 calculating turkey numbers in a Given situation.
Obj: Exponential and linear growth
WHAT’S WILD grades K-3.
collecting photos of animals and making a poster or collage.
Obj: Distinguish between wild and domestic animals
TRACKS! Grades 4-7 making plaster casts of animal tracks
Obj: students will id common animal tracks.
OH DEER! Grades 4-12 outside activity where students act as deer
and Food, shelter and water.
Obj: describe habitat, limiting factors and population fluctuation
HABITAT LAP SIT grades 4-9 students id the four main things
found in habitat and form a circle then step inward and sit creating
a seat for others
Obj: id components of habitat, and interpret results of loss or
change.
Modifying activities- a short list of ways to modify the above
activities.

JAKES MAGAZINE summer of 2000 edition. 14 pages of articles and
activities on the following:
1. intro
2. contents
3. letter to editor
4. herbaceous habitat article
5. life of an ancient tree
6. partners in nature
7. working forests
8. what is a forester
9. the history of paper and recycling
10. PROJECT- making Paper
11. XWORD puzzle on trees
12. WORD FIND on trees
13. Merchandise

SUPPORT DOCUMENTS
Sounds at a glance
   Morning sounds- sounds in the woods in the am
   Turkey- one gobble
At a Glance- Info on the NWTF
Know Your Turkey Poster

WILDLIFE BULLETINS
Aging turkeys with actual photos
Eastern subspecies that we have in WI
Florida found in florida
Goulds found in mexico
Merriams found out west
Occelated found on yucatan peninsula
Rio Grande found in southwest
What's on this CD?

Welcome to the National Wild Turkey Federation's multimedia educational CD/CD-ROM! This CD-Rom is full of educational tools, activities, and background information to help you teach about one of the greatest wildlife conservation success stories, the return of the wild turkey.

The multimedia CD/CD-ROM includes:

An audio track that will place your students in the middle of the spring turkey woods as it awakens with the sounds of wildlife. This track is six minutes long and can be used to enhance the creative writing activity in your lesson plan packet. Just put this in a CD player and press play!

National Wild Turkey Federation Wildlife Bulletins providing a wealth of background information for the lessons and activities in the education box. These printable bulletins include information on the history of the wild turkey, the subspecies of wild turkeys and their ranges, a bulletin about the Ocellated turkey, information on predators and their effects on wild turkeys, regional recommendations for planting food sources for wild turkeys, and how to age a gobbler.

A Turkey Trouble Teacher's Guide and Supplement to the Project WILD activity “Turkey Trouble” was developed by a teacher in conjunction with the South Carolina Department of Natural Resources. The supplement provides teacher friendly background information about wild turkeys and is suitable for the “Turkey Trouble” Project WILD activity and the other lessons and activities in the education box. The information in this supplement can be modified to include wild turkey information about your state or province, by contacting your state or provincial wildlife agency.

Five Project WILD Activities for grades K-12 to help you teach about wildlife conservation. Project WILD is an award-winning conservation and wildlife education program that provides training to educators across North America and abroad. Activities in the Project WILD guide are designed to be fun, hands on, and are correlated to national educational and environmental education standards. Each activity contains suggestions on
how it can be modified as well as where to locate appropriate background information within your kit.

**JAKES Magazine: Wildlife Management and Forestry Issue** highlights the different ways NWTF volunteers and partners work together to provide suitable habitat for wild turkeys and other wildlife.

The **Know your Wild Turkey Tom Poster** is a small printable version of the one contained in your kit.

**About the National Wild Turkey Federation** provides an at a glance account of the Federation’s mission and programs.

Just click on the *highlighted* text or *icon* you would like to explore!
WHAT'S WILD

OBJECTIVES
Students will: 1) distinguish between wildlife and domesticated animals; and 2) recognize that wildlife occurs in a variety of forms.

METHOD
Students find and classify pictures of wild and domesticated animals, and construct collages.

BACKGROUND
An animal is generally referred to as any living organism other than a plant. Wildlife is any animal that lives in a basically free condition, providing for its own food, shelter, and other needs in an environment that serves as a suitable habitat. Wildlife refers to animals that are not tamed or domesticated. Wildlife may be small organisms only visible to humans if seen through a microscope, or as large as a whale. Wildlife includes, but is not limited to, insects, spiders, birds, reptiles, fish, amphibians, and mammals, if non-domesticated. Domesticated animals are those which humans have tamed, kept in captivity, and bred for special purposes. The process of domestication takes place over a long period of time and has involved genetic manipulation through selective breeding. All domesticated animals have their origins in wild ancestors. Cattle used for food and other products; sheep for wool and other products, as well as dogs, cats, birds, and fish commonly kept as pets are all examples of domesticated animals.

Confusion can arise about animals that sometimes may be wild, sometimes may be tamed, and sometimes may be domesticated. If the animal, or population of animals, can live on its own, survive, and even reproduce, it is probably wild. Individual animals may be tamed—like some animals in zoos—while most of their numbers remain wild. A wild animal may appear to be tame, but still should be considered wild unless it is both tamed and domesticated. Some animals that are usually considered domesticated—like dogs, cats, horses, and goats—may become wild. When they do, the term “feral” is used. For example, there are feral goats on Catalina Isle, and feral horses and burros in some areas of western states in the U.S.

Where it is difficult to distinguish whether an animal is wild or domesticated, encourage the students to think in terms of what is usually the case. Remember that wild animals basically take care of themselves, as long as they have a suitable environment or habitat in which to live. Domesticated or tamed animals basically depend on people to feed and take care of them, and are typically used by people; for example, as a source of products and as pets. Whereas domesticated animals like cats and dogs are normally considered suitable pets, wild animals—even if tamed—are nearly always unsuitable, inappropriate, and frequently illegal pets.

The major purpose of this activity is for students to be able to distinguish between wild and domesticated animals.

Age: Grades K-3  
Subjects: Science, Language Arts, Art  
Skills: classification, media construction, observation  
Duration: 60 minutes  
Group Size: any  
Setting: indoors  
Conceptual Framework Reference: WPIA, WPIA2, WPID  
Key Vocabulary: animal, wild, domesticated  
Appendices: none
MATERIALS
magazine or newspaper pictures of a wide variety of animals; poster board or heavy construction paper; glue

PROCEDURE
1. Ask students to bring pictures to class of as many animals as they can find in magazines or newspapers at home (or get them from magazines and newspapers available in school, if any). Ask the students to look for pictures of as many different animals as they can, telling them that animals are any living things except plants.
2. Once the students have assembled a collection of animal pictures, it is time to classify them. Students may work alone or in small groups. Talk with the students about wild animals and domesticated animals (like pets, farm animals, etc.) before they get started with their classifying.
3. Once the students have put their animals into two categories—either wild or domesticated—get out the poster board or construction paper and glue and ask the students to make two collages... one of wildlife, and one of domesticated animals. You can make a classroom gallery out of the products.

EXTENSIONS
1. Make a master list of the wildlife and domesticated animals. Use the words for spelling, and talk about the variety of animals found.
2. Younger students can take cut-outs of animals and put them where they fit—like birds in the sky, whales in the ocean, a deer in the forest.
3. Make mobiles that show “layers” of animals—in the sea, on land, and in the air. Build one huge mobile with an animal for each student that shows deserts, forests, mountains, seas, and the skies. Different colors of brightly-colored yarn can be used to hang the different animals in the mobile according to the ecosystem in which they live.

AQUATIC EXTENSIONS
1. Aquatic wildlife occurs in a variety of forms. Create a collage of aquatic animals, including many different kinds.
2. Create posters or collages of aquatic wildlife according to the habitat in which it lives. For example, there are a variety of possible freshwater as well as marine environments in which aquatic wildlife might live. Freshwater: stream or brook, lake, pond, river. Marine: ocean.

EVALUATION
Which animals have been domesticated: goldfish, horses, cows, ducks, boa constrictors, mosquitoes, bats, chickens, lions, eagles?
TRACKS!

OBJECTIVES
Students will identify common animal tracks.

METHOD
Students make plaster casts of animal tracks.

BACKGROUND
Looking for evidence of wildlife is one method of determining what types of animals are around. Signs such as burrows, nests, droppings or food litter can be identified—but some of the easiest signs to interpret are animal tracks.

Animal tracks can be the basis for several types of investigations. Identifying the tracks that you and your students find will help fill in a species list of those animals found in your area. Wildlife population estimates can be made from observing the number of tracks found during a specified length of time. Habitat requirements of individuals can be determined by finding their tracks in certain areas and not finding them in others.

Track hunting is really very easy. Just find a spot of level ground with fairly soft, fine, textured soil. Smooth it over and come back later to see what has been there! Obvious places for your smooth spot would be near water or on well worn trails. Larger animals will use the more open areas, while a small spot the size of your hand cleared under some bushes may reward you with many different little tracks of mice, shrews and reptiles.

Tracks can be preserved and collected by making plaster casts of them. This simple procedure will allow you to "collect" track and add them to other evidence like bones, nests or scats that you already may have collected.

Once these tracks have been observed or preserved, information about the animal that made them can be discovered. For example, all mammals have basically the same foot structure. They just use the parts in different ways. If we look at an animal's foot in relation to the human hand, we find that some animals walk on their hands—like raccoons and bears. Others walk or run on their toes, like cats and coyotes, while some walk on their "toenails" or hooves like deer and elk.

By looking at a track, we can make some determinations about how that animal lives. We can notice what part of the foot it walks on, whether claws are present and how many steps are taken in a measured distance.

The major purpose of this activity is for students to become sufficiently familiar with evidence of wildlife to be able to identify a few animal tracks common to their area.

MATERIALS
plaster of Paris; containers for mixing; spray shellac or plastic; vaseline; cardboard; knives; sandpaper; black ink or paint
OPTIONAL: loops of wire

Age: Grades 4-7
Subjects: Science, Art
Skills: analysis, application, comparing similarities and differences, psychomotor development, synthesis
Duration: two 45-minute periods or longer
Group Size: small groups of two to five
Setting: outdoors
Conceptual Framework Reference: WPIA1
Key Vocabulary: tracks, evidence
Appendices: Outdoors, Field Ethics
PROCEDURE

1. Take your class on a field trip to a nearby lake, stream, or wildlife refuge area—somewhere where there will be lots of tracks!

2. Divide into small groups to find tracks. You may want to divide the students into groups according to areas in which they will look for tracks (e.g., one group under bushes, one group at a meadow's edge, one group near a pond's edge). Prepare the students in advance to assist them in looking carefully and responsibly.

3. Once a track is found, clean it of loose particles of soil, twigs, leaves, and other litter.

4. Spray the track with shellac or plastic from a pressurized can if available.

5. Form a two-inch wide strip of cardboard or tin into a ring surrounding the track. Press firmly into the ground to give support, but allow at least one inch to form the edge of the mold for the plaster. Square forms can be made by cutting milk cartons horizontally—one of the easiest ways to make the forms! Simple round forms can be made by cutting both the top and bottom from a tuna or catfood type of can or a plastic margarine tub. Stapled strips of cardboard in the shape of a circle can also be used.

6. Mix about two cups of plaster of Paris in a tin can or plastic bowl, adding water slowly until it is about as thick as heavy cream. Pour carefully into the mold until the plaster is about to the top. Allow plaster to harden at least 15 minutes before lifting it out of the track. If the soil is damp, hardening may take longer.

7. When the cast is hardened, lift the cast out, remove the ring and clean the cast by scraping it with a knife blade and washing.

8. Back in class, apply a thin coating of vaseline to the track and surface of the cast. Place it on a flat surface and surround the casting with a two-inch strip of cardboard or tin as before.

9. Mix plaster of Paris and pour it into the mold, making certain that the top surface of the casting is smooth and level with the mold. If you plan to use the casting as a wall plaque, place a loop of wire in back of the casting while the plaster is still soft. Allow two hours for plaster to harden.

10. Carefully remove the mold when the plaster is dry. Separate the two layers and wipe the excess vaseline from the face of the cast and track. Scrape any rough places with a knife blade, or use fine sandpaper to smooth the surface. Wash the completed cast in running water.

11. When the cast is thoroughly dry, paint the inside of the track with India ink or black poster paint. Label each cast with the name of the track and the student's name. A coat of clear shellac or clear plastic may be applied to protect and preserve the casting.
Reprinted from December 1953 Virginia Wildlife Magazine
EXTENSIONS
1. In a sandy area, move in different ways. For example, you can walk, run and jump. Compare the differences between sets of tracks made by the same person. Evaluate how speed, directional changes and other variations in travel alter the tracks.
2. You may be able to obtain various animal feet or rubber replicas of feet from your local wildlife agency, nature center or scientific supply company. The feet or replicas can then be used to make tracks and plaster casts. Once you have made tracks with real or rubber feet, make up a wildlife story and express it by making the appropriate tracks. As a variation, make up a “track story” and have others guess what happened.

AQUATIC EXTENSION
Display all the tracks according to the habitats in which you found them. How many of the tracks, if any, were found near water? If any were found near water, identify the kind of aquatic environments in which the tracks were found—for example, pond, stream, lake, marsh, beach.

EVALUATION
1. Draw and label tracks of animals common to your area.
2. How would knowing about animal tracks and tracking help the following people? Consider: a biologist studying lions; a wildlife photographer interested in elk; a shepherd with a flock of sheep. What kinds of things would they need to know about animal tracks to do their jobs?
OBJECTIVES
Students will: 1) identify and describe food, water, and shelter as three essential components of habitat; 2) describe the importance of good habitat for animals; 3) define "limiting factors" and give examples; and 4) recognize that some fluctuations in wildlife populations are natural as ecological systems undergo constant change.

METHOD
Students become "deer" and components of habitat in a highly involving physical activity.

BACKGROUND
A variety of factors affects the ability of wildlife to successfully reproduce and to maintain their populations over time. Disease, predator/prey relationships, varying impacts of weather conditions from season to season (e.g., early freezing, heavy snows, flooding, drought), accidents, environmental pollution and habitat destruction and degradation are among these factors.

Some naturally-caused as well as culturally-induced limiting factors serve to prevent wildlife populations from reproducing in numbers greater than their habitat can support. An excess of such limiting factors, however, leads to threatening, endangering, and eliminating whole species of animals.

The most fundamental of life's necessities for any animal are food, water, shelter and space in a suitable arrangement. Without these essential components, animals cannot survive.

This activity is designed for students to learn that:
• good habitat is the key to wildlife survival;
• a population will continue to increase in size until some limiting factors are imposed;
• limiting factors contribute to fluctuations in wildlife populations; and
• nature is never in "balance," but is constantly changing.

Wildlife populations are not static. They continuously fluctuate in response to a variety of stimulating and limiting factors. We tend to speak of limiting factors as applying to a single species, although one factor may affect many species. Natural limiting factors, or those modeled after factors in natural systems, tend to maintain populations of species at levels within predictable ranges. This kind of "balance in nature" is not static, but is more like a teeter-totter than a balance. Some species fluctuate or cycle annually. Quail, for example, may start with a population of 100 pairs in early spring; grow to a population of 1200 birds by late spring; and decline slowly to a winter population of 100 pairs again. This cycle appears to be almost totally controlled by the habitat components of food, water, shelter and space, which are also limiting factors. Habitat components are the most fundamental and thereby the most critical of limiting factors in most natural settings.

This activity is intended to be a simple but powerful way for students to grasp some basic concepts: that everything in natural systems is interrelated; that populations of organisms are continuously affected by elements of their environment; and that populations of animals do not stay at the same static number year after year in their environment, but rather are continually changing in a process of maintaining dynamic equilibria in natural systems.

The major purpose of this activity is for students to understand the importance of suitable habitat as well as factors that may affect wildlife populations in constantly changing ecosystems.
**MATERIALS**
area—either indoors or outdoors—large enough for students to run (e.g., playing field); chalkboard or flip chart; writing materials

**PROCEDURE**
1. Begin by telling students that they are about to participate in an activity that emphasizes the most essential things that animals need in order to survive. Review the essential components of habitat with the students: food, water, shelter, and space in a suitable arrangement. This activity emphasizes three of those habitat components—food, water and shelter—but the students should not forget the importance of the animals having sufficient space in which to live, and that all the components have to be in a suitable arrangement or the animals will die.
2. Ask your students to count off in fours. Have all the ones go to one area; all twos, threes and fours go together to another area. Mark two parallel lines on the ground or floor ten to 20 yards apart. Have the ones line up behind one line; the rest of the students line up behind the other line.
3. The ones become "deer." All deer need good habitat in order to survive. Ask the students what the essential components of habitat are again: food, water, shelter and space in a suitable arrangement. For the purposes of this activity, we will assume that the deer have enough space in which to live. We are emphasizing food, water and shelter. The deer (the ones) need to find food, water and shelter in order to survive. When a deer is looking for food, it should clamp its hands over its stomach. When it is looking for water, it puts its hands over its mouth. When it is looking for shelter, it holds its hands together over its head. A deer can choose to look for any one of its needs during each round or segment of the activity; the deer cannot, however, change what it is looking for (e.g., when it sees what is available, during that round). It can change what it is looking for in the next round, if it survives.
4. The twos, threes and fours are food, water and shelter—components of habitat. Each student gets to choose at the beginning of each round which component he or she will be during that round. The students depict which component they are in the same way the deer show what they are looking for; that is, hands on stomach for food, etc.
5. The activity starts with all players lined up on their respective lines (deer on one side; habitat components on the other side)—and with their backs at the students at the other line.

6. The facilitator or teacher begins the first round by asking all of the students to make their signs—each deer deciding what it is looking for, each habitat component deciding what it is. Give the students a few moments to get their hands in place—over stomachs, mouths, or over their heads. (As you look at the two lines of students, you will normally see a lot of variety—with some students water, some food, some shelter. As the activity proceeds, sometimes the students confer with each other and all make the same sign. That's okay, although don't encourage it. For example, all the students in habitat might decide to be shelter. That could represent a drought year with no available food or water.)

**NOTE:** If students switching symbols in the middle of a round is a problem, you can avoid that by having stacks of three different tokens, or pieces of colored paper, to represent food, water and shelter at both the habitat and deer ends of the field. At the start of each round, players choose one of the symbols before turning around to face the other group.
7. When you can see that the students are ready, count: "One. . . two. . . three." At the count of three, each deer and each habitat component turn to face the opposite group, continuing to hold their signs clearly.
8. When deer see the habitat component they need, they are to run to it. Each deer must hold the sign of what it is looking for until getting to the habitat component person with the same sign. Each deer that reaches its necessary habitat component takes the "food," "water," or "shelter" back to the deer side of the line. This is to represent the deer's successfully meeting its needs, and successfully reproducing as a result. Any deer that fails to find its food, water, or shelter dies and becomes part of the habitat. That is, in the next round, the deer that died is a habitat component and so is available as food, water, or shelter to the deer who are still alive.

**NOTE:** When more than one deer reaches a habitat component, the student who gets there first survives. Habitat components stay in place on their line until a deer needs them. If no deer needs a particular habitat component during a round, the habitat component just stays where it is in the habitat. The habitat person can, however, change which component it is from round to round.
9. You as the facilitator or teacher keep track of how many deer there are at the beginning of the activity, and at the end of each round you record the number of deer also. Continue the activity for approximately 15 rounds. Keep the pace brisk and the students will thoroughly enjoy it.
10. At the end of the 15 rounds, gather the students
together to discuss the activity. Encourage them to talk about what they experienced and saw. For example, they saw a small herd of deer (seven students in a class size of 28) begin by finding more than enough of its habitat needs. The population of deer expanded over two to three rounds of the activity until the habitat was depleted and there was not sufficient food, water and shelter for all the members of the herd. At that point, deer starved or died of thirst or lack of shelter, and they returned as part of the habitat. Such things happen in nature also.

NOTE: In real life, large mammal populations might also experience higher infant mortality and lower reproductive rates.

11. Using a flip chart pad or an available chalkboard, post the data recorded during the activity. The number of deer at the beginning of the activity and at the end of each round represent the number of deer in a series of years. That is, the beginning of the activity is year one; each round is an additional year. Deer can be posted by fives for convenience. For example:

![Graph showing number of deer over years]

The students will see this visual reminder of what they experienced during the activity: the deer population fluctuated over a period of years. This is a natural process as long as the factors which limit the population do not become excessive, to the point where the animals cannot successfully reproduce. The wildlife populations will tend to peak, decline, and rebuild—peak, decline, and rebuild—as long as there is good habitat and sufficient numbers of animals to successfully reproduce.

12. In discussion, ask the students to summarize some of the things they have learned from this activity. What do animals need to survive? What are some of the "limiting factors" that affect their survival? Are wildlife populations static, or do they tend to fluctuate, as part of an overall "balance of nature?" Is nature ever really in "balance" or are ecological systems involved in a process of constant change?

VARIATIONS
1. After the students have played several rounds of "Oh Deer!," introduce a predator such as a mountain lion or wolf into the simulation. The predator starts in a designated "predator den" area off to the side. The predator has to skip or hop. This reduces the possibility of violent collisions between deer and predators. The predators can only tag deer when they are going towards the habitat and are between the habitat and deer lines. Once a deer is tagged, the predator escorts the deer back to the predator den. That simulates the time it takes to eat. The "eaten" deer is now a predator. Predators that fail to tag someone die and become habitat. That is, in the next round, the predators that died join the habitat line. They will become available to surviving deer as either food, water or shelter. During each round, the teacher should keep track of the numbers of predators as well as the number of deer. Incorporate these data into the graphs.

2. Instead of drawing the line graph for students as described in procedure 11, have the students create their own graphs. Provide them with the years and numbers of deer. Depending upon the age group, they can make picture, line or bar graphs.

EXTENSIONS
1. When you have finished tabulating and discussing the graph data, ask the students if they have ever heard of the Hudson Bay trappers in American history. Tell them, briefly, who they were. There is a hundred years, or more, of records of the activities of these trappers. In those records are some interesting data. These data refer to pelts shipped from America to Europe, particularly the pelts of snowshoe hares and lynx. Researchers have found that snowshoe hare populations seem to peak about every seven to nine years and then crash, repeating the process over each comparable time period. So, a snowshoe hare population graph would look like this:

![Graph showing average population for hares]

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It has also been discovered that lynx populations do the same thing—except that they do it one year behind the hare populations. The combined graph would look like this:

Graph this right over the deer graph that you made, adding first the hares, and then the lynx. Ask the students:

- Which animal is the predator? Which prey?
- Are predators controlling the prey, or are prey controlling the predators? (We have been brought up to "know" that predators control the prey—and are now discovering that this is not so. The number of prey animals available tells us how many predators can live in the area.)
- Is this like the deer habitat activity we just played? Who controls? (Sometimes the habitat—when the deer population is not too large; sometimes the habitat—when the deer population "gets on top of it" and destroys the vegetative food and cover.)

2. Some recent research has added a new dimension to the story of the snowshoe hares and the lynx. It has been found that a major winter food of the hare is a small willow. As hare populations grow, the use of the willow plants grows too. But, when the willow plant has been "hedged" or eaten back so far, the plant generates a toxin (poison) which precludes use by the hare. That is when the hare population crashes, followed by the crash of the lynx population about a year later. Then the willow, relieved of pressure, begins to grow again. The hare population begins to grow in response, and last of all, within a year or so, the lynx population follows. And the cycle has begun again—over and over—every seven to nine years.

3. Discuss the "balance of nature." Is it ever in "balance?"

**AQUATIC EXTENSION**

Do the activity in exactly the same fashion, except substitute an aquatic species of wildlife. The essentials are still the same. In this case, rather than assuming all the necessary space is available, assume all the water is available but space is needed, as is food and shelter. Hands on stomach is food, hands together over head is shelter—and arms out to the side is space. Otherwise, conduct the activity in the same fashion. The objective remains the same, except that now you are identifying food, shelter and space as three essential components of habitat. Examples of possible aquatic species: manatee, salmon, frog.

**EVALUATION**

1. Name three essential components of habitat.
2. Define "limiting factors." Give three examples.
3. Examine the graph. What factors may have caused the following population changes.
   - a) between years 1 and 2?
   - b) between years 3 and 4?
   - c) between years 5 and 6?
   - d) between years 7 and 8?

4. Which of the following graphs represents the more typically balanced population?
HABITAT LAP SIT

OBJECTIVES
Students will: 1) identify the components of habitat; 2) recognize how humans and other animals depend upon habitat; and 3) interpret the significance of loss or change in habitat in terms of people and wildlife.

METHOD
Students physically form an interconnected circle to demonstrate components of habitat.

BACKGROUND
See "The Beautiful Basics," "Everybody Needs A Home," "What's That, Habitat?" "Habitracks" and "Habitat Rummy" for activities with similar purposes. People and other animals share some basic needs. Every animal needs a place in which to live. The environment in which an animal lives is called "habitat." An animal's habitat includes food, water, shelter and space in an arrangement appropriate to the animal's needs.

If any of these components of habitat is missing or is affected significantly so that the arrangement for the individual animal or population of animals is no longer suitable, there will be an impact. The impact will not necessarily be catastrophic, but can be. There are many additional limiting factors beyond those of suitable food, water, shelter and space. For example, disease, predation, pollution, accidents and climatic conditions are among other factors which can have impact.

All things are interrelated. When we look at a biological community, we find interrelationships and interdependencies between plants and plants, plants and animals, as well as animals and animals. These interrelationships and interdependencies are important.

The major purpose of this activity is for students to become familiar with the components of habitat, and to recognize that it is not sufficient for there to be food, water, shelter and space in order for animals to survive—those components of habitat must be in a suitable arrangement.

NOTE: This activity was inspired by a "New Game" and adapted to teach concepts related to wildlife.

MATERIALS
none needed

PROCEDURE
1. Have students form a circle standing shoulder to shoulder. Students should then name off the components of habitat, with the first student saying "food," the next student saying "water," the next saying "shelter," and the fourth saying "space." Continue going around the circle like this until each student has called out a habitat component.

2. Ask the students to turn toward their right, at the same time taking one step toward the center of the circle. They should be standing close together, "heel to toe," with each student looking at the back of the head of the student in front of him or her.

3. Don't panic—this will work! Ask everyone to listen carefully. Students should place their hands on the shoulders of the person in front of them. Students slowly sit down as you count to three. At the point of three, you want the students to sit down—on the knees of the person behind them, keeping their own knees together to support the person in front of them. You then say, "Food, water, shelter and space—in the proper arrangement (represented by the students' intact, "lap-sit" circle)—are what is needed to have a suitable (good) habitat."

4. The students at this point may either fall or sit down. When their laughter has subsided, talk with them about the necessary components of suitable habitat for people and wildlife.

Modifying This Project

Age: Grades 4-9 (also younger and older)
Subjects: Science, Physical Education
Skills: discussion, generalization, kinesthetic concept development, small group work
Duration: 20 minutes
Group Size: 15 to 45 students
Setting: outdoors preferred; indoors possible
Conceptual Framework Reference: HNIIA
Key Vocabulary: habitat, food, water, shelter, space, arrangement
Appendices: Simulations

Modifying This Project

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5. After the students understand the major point—that food, water, shelter and space are necessary for any animal's survival, and in their appropriate arrangement comprise a suitable habitat—let the students try the circle activity again! This time ask them to hold their lap sit posture. As the students lap-sit-still representing food, water, shelter and space in their appropriate arrangement—identify a student who represents “water.” Then say, “It is a drought year. The water supply is reduced by the drought conditions.” At this point, have the student who was identified as representing “water” remove himself or herself from the lap-sit circle—and watch the circle collapse, or at least suffer some disruption in arrangement. You could try this in several ways—removing one or more students from the circle. Conditions could vary: pollution of water supply, urban sprawl limiting availability of all components, soil erosion impacting food and water supplies, etc. Since animals’ habitat needs depend upon food, water, shelter and space, in their appropriate arrangement, “removal” of any will have an impact.

6. Ask the students to talk about what this activity means to them. Ask the students to summarize the main ideas they have learned. They could include: a) food, water, shelter and space, in their appropriate arrangement, can be called habitat; b) humans and other animals depend upon habitat; c) loss of any of these elements of habitat will have impact on the animals living there; and d) the components of habitat must be in an arrangement suitable to the needs of the individual animals or populations of animals in order for the animals to survive.

**VARIATION**

Have the students form a circle, holding hands. Walk around the circle, first naming one student as an animal of a particular ecosystem. Name the next four students in the circle as food, water, shelter and space for that animal. Repeat the process until all the students are involved. Any “extras” can be identified as elements of habitat (e.g., resulting from a particularly good year for habitat needs for the last animal named). When all of the students have been designated as an animal or as components of an animal’s habitat, comment on the fact that they are holding hands. This represents the idea that all things in an ecosystem are interrelated. Briefly discuss the idea of interrelationships. Then move the students into position to the “lap sit” described in the Procedure above. Remind the students that they noticed all elements of the ecosystem were interrelated when they were holding hands. Now they are going to find out that they all are dependent upon one another as well. Do the “lap sit.” Discuss interrelationships and interdependencies in ecological systems.

**AQUATIC EXTENSIONS**

Do the “Variation” to “Habitat Lap Sit” from an aquatic perspective. Start it like this:

Have students form a circle, holding hands. Name one student as an animal in an aquatic ecosystem. Name the next four students in the circle as food, water, shelter and space for that animal. Repeat the process until all the students are involved. That is, name another student as an animal in the same aquatic ecosystem, and then name the next four students in the circle as food, water, shelter and space for that animal, etc. Finish the procedure as it is described in the “Variation.” Do the activity more than once, picking a different aquatic ecosystem each time—to emphasize that all aquatic animals, in any aquatic ecosystem, need food, water, shelter and space in a suitable arrangement in order to survive.

**EVALUATION**

1. What are the five essential components of habitat?
2. Explain how the arrangement of food, water, shelter and space is important to humans and other animals.
3. What would probably have the greater long-term impact on the wildlife living on a farm in Iowa? A severe winter which killed many animals or the development of part of the farm into a commercial shopping center?
Objective:
Students will be able to express what they have learned about wild turkeys through the creation of a Cinquain Poem.

Materials needed:
- Paper
- Pencils

Background:
Review what students have learned about wild turkeys through the other lessons. Tell students they will use the information they have learned to create a Cinquain Poem. Discuss the elements of a Cinquain Poem as you write them on the chalkboard.

Cinquain Poems consist of five lines, each line has a purpose and number of syllables.

- **Line 1**: Title or subject (1 or 2 words)
- **Line 2**: Four adjectives describing subject or the title. (four syllables)
- **Line 3**: Four verbs describing the title or subject. (four syllables)
- **Line 4**: A phrase about the subject or title. (eight syllables)
- **Line 5**: Another word for the subject or title. (two syllables)

Example:

**The Jake**

Young, fun, wise, sleek;
Fly, eat, roost, sleep;
Always keeping a sharp eye out;
Gobbler.

Students may share poems with the class. Poems may also be displayed, particularly around the Thanksgiving holidays.

Vocabulary Terms:

- **beard** — a group of hair-like feathers that grow from a male turkey’s breast
- **biologist** — a person who studies living things
- **brood** — a group of young turkey siblings
- **clutch** — a hen’s nest of eggs
- **domestic** — raised by humans; not wild
- **forage** — to look for food
- **gobbler** — a male turkey
- **hen** — a female turkey
- **jake** — a young gobbler
- **jenny** — a young hen
- **legume** — a ground-covering plant, such as clover
- **population** — the number of humans or certain types of animals in a specific area
- **poulter** — a young turkey
- **predator** — an animal that eats other animals
- **radio telemetry** — the use of radio transmitters to locate and study wild animals
- **range** — the roaming area of a specific animal
- **restoration** — to rebuild populations through conservation programs
- **rocket net** — a rocket-propelled net that is shot over animals to catch them for relocation
- **spur** — a pointed claw on the back of a gobbler’s legs
- **transmitter** — a small box, attached to an animal by harnesses, that sends out a radio signal. The signal is used by biologists to study the movement of these animals
- **trapping** — using nets to catch animals so they can be moved to a different area
- **tuber** — plant with edible roots, such as carrots and chufa
- **yelp** — a sound made by turkeys to find each other
**Objective:**

The students will be able to demonstrate creative writing skills while developing an appreciation for wildlife conservation and the outdoors.

**Materials needed:**

- Paper
- Pencils
- Multimedia CD/CD-ROM (enclosed in box)
- CD Player

**Activities:**

**Activity 1**

The NWTF educational box contains a multimedia CD/CD-ROM with a “Spring Sounds” track. This track (Track one) contains recordings of wild turkeys and other wildlife waking to the spring morning and calling. Have the children close their eyes while listening to the track, and let what they hear place them in the woods. Have them write a paragraph to briefly describe what they hear. You may want to let them know that what they are hearing are animals in the woods, or you may just want to have them listen to it without providing any clues.

Students may also attempt to identify the calls they hear. Have some of the students share their paragraphs. Discuss the sounds you would expect to hear in your area. You may also wish to play the “Roll Call” segment on the video, which describes the different sounds made by wild turkeys.

**Activity 2**

Have the children write a brief description about their favorite outdoor experience (hiking, camping, watching clouds go by, etc.). Make the task less daunting by telling them that they do not need to make a story with a beginning, middle and end, but that they just need to be creative. Remind the children that creativity is not necessarily the ability to make something up, but also the ability to describe the moment.

Encourage the children to describe the trees, earth and sky, and their emotions. While they are thinking, ask them questions to fuel their imagination: Was it cold that day? Was it hot? Was the wind blowing? Was the sun shining, setting, rising, or shining at all? Who was with you? What were they saying or doing? Did you see any animals? Some of the children may want to draw, or write a poem about their experience. Let them. Encourage them to follow their creative inclinations.
Objective:
The students will be able to demonstrate the use of mathematical formulas and the ability to work word problems.

Materials needed:
- Paper
- Pencils
- Aging Spring Turkeys bulletin from multimedia CD/CD-ROM
- JAKES Ruler

Activities:

Activity 1
The National Wild Turkey Federation has a program called Wild Turkey Records. The purpose of this program is to provide our members with a permanent record-keeping system and important data for researchers. A turkey’s weight, spur length and beard length are all used in a formula to score turkeys. This information is also helpful in estimating the age of a wild turkey gobbler. The formula for scoring turkeys has been provided, along with sample problems for the students to calculate.

Wild Turkey Records Formula
(put numbers in decimal form)

Weight:
- Pounds ______ Ounces ______ = ______

Spur Lengths:
- Left- ______ Inches x 10 = ______
- Right- ______ Inches x 10 = ______

Beard Length:
- Inches ______ x 2 = ______

GRAND TOTAL = ______

1st turkey
- Weight: 18 lbs. 10 oz.
- Left spur: 1/8 inch
- Right spur: 1/8 inch
- Beard: 3 inches

2nd turkey
- Weight: 20 lbs. 8 oz.
- Left spur: 1 inch
- Right spur: 1 inch
- Beard: 9 inches

Extension
Note: Turkey parts may be obtained or borrowed from your state wildlife agency or local NWTF chapter volunteers. For more information about NWTF volunteers in your area, contact nwtf@nwtf.net or call 1-800-THE-NWTF.

1. Explain to students how beards, wings, tail feathers and spurs are used to estimate the age of spring turkeys (Refer to the Aging Spring Turkeys Wildlife Bulletin on the multimedia CD.)

2. Place students in small groups. Provide real turkey feet, tail feathers, wings and beards at different stations in your classroom.

3. Provide a copy of the Aging Spring Turkeys wildlife bulletin at each station.

4. Have student groups rotate to each station, measuring and observing the turkey parts. Have them estimate the turkey’s age at each station and justify their answers.
Word Problems:

1. Hens lay 10 to 12 eggs in a clutch each season. If five hens each laid 11 eggs and four hens each laid 12 eggs and two hens each laid 10 eggs, how many total eggs were laid by all the hens?

2. Laying a full clutch of 12 eggs takes about 2 weeks. Most hens lay 1 egg a day but can delay laying their eggs if they are disturbed. If a hen starts laying her eggs and lays 1 egg a day but is delayed 6 days, how many total days will it take her to lay 12 eggs?

3. Turkey eggs are vulnerable to a number of predators such as rat snakes, crows, raccoons and skunks. Problem: There are seven clutches of eggs. Five of the clutches contain 11 eggs each and two clutches each contain 12 eggs. Four of the clutches containing 11 eggs are raided by rat snakes and lose four eggs each and one of the clutches containing 12 eggs loses five eggs to a skunk, how many eggs are left in all?

SOLUTIONS

TURKEY 1

<table>
<thead>
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<th>Weight:</th>
<th>Pounds</th>
<th>Ounces</th>
<th>Total Weight</th>
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Spur Lengths:

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<tr>
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</tbody>
</table>

Beard Length:

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</thead>
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<td>6</td>
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GRAND TOTAL = 27.125

TURKEY 2

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<th>Ounces</th>
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Spur Lengths:

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</thead>
<tbody>
<tr>
<td>Right-</td>
<td>1</td>
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<td>10</td>
</tr>
</tbody>
</table>

Beard Length:

<table>
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<th>Inches</th>
<th>9 x 2</th>
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</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>18</td>
</tr>
</tbody>
</table>

GRAND TOTAL = 58.5

Word Problems:

1. \((5 \times 11) + (4 \times 12) + (2 \times 10) = 123\) eggs

2. 1 day/egg for 12 days + 6 days = 12 + 6 = 18 days

3. \(((5 \times 11) - (4 \times 4)) + ((2 \times 12) - (1 \times 5)) = 58\) eggs
Objective:
The students will be able to demonstrate the role of wild turkeys as an important natural resource in Native American history.

Materials needed:
- Construction paper
- Pens, pencils, markers
- Glue, tape
- Beads

Background:
The wild turkey was an important natural resource for American Indians. In fact, many native cultures relied on wild turkeys for food, clothing, tools, and religious rituals. The relationship between the wild turkey and some tribes can be compared to the relationship between the Plains Indians and the buffalo. Some groups used every part of the turkey.

Turkeys were hunted by American Indians and later raised for food. Wild turkeys were a major food source for some tribes, but not as important for others. By the time of the Spanish Conquest of Mexico (1519-1521), turkeys accounted for 10 percent of the meat in the diet of the Aztecs and other people of central Mexico. The turkey was a food source in the eastern woodlands, though its importance varied from tribe to tribe. Some tribes, such as the Pueblos, considered the feathers much more important and still do today. Turkey eggs were eaten but were probably not an important food source. Some tribes' customs discouraged eating wild turkeys. Many Apache would not eat turkeys and the Cheyenne believed that eating turkeys would make them cowardly because of the turkey's habit of running away quickly when they are threatened.

Turkey feathers were used to make various types of clothing. One of the most common methods was to attach feathers to some type of cord made from hemp, yucca, or mulberry, which was then woven to form blankets, dresses, coats, and other items. Blankets and headdresses also were made from breast feathers by American Indians in Florida as well as the Pueblo tribes. Feathers also were used for arrows, and it also has been reported that the spurs of old gobblers were used by American Indians as tips for their arrows. Feathers were an important part of prayer sticks, masks, and headdresses. They were used by priests while conducting various rites and also were believed to bring rain, provide protection, and battle evil spirits.

Turkey bones were used to make a variety of simple, everyday tools and jewelry. Some examples are awls, needles, tattooing implements, beads, and pendants. Turkey bones were also used to make turkey calls for hunting. The calls were made from the wing bones. Small knives and arrow points were possibly made from bones as well. Long bones were hollowed out and used as sucking tubes by shamans in some groups to remove objects that caused illness, as well as the sickness itself.

There were many other uses for the wild turkey. The American Indians used the beards as decorations on clothing and implements. Turkeys also were used in ceremonies and as aids in storytelling. Many tribes such as the Comanche, Choctaw, Delaware and Seminole duplicated the turkey's motions during various ceremonies by dance. Sioux and Chickasaw women were sure that turkeys caused illness and tried to gain favor with a special dance.

Activity:
Have the children make headdresses, jewelry, or other similar items replicating the uses of the wild turkey by American Indians. Divide the children into small groups and have them create and present a mural, diorama or skit demonstrating some of the uses of the wild turkey in native culture. Encourage them to be creative!
Objective:
The students will be able to analyze the design features of the wild turkey transport box and its contribution to wild turkey restoration, and demonstrate their knowledge of design by researching and designing a transport box for another wild animal.

Materials needed:
- Wild Turkey Transport box
- "Return of the Wild Turkey" Video
- Pencils, markers, crayons
- Rulers
- Tape
- Glue
- Scissors
- Cardboard and or poster board

Background:
The turkey transport box, which contains your educational materials, is a scale replica of the actual transport box used by state and provincial wildlife agencies to transfer wild turkeys from areas where they are abundant to areas where there are few and the habitat is suitable. This transport box was designed specifically for moving wild turkeys by the National Wild Turkey Federation, in cooperation with government wildlife agencies. The transport box has come a long way since the use of cumbersome wooden crates, chicken wire, burlap sacks and containers from which the birds could easily escape. The design of the wild turkey transport box is truly a feat of engineering and has contributed significantly to wild turkey restoration. The NWTF currently produces and donates these boxes to wildlife agencies for wild turkey restoration. More than 115,000 of these boxes have been produced, so far, and have been used to transport more than 200,000 wild turkeys to areas with suitable habitat!

Design Features:

Dimensions — the box size was designed to hold an adult turkey comfortably and to restrict movement in order to prevent the bird from injuring itself by thrashing around.

(HThe actual transport box is 3 inches taller and 3 inches wider than the replica.

Holes — The elongated holes allow for maximum breathing capacity, while being small enough to prevent the bird from entangling its legs, feet or head.

Cardboard Box — The dark confines of the box calm the bird during transit. Too much light has the tendency to excite the birds, which can result in stress and injury.

Wax Coating — The wax coating prevents the box from falling apart in wet conditions.

Interlocking Box Top — The interlocking top prevents escape during transit.

Folding Capability — The box easily folds flat so that large numbers of boxes can be transported to the trap site.

Economical — The cardboard material is relatively inexpensive compared to other materials and is lighter, foldable and, therefore, more economical to ship.
Activities:

Discuss the use and design features of the turkey transport box with your students. Allow them to view the transport box as you discuss each feature. The box can also be seen in action on the “Return of the wild Turkey” video.

1. Have students design a transport box for a wild animal of their choice. Explain to the students that they must justify the features of their transport box based on their research of this animal. Have students create an illustration or model of their transport box design. Students can present and display their designs for the class, grade level, or school!

2. **Math Connections!** — Discuss the concept of scale with your students. Explain how the turkey transport box they are seeing is a scale model of the actual box. Have students create a scale model of their transport box design.

3. **Getting Creative!** — Have students design a transport box for a fictional creature. Be sure they can justify each feature of their design!

4. **Career Extensions!** — Have students research and explore careers in engineering and design related fields.

Transport box design criteria:

- The box must protect the animal and provide for its needs while preventing the animal from injuring itself.
- The box must be designed to prevent the animal from escaping
- The box must withstand natural elements
- The box must be easy to transport
- The box must be economical

HAVE FUN!
National Wild Turkey Federation
Wild About Turkey Lesson Plan

~ SCIENCE ~

Objective:
Students will display the ability to recall the variety of scientific information included in the education box.

Materials Needed:
Teacher's Science Summary Sheet
Science Question and Answer Sheet
Display Poster to cross reference matching exercise

Background:
The wild turkey is native to the North American continent and exists in a variety of habitats throughout its range. Once abundant, wild turkey populations declined as the settlers colonized America. As the frontier moved westward throughout the 18th and 19th centuries, the vast eastern forests were cleared for agriculture and settlements. Wild turkeys almost became extinct during this time due to habitat loss and unregulated hunting. Wild turkey numbers reached their lowest numbers near the end of the 19th century. Several actions played into the comeback of wild turkeys and other wildlife in the 20th Century. First, the U.S. government passed legislation such as the Lacey Act and the Pittman Robertson Act, which enforced seasons and bag limits as well as provided funds to restore wildlife. Also, as a result of active restoration programs and research efforts by state and provincial agencies and organizations like the National Wild Turkey Federation, the wild turkey is no longer endangered and healthy populations exist in all states except Alaska.

There are only two species of turkey in the world, the North American wild turkey (Meleagris gallopavo) and the ocellated turkey (Meleagris Ocellata). The North American wild turkey is divided into five distinct subspecies: Eastern, Gould's, Merriam's, Rio Grande and the Osceola. The Eastern wild turkey is the most widely distributed and abundant of the five subspecies.

The male turkey is known as a gobbler and has a red, white and blue head. Gobblers have beards and spurs and can weigh more than 21 pounds. The female turkey is called a hen. Hens have much more subdued coloring than males, weigh about 12 pounds and usually don't have spurs or beards, although it is not rare for hens to grow beards. Young male turkeys are called jakes and young female birds are called jennys. Very young turkeys are called pouls.

Wild turkeys eat a variety of food. Acorns are probably the single most important food item in their diet. Legumes, forage plants such as peas and clover, are another food source for turkeys. Most legumes produce abundant, high-quality food. Turkeys feed on the leaves, flower heads, insects, and other invertebrates that live on the plants. Clovers are the most common legumes planted for wildlife purposes. Chufa is one of the most popular crops planted for wild turkeys. Chufa plants produce 15 to 75 fingernail-sized tubers a couple of inches under the ground. Turkeys scratch out the tubers in the fall and will continue to visit this planted area regularly until the tubers are gone or spring greenup provides another desirable food source.

Wildlife biologists and researchers study wild turkeys extensively, and one method biologists use to track turkeys is radio-telemetry. Researchers follow radio signals sent from transmitters strapped on the turkeys' backs—centered between the wings. Radio telemetry enables researchers to gather information such as where the birds are living, where they travel, how many pouls are produced, what the birds are eating and when and how specific birds die. Through this research, we can more effectively manage wild turkeys and their habitat.

Turkeys have to be carefully captured for researchers to attach the transmitters. The most common method for trapping turkeys is the use of rocket-projected nets. Nets were originally used for trapping waterfowl, however using them for turkeys allows agencies to catch larger numbers of birds for restoration and research projects.
In 1973 there were an estimated 1.3 million wild turkeys and today there are more than 5.4 million birds. Wildlife agencies, biologists, researchers, and organizations like the National Wild Turkey Federation, who are dedicated to the conservation of the wild turkey, will continue to study the wild turkey and improve its habitat so future generations can enjoy this majestic bird.

**Activities:**

**Activity 1**
View and discuss the video, “Return of the Wild Turkey,” and the background information, both provided. Divide the students into small groups, providing each group with a background information sheet and a wild turkey subspecies bulletin relevant to your area. Instruct the groups to develop a want ad to be printed in a newspaper. The want ad should be written from the perspective of a wild turkey subspecies in search of a good home. Ads should incorporate information regarding wild turkey habitat requirements, subspecies locations and physical characteristics. Stress creativity and humor. The ads, however, must incorporate factual information. Illustrations may be included. Student groups may present or share their ads with the class.

**Activity 2**
Using the “Knowing Your Wild Turkey Tom” poster as a reference, have the students draw a line from the anatomical terms to the correlating part of the turkey’s body. Have the students determine if this is a hen or a gobbler and why. Also, have the students determine if this is an adult turkey or a juvenile and how they came to that conclusion.
Question and Answer Sheet
(written answer in the space provided)

1. How many species of turkeys are there in the world and what are they?

2. Name the five subspecies of the North American turkey.

3. Name three types of food wild turkeys eat.

True or False: (circle the correct answer)
4. Radio-telemetry has been extensively used to study wild turkeys. True - False
5. Wild turkeys are captured by rocket nets and transported to areas where there are few turkeys. True - False
6. Wild turkeys are found in all 50 United States. True - False
7. The wild turkey nearly went extinct as a result of habitat loss and unregulated hunting. True - False
8. Female turkeys never have beards. True - False

Multiple Choice: (circle the correct answer)
9. Which subspecies of North American wild turkeys is the most abundant?
10. A young male turkey is called a:
    a. hen       b. gobbler       c. Jake

Answers:
1. Two — North American wild turkey, Ocellated wild turkey
2. Eastern, Gould's, Merriam's, Osceola (Florida), Rio Grande
3. acorns, legumes, insects, tubers (Chufa)
4. True
5. True
6. False — no turkeys are found in Alaska
7. True
8. False — some hens grow beards
9. a
10. c
Objective:
Students will be able to construct a turkey call and create different calls made by a hen.

Materials needed:
One 48 oz. red party cup (per student)
12" piece of yarn (per student)
One round toothpick (per student)
Set of turkey drawings (per student)
Crayons
Staples

Background:
Wild turkeys communicate just as humans do. While adult male turkeys, called “toms” or “gobblers,” are most famous for their gobble, and hens for their yelp and clucks, turkey talk consists of a variety of sounds to communicate different messages.

Some of the approximately 28 sounds, which can be heard on the enclosed multimedia CD/CD-ROM and viewed on the “Roll Call” segment of the enclosed video, include:
Yelp — a long sound made to locate young or other turkeys
Cackle — fast series of yelps hens use to call gobblers or when flying up to roost
Cluck — short notes hens make when relaxed or content
Cutting — fast series of clucks hens make when excited. Also used to call gobblers
Purr — a very soft sound hens make when relaxed or feeding
Putt — a loud clucking sound used to warn other turkeys of danger
Gobble — a sound used by male turkeys to attract a hen for mating

Activity:
1. Instruct students to place cups upside down on their desks.
2. While holding the cup steady, carefully poke a small hole in the center of the bottom of the cup with the toothpick or thumbtack.
3. Thread the yarn through the hole in the cup bottom.
4. Tie the end of the yarn sticking out of the cup’s bottom to the center of the toothpick so the toothpick anchors the yarn in place.
5. Color and cut out the turkey drawings.
6. Ask your teacher to secure the turkey drawings to the cup with a stapler.
7. Try out your new turkey call by holding the cup with one hand and tugging on the yarn with the other. Practice this movement by changing the speed and strength of each tug. (Wetting the yarn typically provides a better sound.)
8. Practice making different types of turkey sounds and have your classmates guess what you are making.

Extensions:
• Encourage the students to experiment with different string lengths and hand positions on the cup.
• Connections can also be made to the scientific concepts of sound, pitch, and vibrations.
• Ask a local NWTF volunteer to provide a turkey-calling demonstration, then have a calling contest to see which of the students make the best turkey sounds.
• Have the students design their own turkey calls from things such as straws, film canisters, balloons, rubber bands and other materials.

Note: To find out about NWTF volunteers in your area, contact nwtf@nwtf.net or call 1-800-THE-NWTF
National Wild Turkey Federation
Wild about Turkey Lesson Plan

~ Habitat Management ~

Objective: The student will learn the basic habitat components that are necessary for wild turkeys and wildlife to thrive and the importance of managing and enhancing those components for wildlife.

*Materials needed:
- Making Tracks Poster or CD ROM
- Regional Recommendations for Planting for Wild Turkeys NWTF Bulletin (CD ROM)
- Planting Legumes for Wildlife Bulletin (CD ROM)
- .10th acre (66’x66’) or smaller land opening (preferably boarding a wooded area)
- Water source: naturally occurring, bird bath, man made pond etc.
- Hoe or small tiller
- Fertilizer (as needed)
- Pesticides/herbicides (as needed)
- Seed or trees
- County or State Resource person

*This will depend on which extension activities you do.

Background:
The four basic habitat components that wildlife needs to survive are food, water, shelter and space and a sufficient quantity and quality of each. As the human population expands wildlife has less and less space in which to live. Because over 70% of the land in the United States is privately owned, proper management of private land is critical to the future of wildlife. The National Wild Turkey Federation supports scientific wildlife management on public, private and corporate lands. The Federation has several programs specifically designed to help private landowners manage their land to benefit wildlife. *Wild Turkey Woodlands* emphasizes the role private landowners play in wildlife conservation and recognizes landowners who manage their property for wild turkeys and other wildlife. These management practices allow landowners to meet their lumber needs while also enabling wildlife to thrive. The NWTF also has a variety of regional habitat programs that provide wildlife habitat on private land by focusing on regional habitat needs. For more information on these programs please visit the NWTF website at www.nwtf.org.

Planting a small wildlife opening is one of the easiest things a private land owner or school group can do to enhance habitat for wildlife. One approach to managing an opening is to plant crops, which provide abundant seed and attract insects. Crops that mature at different times during the year will provide benefits turkeys as well as other wildlife. A small piece of land will not be able to provide all of the year-round habitat needs for wild turkey, but a well managed opening can provide brood, nesting and feeding habitat if other habitat needs are located on adjacent lands.

Activity:
Using the *Making Tracks Poster* discuss what wildlife needs to survive. Referring to the poster, discuss each management practice illustrated and how each practice benefits wildlife and people. Ask students if they have ever observed any of these management practices while out in the woods or during a car ride or have used them on their own property. Explain that these practices must be done properly and responsibly in order for wildlife to thrive and people to still have their...
lumber needs met. This is called sustainable forestry. Invite a resource person to your class or arrange a field trip where students can observe and learn about these practices first hand. Divide students into groups and have each group provide a presentation on one of the management practices they researched or observed.

Extensions:
Divide students into small groups. Assign each group a regional habitat program to research and present. Compile each of the programs onto a large map that can be presented to other classes or displayed in the classroom or library.

Check to see if there is suitable space and get permission to design and create a wildlife opening on the school property. Review the Regional Recommendations or Wildlife and Planting Legumes for Wildlife Bulletins and have your students brainstorm the steps to take to create a wildlife opening. Invite your county extension officer, state wildlife agency officer, state forestry office, county natural resource conservation officer or state biologist to your class to help your students plan and coordinate this project. Have students maintain and document the wildlife that uses the opening. Your students can take this project one step further by using the opening as a teaching site for younger students or by helping other schools design and create openings!

Here are some things to think about for creating, managing and enjoying your wildlife opening:
1. Assess your space:
   (Your local agricultural extension agent can help you answer these questions)
   - Will your opening need to be cleared and mechanically tilled?
   - Are other habitat needs such a shelter and water provided on adjacent lands?
   - Will the land need be fertilized or will it need an application of herbicide before planting?
   - Will existing plants provide seeds, fruits and nuts for wildlife?
   - What types of plants would be appropriate for wildlife in your region?

2. Where to go for technical help/to buy seed
   1. Contact for seed and herbicide: NWTF, local chapter or the National office and ask for conservation programs department.
   2. Contact for soil analysis: Local Ag extension office or state wildlife office

3. Observation/Recording Decide how often to observe your food plot. Record:
   1. Plant growth
   2. Disease/insects
   3. Animal tracks

4. Do your part to improve private lands for wildlife and to replenish our natural resources. Share the management techniques you have learned with others. Let us know at the NWTF what you have learned from your project. Together we can make a difference!
APPENDIX B
July 26, 2002

Scott Stankowski
856 Oak Ridge Ln
Stevens Point, WI 54481

Subject: Use of DNR publications

Dear Scott:

As per our conversation on July 26, 2002, you have my permission to use any material relating to turkeys published by WDNR except photographs to which WDNR does not own copyright.

This material includes, but is not limited to:
- WI Turkey Hunters Guide
- Managing your land for wild turkeys
- WI wild turkey updates
- Wild turkey management and ecology in Wisconsin.

Please cite these documents as WDNR publications followed by the publication number. Thank you and good luck with your project.

Sincerely

Keith Warnke
Upland Wildlife Ecologist
June 30, 2002

Scott Stankowski
856 Oak Ridge Ln
Stevens Point, WI 54481

Dear Scott,

Thank you for your request for permission to adapt the activity Turkey Trouble in the materials you are preparing. You have permission to print Turkey Trouble with Wisconsin adaptations. The following copyright information must appear with the activity:

Copyright 1983, 1985, 1992 Council for Environmental Education. Adapted with permission from Project WILD Aquatic K-12 Curriculum & Activity Guide. The complete activity guide can be obtained by attending a Project WILD workshop. For more information, call the Wisconsin Project WILD office at 608/264-6280.

We are not granting permission for any Project WILD activities to be uploaded on to the Internet or any on-line service.

The Wisconsin WILD office is interested in printing copies of the activity and provide them to educators attending WILD workshops throughout the state.

Please call (608) 264-6282 with any questions. Thank you for including Project WILD in your efforts. We appreciate your continued support.

Sincerely,

Al Stenstrup
Wisconsin Project WILD Coordinator
Wisconsin Department of Natural Resources
Memorandum

From: Steve Bates, DNR Education Coordinator
      PO Box 167
      Columbia, SC
      29202

To: Scott Stankosky
   856 Oak Ridge Ln.
   Steven’s Point, Wisc.
   54481

Re: Permission to use “Wild About Turkey” supplement

Date: August 29, 2002

This memorandum hereby gives Scott Stankosky permission to use the “Teacher’s Guide, Turkey Trouble, South Carolina Supplement To The Project WILD Activity Turkey Trouble.”

Credit must be given where appropriate to the writer, consulting Biologists, editor, Project WILD and the South Carolina Department of Natural Resources.
June 3, 2002

Scott Stankowski
856 Oak Ridge Lane
Stevens Point, WI 54481

Dear Scott:

I am writing this letter to confirm our agreement regarding your Wild About Turkey Education Box project. I understand you have an enthusiastic team rearing to go and wanted to provide a document to outline and clarify the project at hand.

The National Wild Turkey Federation will provide payment in the amount of $1,250 upon completion of the project that includes:

- $700 honorarium for the panel of teachers who will work on this project
- $200 registration fee for the Wisconsin State Science Teachers Conference
- $110 conference mileage
- $170 conference lodging
- $70 conference meals

The NWTF is expecting you along with your panel to take the current NWTF lesson plan packet (hard copy only) and:

1. Correlate the lessons to the Wisconsin State Teaching Standards in each content area and grade level
2. Correlate the lessons to the Wisconsin State Environmental Education Standards in each content area and grade level
3. Modify and Enhance the lessons to meet the objectives of #1 and #2 and to provide a more effective learning experience for Wisconsin K-12 students.
4. Include in #1, #2 and #3, the draft for the new "Habitat Management" lesson to be included in the 2003 Wild About Turkey Education Box. (I will provide this draft)

The NWTF also expects you and your panel to:

5. Develop a Wisconsin version of the South Carolina Department of Natural Resources "Turkey Trouble Supplement for Teachers" only (NOT Project WILD's "Turkey Trouble" activity). This will require your attaining the permission of SCDNR and Project WILD. I can provide you with contact information if you need it. I recommend you simply develop a Wild Turkey Guide for Wisconsin Teachers. This would eliminate the need for Project WILD's approval and still be a very useful tool for all the lessons in the packet.

Also, we expect you to:

6. Present your project and the Wild About Turkey Education Box at the 2003 Wisconsin State Science Teachers Conference.

The NWTF expects that you will culminate this project into a paper to be turned in to your advisor, the Wisconsin University Library and a copy to keep for yourself. ANY products developed from this project.
(Wisconsin or supplemental CD-ROM, booklet, etc..) must be reviewed and approved by us and are considered property of the National Wild Turkey Federation.

Well Scott, I think that about covers it! I'm sorry to sound so official, but I want to be sure to avoid any miscommunications. Please let me know if you have any questions about this agreement. As I mentioned earlier, I'm very excited about the potential of this project for Wisconsin and for other states for which this can serve as a model.

Sincerely,

Christine K. Rolka  
Education Coordinator
To: State Chapter Presidents

From: Scott Stankowski, Chapter President; Central Wisconsin Struttin’ Toms

Greetings,

I am writing to you to request your assistance. I am a high school science teacher at Wisconsin Rapids Lincoln High School. I am currently working on my masters in Environmental Education through the University of Wisconsin-Stevens Point. As part of my degree requirements I am to create a project that involves Environmental Education. I chose to revise the current “Wild About Turkey” Education box. I will also be enhancing the curriculum by creating applicable lesson plans in a variety of topics.

What I would like from you is a list of schools or teachers that you have previously distributed the box to. I would like to find out from these teachers, what they like about the education box and what they would like to see added to it.

This is a great opportunity to enhance the NWTF’s involvement within our schools, you can contact me by the following ways:

Phone: W (715)422-7202  H (715)345-9984
Email: stankowssh@wrps.org
Address: 856 Oak Ridge Ln.
          Stevens Point, WI  54481

I thank you in advance for promoting the education of the wild turkey in our schools.
Sincerely,

Scott Stankowski
Central Wisconsin Struttin’ Toms
Wild About Turkey: Wisconsin Teacher Supplement
Welcome to the Wisconsin version of the “Wild About Turkey” Education box from the National Wild Turkey Federation. The materials found within this supplement will enable the Wisconsin educator to quickly find a lesson that they can apply into their classroom. All lessons were created by classroom teachers for classroom teachers. Each major discipline has lessons that can easily be used by you the teacher. All lessons have not only their discipline standards addressed but environmental standards addressed. Materials found within the box provide excellent resources for the teacher, especially the video, posters and bulletin boards for use with this supplement. Please share this with your colleagues and enjoy the wild turkey, Wisconsin style.

What This Supplement Contains:

Wisconsin Wild Turkey Information Supplement

Science Lesson Plans
- Eggcelent
- Feathers for Flight
- Gobble Fever
- Grindin’ Gizzards
- Population Management
- Turkey Trouble Wisconsin (Project Wild adapted)

English Lesson Plans
- I am Turkey
- Personal Narrative
- The Awe of it Poems

Math Lesson Plans
- Influencing Animals

Social Studies Lesson Plans
- Computer Turkey Hunt

Technical Education Lesson Plans
- Turkey Beard Display Board
- Peg/Slot Call Design

Art Lesson Plans
- Interpretive Turkey

K-6 Lesson Plans
- Predicting and Confirming guide
- Powerpoint –If I strategy
- Powerpoint –Dice game

Standards Addressed by lessons previously in box
- Project Wild
- NWTF

Acknowledgements:
Special thanks goes out to the following for their help, insight and contributions!
Jordan Tack; Graphic Editor
The turkey curriculum panel
Mark Larson, Lowell McCoy, Christine Rolka, Charlie Burke, Scott Slajus,
Neal Paisley for his photography.
Artwork done by author other than Jake and Snoodly courtesy of NWTF
Artwork on page 65 completed by Meredith Larsen as a student under the direction of Jeff Johannes in Advanced Drawing, Painting and Printmaking. Lincoln High School, Wisconsin Rapids. 9/02
WISCONSIN TURKEY
INFORMATION SUPPLEMENT

INTRODUCTION

"You Turkey!" This may sound quite insulting, but actually wild turkeys are one of the more interesting inhabitants of Wisconsin. Many states lost entire populations of wild turkeys before 1950 due to unregulated hunting and habitat destruction. Wisconsin was no exception, losing its turkey population in the late 1800's. In 1976, efforts were made to bring back the wild turkey to its current population.

The Project Wild activity, "Turkey Trouble!" uses the reintroduction of the Merriam's Wild Turkey (Meleagris gallopavo merriami) in Wyoming as the basis of a lesson on understanding and graphing wildlife population growth. "Turkey Trouble" can become an excellent activity using the modified lesson for Wisconsin. This guide was designed to give teachers the background to allow them to transfer the situation of "turkey trouble" to the state of Wisconsin, and to use the activity to teach students about their own state and its wildlife. Not only will this guide be helpful for turkey trouble, but all other lessons included in this supplement for Wisconsin.

HISTORY OF THE WILD TURKEY IN WISCONSIN

Historically turkeys occupied much of southern Wisconsin, south of a line from Prairie du Chein to Green Bay. The northern boundary of turkey distribution probably fluctuated in response to severe winters. Southwestern Wisconsin probably had the highest populations. It was not uncommon in 1816 for a Fox Indian to bring 20 to 30 turkeys to Prairie Du Chein for sale. In 1856 wild turkeys sold for 25 cents apiece in Lancaster (the equivalent to $5 in 2001). By 1860 wild turkeys were very rare, and they were completely gone by the late 1800s. Unregulated market hunting, widespread clearing of woodlands, and infectious diseases from domestic poultry contributed to the extirpation.
Early restoration efforts took place in 1887, 1927 and 1954-57. None of these efforts ever produced a sustainable population. Poor management techniques as well as unhealthy strains of birds were to blame for the failures. In the mid 60s birds were released in several counties. A hunting season took place in the Meadow Valley Wildlife Area. These populations were game-farm-origin turkeys and were unsuccessful in establishing themselves. They failed for several reasons including: genetic selection against wildness in game farm populations, poor survival skills, and a high incidence of disease and parasitism associated with confinement.

These experiences made it clear that successful restoration depended on acquiring some truly wild turkeys. The DNR made a joint agreement with the state of Missouri starting in 1976. In exchange for 45 turkeys we would send them 135 roughed grouse. Subsequent deals were made and a total of 334 wild turkeys were brought into Wisconsin in exchange for more than 1,000 grouse.

To accelerate restoration, these turkey populations were live trapped in areas that were showing excellent growth rates. The entire state population derived from these early successes. By the spring of 2000 Wisconsin’s turkey population had grown to over 200,000 birds.

Funding for Wisconsin’s turkey restoration program come from hunting licenses, Pittman-Robertson funds, and the National Wild Turkey Federation’s “Target 2000” program. The NWTF initiated Target 2000 in the late 1980s with the goal of restoring turkeys to all suitable habitat in the United States by the year 2000. This program coordinated turkey transplants among numerous states and established a standard reimbursement rate to cover the costs of live-trapping, handling, and transporting birds. Wisconsin shipped about 1,400 turkeys to four other states for their restoration programs just as Wisconsin benefited from Missouri turkeys. The resulting revenues let Wisconsin accelerate in-state restoration.

CLASSIFICATION
CLASS: Aves
ORDER: Galliformes
FAMILY: Meleagrididae
SCIENTIFIC NAME: Meleagris gallopavo

Only two species of wild turkey exist in the world. The Ocellated Turkey (Meleagris ocellata) exists in a 50,000 square mile area comprised of the Yucatan Peninsula of Mexico, northern Belize and the El Peten region of northern Guatemala. The second species is Meleagris gallopavo, or North American Wild Turkey.

The turkey found on modern Thanksgiving Day dinner tables purchased in the local grocery store is not the wild turkey discussed here, but rather the domestic turkey commercially raised on farms throughout the country. Students should not confuse them with the wild turkey. It is believed that the forerunner of the domestic turkey is an extinct subspecies, Meleagris gallopavo gallopavo, which was taken from Mexico by the Spanish conquerors in the 1500s and then brought back from Europe. It is thought that these turkeys were domesticated by Native Americans in Mexico between 150 BC and 400 AD.

There are five subspecies of wild turkey in the United States. The Merriam’s wild turkey has already been mentioned. The other four subspecies are Florida wild turkey (Meleagris gallopavo osceola), Gould’s wild turkey (Meleagris gallopavo mexicana), Rio Grande wild turkey (Meleagris gallopavo intermedia), and Eastern wild turkey (Meleagris gallopavo intermedia). Subspecies are distinguished mainly by coloration, body size, length of legs, and where they live.
The Merriam’s, Rio Grande, and Gould’s are generally western birds. The Florida wild turkey is found in peninsular Florida. The Eastern wild turkey is found mainly in the eastern U.S., although it has been introduced into several Midwest and western states. The Eastern wild turkey is the only subspecies found in Wisconsin.

PHYSICAL CHARACTERISTICS

The adult male, called a “gobbler” or “tom,” can grow up to 4 feet tall and weigh more than 20 pounds. Its tail feathers are chestnut brown to chocolate brown, while the breast feathers are tipped in black. The rest of the body feathers are a shiny copper/bronze color. Primary wing feathers have black and white bars, and secondary wing feathers have prominent white bars and are edged in white. This produces a white triangular area on each side of the turkey when the wings are folded back. Mature females, called “hens,” can grow almost as tall but will only weigh between 8 and 12 pounds. Their coloration is more brown and less metallic or shiny.

Both sexes have a “snood,” which is a limp appendage just above the beak and a “dewlap,” or pinkish flap of skin that hangs directly under the throat. Gobblers are usually bald, with fleshy red protuberances, called caruncles, at the base of the front of the neck and on the back of the head. Males also have a tuft of bristles, or “beard,” near the base of the neck and spurs on their legs just above the feet. Measuring the size of spurs is a good way to estimate the age of the turkey. About 10% of females may grow beards, although they are thinner and shorter. Hens may even grow spurs, but they are usually rounded and poorly developed. Another major difference between the sexes is that the female has a grey head, rather than the pinkish or white head of the gobbler, and the back of her neck has feathers.

Wild turkeys have keen eyesight. They see approximately the same distance as humans, but they can pick out minute details. They have excellent hearing, but a poor sense of smell.

One of the most surprising facts about the turkey is that they fly and have been clocked at speeds up to 55 mph. They can also run at a good clip, up to 19 mph if needed. Average walking speed is about 3 mph. Turkeys roost in trees at night, keeping predators from interrupting their rest.

The commercially raised domestic turkey looks quite different from its wild relative. Feathers are usually white, which is preferred for the “clean” appearance of the skin. Also, the birds are so round, they have difficulty flying and even walking. Efforts were made to mate wild and domestic turkeys to increase the wild population, but this was unsuccessful because the resulting offspring could not survive in the wilderness. They had lost their survival instincts and were quickly eaten by predators. This was true even if the wild turkey had only a small percentage of domestic turkey in its genetic makeup. Because of this, early wild turkey restorations were hindered by the release of pen-reared birds.

MATING, NESTING, AND BROODING

In Wisconsin, mating season begins in early April, and is signaled by the gobbling and strutting of the males, which attracts the females. There is a definite pecking order among males. Males will mate with several females, but the female chooses which gobbler will be her mate. There are no traditional “families.” The male takes no interest in nesting or raising the “poults,” or baby turkeys.
Hens become secretive when choosing a nesting site. The nest is not very complicated at first, it is usually being just a shallow depression on the ground. It takes 2 weeks for the hen to lay 10-12 eggs. The hen lays one egg per day for 10 to 14 days. She will start incubation only after all the eggs are laid, so that all the pouls will hatch at the same time. Wild turkey eggs are larger than chicken eggs, but smaller and more pointed than domestic turkey eggs. They are generally a pale creamy white with reddish-brown or chocolate colored speckles. Initially the eggs weigh about 2.5 ounces but, during incubation, will lose weight due to metabolism of the embryo and evaporation of gases and moisture through the shells microscopic pores. For this reason, the hen will turn the eggs almost hourly to allow the exchange of carbon dioxide inside the egg for fresh oxygen outside. After each egg is laid, the hen adds debris to the nest to cover the eggs. In this way, the nest is actually built while the eggs are being laid. The hen will continually incubate the eggs for 26-29 days and leave the nest only for short periods to feed.

Turkey hens begin nesting at one year-old and may nest again if their first clutch is destroyed. If the hen is disturbed while laying the eggs, she may abandon the first nest and find another suitable place to start a new nest. However, this may be delayed for two weeks. She will “dump” the egg that was ready to be laid and hold the rest inside in suspended animation for a few days. Records have shown that some hens nested four times in one year, producing 40 eggs! Unlike chickens, turkeys have a determinant number of eggs to lay and will not continue to lay eggs indefinitely if the eggs are removed from the nest.

When the pouls start pipping, the hen will make soft clucking sounds, which help the pouls to imprint on their mother. The pouls start hatching by chipping a small hole in the egg with their egg tooth. Hatching takes about 30 hours, continuing through the night regardless of weather conditions.

While the last eggs are hatching, the day-old precocial (chicks in the downy feather stage of development) pouls are already jumping around, catching flies and ants, and calling to each other. As soon as all the pouls are hatched, the hen prepares to leave the nest by calling to them. The last ones to hatch have trouble at first, because they have not had enough time to imprint on the hen and instead are fixated on the nest. Eventually they listen to the persistent hen and follow her. They never return to the nest.

If the hen and her brood leave in the morning, they may travel a mile before dark. The hen will find dense ground cover near a tree, spreading her wings to cover her brood. Pouls will roost on the ground until they are about 12 days of age. They begin flying at 12 to 14 days of age. They are soon able to fly 10 to 20 feet and roost in trees at night, just like the adults. They will stay close to their mother for the first few nights but will eventually move several feet away from her. As summer progresses, the brood spreads out, first to other branches on the same tree, then to nearby trees. By fall, the family flock may roost in an area of an acre or more.

As the juvenile turkeys grow to maturity, they go through several molts, or feather replacements. Knowing the details of these molts is helpful to hunters for aging the turkey.

Life expectancy for wild turkeys is 2-3 years, on the average, but 13 year-old turkeys have been recorded. Predators, both animal and human, and adverse weather conditions are the main reasons for a wild turkey’s death.

HABITAT
The wild turkey is essentially a forest species. In Wisconsin they can be found as far north as Bayfield. Highest densities are located in the southeastern and central parts of the state. (see map).

Food
Adult wild turkeys prefer plant matter, which composes about 90% of their diet. However, the eating habits change seasonally, depending on the availability of food. Mast makes up a major portion of their diet, particularly during the fall and winter. Mast is the “fruit” that drops from trees and bushes and covers the ground. Hard mast includes acorns, beechnuts, and pecans. Soft mast includes grapes, dogwood berries, cherries, and several other types of berries. Grass, forage (clover, grasses, and sedges), magnolia and sweetgum seeds, oats, corn, soybeans and wheat also add to their plant diet. Animal matter includes grasshoppers, millipedes and insect larva.
Insects are the most important food item for the young poults, comprising approximately 90% of their spring and summer diet.

Dairy farms are another important resource, especially in winter. Turkeys seek out unharvested crops, waste grain, and undigested corn and plant remains in spread manure. During periods of deep snow, when scratching for food is difficult, spread manure can be a life saver. When snow prevents farmers from spreading manure, turkeys may seek waste grain in barnyards, undigested material in manure piles, and corn in cribs or fodder stacks.

Seed heads on plants that stand above the snow can also supply winter nourishment. In addition, turkeys will feed on the fruits of a variety of plants exposed above the snow. Current efforts made by landowners to over winter crops is also helpful.

**Water**

Turkeys use open streams, ponds and prepared water holes. They need two or more sources of permanent open water per square mile of range, which is not a problem for the Eastern wild turkey in Wisconsin.

**Shelter**

Cover is extremely important to the wild turkey, especially when nesting. They prefer the borders between woodlands and fields, where there is low groundcover for nesting, but not so dense that the turkey has trouble detecting predators. The trees are used for roosting at night and for the mast deposited on the ground. Heavy forest cover, such as hardwoods, and pines, are preferred, often near water. The corridors along streams are convenient for travel, feeding, and roosting.

**Space**

Surprisingly, the annual range of many wild turkeys is less than 1,000 acres! They are not migratory. Most Eastern wild turkeys live out their lives and die within five miles of their hatching site. Typical daily movement from one end of the home range to the other is often less than two miles. However, there are records of turkeys moving 12 miles within one year.

**MORTALITY FACTORS**

**Predators**

As soon as the eggs are laid, they are in danger from predators seeking a tasty meal. Skunks, crows, ravens, snakes, opossums, raccoons, rodents, dogs, and coyotes are prime patrons of the nest while the hen is off feeding. Only half of wild turkey nests successfully hatch. The poult which hatch are then vulnerable to the predators mentioned above as well as hawks, owls, foxes, and larger predators such as eagles. Because of predators, as well as other factors such as weather and straying, only half of all poult live beyond three weeks. Turkey eggs, poult, and even adults are not the normal diet for these predators, however. Where turkeys have optimum ground cover and where habitat favors small mammals like rats and mice (the main staple of most predators' diet), predation of turkeys is reduced. As predator-prey relationships are part of the natural “balance” in nature, attempting to reduce the number of predators of turkeys would only upset delicate food chains, resulting in further problems.

**Diseases and Parasites**

Wild turkeys have several kinds of harmless tapeworms, roundworms, and smaller blood parasites that do not hinder their survival. However, two diseases are cause for concern. **Avian Pox** is an infectious, contagious disease belonging to the genus Avipoxvirus. This disease may infect any order of birds, including domestic and wild turkeys. Poxviruses infect the epithelial tissues resulting in wart-like growths, usually on unfeathered areas like the head, legs, feet, eyelids, margins of the beak, and in the mouth, crop, and upper respiratory tract. Mortality depends on the severity and location of the lesions and how debilitating it becomes to the turkey. Transmission is through contact with damaged epithelium or through insect vectors, which is why the disease occurs frequently during peak mosquito activity. Clinical signs include emaciation, weakness, respiratory distress, and blindness. Control and prevention is difficult, but it is extremely important to check for infected turkeys before they are released into new locations.

**Blackhead Disease** has caused more havoc in the domestic turkey business than any other disease, and is also an important disease of the wild turkey,
although it is not common. Technically called Histomoniasis, it is caused by a protozoan parasite called Histomonas meleagridis. Signs of infection include sulfur-colored droppings, lethargy, drooping wings, weakness or emaciation. The birds will close their eyes and hold their head close to their body. Lesions occur internally, causing necrosis of the liver. Transmission of the disease is dependent upon a parasitic roundworm, which is an intermediate host, and is spread through droppings. Another intermediate host is the earthworm. The important point to remember is that controlling the spreading of the disease depends on careful observation of birds which may be transported to new locations. Pen-raised birds should never be mixed with their wild relatives. Ring-necked pheasants and chickens should also be isolated from wild turkeys because they rarely become sick with the disease and will serve as unsuspected carriers.

Hunting

Though unregulated hunting and habitat loss almost drove the wild turkey to extinction, the Pittman-Robertson Act, the National Wild Turkey Federation's Target 2000 program, and excellent hunting policies by the states have helped to secure the wild turkey's future.

In Wisconsin, hunters of age 12 and older must apply for a turkey permit. In the spring they must select 1 of 42 zones and 1 of 6 five day time periods which run from Wednesday through Sunday. Hunters may hunt one half hour before sunrise until 5 pm. Upon receipt of a permit, hunters must purchase a turkey hunting license and a turkey stamp or possess a conservation patrons license. Shotguns, muzzleloader shotguns and bows and arrows are permitted. All other methods and weapons of taking turkeys are prohibited. Baiting turkeys is strictly banned as well as shooting of turkeys from a vehicle. Electronic callers and dogs are also prohibited. The bag limit is one bearded bird or gobble per permit in the spring. The fall season lasts approximately a month and a separate license must be purchased. Males or females may be taken in the fall. A regulations brochure for each season with detailed regulation is published. Hunters should refer to those regulations before hunting in Wisconsin. Turkey hunting is strictly managed in Wisconsin as in other states and birds must be taken to registration stations upon harvesting.

Weather

The weather plays an important role in the survival of the turkeys in Wisconsin. Turkeys are able to survive in temperatures below -40 F if they find enough food. The birds metabolic rate will speed up if the temperature drops below -50 F and more food is needed. Snow depths in excess of 10-12 inches can also hamper a turkeys ability to survive. If the snow is soft or wet the birds will find it difficult to walk and will spend more energy. Warm days in the winter may also help with snow, as the snow may harden, allowing the birds to walk atop of the crust. In extreme climatic situations turkeys will stay on the roost for most of the day conserving valuable energy reserves.

Habitat Deficiencies

Two of the main threats to wild turkey habitat are large, severe forest fires and destruction by the expansion of human populations into their land. Though once more prevalent, both of these are now slowly being curbed by improvements in management practices. More and more natural land is being preserved, landowners are more conscientious of wildlife on their property, and the benefits of forest fires are more understood so they can be better controlled.

flock of turkeys without harming them. Today,
MANAGEMENT

Wild turkeys are opportunistic feeders, eating whatever is available when it is available. Their menu is diverse. One study done in Virginia, in which the crops and gizzards of 537 turkeys were examined, found that the turkeys used 354 species of plants and 313 species of invertebrates.

Bulletins listing plants suitable to enhance wild turkey habitat are available from the NWTF and the WDNR. These are listed in the Resource section of this guide. Careful attention needs to be given to types of small plants and trees as well as the combinations of ages of trees, so that food will always be available at all times of the year.

One particularly interesting plant used to attract turkeys and enhance turkey habitat is called chufa or "Turkey Gold." Turkeys readily come to a chufa patch and use it for several months. It usually has to be replanted each spring. Chufa is an African variety of a native nutsedge (which can be a problem weed in some areas). The 1 to 3 feet tall foliage of the chufa is not utilized by wildlife; the tasty part of the plant is the small, nut-like tubers under the ground. These are scratched out beginning in the fall after the foliage has turned brown, and serve as food for the turkey throughout the winter. The tubers are high in carbohydrates and protein keeping the turkeys strong and healthy. Chufa patches that have been dug up by turkeys remind some observers of craters on the moon.

Another management technique that is very important for wildlife in Wisconsin is called Prescribed Burning. This involves burning the low groundcover in forests on 3 to 5 year cycles, but avoiding the nesting and brood rearing seasons from March to June. Burning improves nutrition of understory plants, stimulates fruit production, and maintains open understories. Turkeys prefer the fresh growth resulting from these burns. This also produces rich insect crops for summer and fall feeding. Prescribed burning is also valuable to all landowners because it reduces the danger of destructive wildfires. By burning undergrowth, fires have less to "feed" on and will not spread as quickly. This was an unfortunate problem that occurred in Florida in the summer of 1998, in which entire counties had to be evacuated until the fires were under control.

TURKEY RESTORATION

So, how are those turkeys shipped to other locations in Wisconsin or out of state? Are they easy to catch? One early method used was called a pole trap and was originated by Native Americans. This involved stacking poles up to 8 feet high on four sides and covering with netting. Bait was put inside and a funnel-type entrance was constructed. These traps caught turkeys, but they were difficult to construct and inflexible.

Trap net setup for capturing Wild Turkeys (N. Paisley)
The cannon-net technique proved to be an effective way of capturing turkeys. This was originally developed in Missouri in 1948 to catch waterfowl. The cannon net was first used in 1951 on the Francis Marion National Forest. A net concealed on the ground was remotely fired, propelling by 3 or 4 black-powder cannons which pulled the net over a cannon-nets have been replaced by rocket-nets, because they are easier to use, and faster.

The trapped turkeys are carefully placed individually into transport boxes for travel to their released at the new location. Within 3-4 years, there may be 400-500 turkeys produced as a result of just one relocation. The National Wild Turkey Federation provides these boxes to wildlife agencies.

It was previously mentioned that attempts to cross wild and domestic turkeys to increase wild turkey stock were failures. Another idea was to raise the wild turkeys in pens under ideal conditions and then release them after the stock had built up. This, too, failed because the hen was unable to teach the poult survival techniques, such as searching for food and avoiding predators. When the turkeys were released, they either starved or were easily caught by other animals.

TURKEY LORE
Wild turkeys were an important part of Native American history. The meat was a staple of many Indian tribes, with some exceptions. The Cheyennes would not eat the turkey for fear it would make them cowardly, probably because of the turkey’s habit of running away quickly when threatened. The Papago and Apache also considered the turkey timid and would not even use the feathers. Some tribes would not eat the bird, even in famine, because it was feared this might anger the deities.

Turkey feathers were important in the ritual manufacture of prayer sticks, masks, and headdresses, and were also used by priests while conducting various rites. Feathers were also believed to bring rain, provide protection, and battle evil spirits. Many other tribes, though, incorporated the turkey in their religious ceremonies. It was considered sacred and had to be cooked in specific ways.

Many tribes duplicated the turkey’s motions during various ceremonies. Comanche, Choctaw, Delaware, and Seminole dancers imitated turkeys. Sioux and Chickasaw women were sure that turkeys caused illness and tried to gain favor with a special dance.

Some strange beliefs are associated with the turkey. Did you know that it was once thought that the bird could make warts disappear? Using a white turkey feather, remove grease from the wheel of a wagon drawn by a white mule. Rub the greased feather on the wart for three days at exactly 3:30 p.m. sharp and the wart will fall off.

Turkeys can predict the weather, according to some. New England farmers claim the Eastern wild turkeys are forecasting a storm if they stand with their backs to the wind. Midwesterners believe that if a turkey perches on the top of a building, cold weather is on the way.

The word “turkey” has been associated with all sorts of unusual, sometimes unpleasant things. If a person is flushed with anger, he is “red as a turkey cock.” You can “strut like a turkey,” be as “shy as a turkey,” or “poorer than a turkey in summer.” However, you can do the “turkey trot” or merrily dance to “Turkey in the Straw.” In the sport of bowling, three strikes in a row is a “turkey”.

While selecting a National bird to represent the United States, the turkey was highly considered. A last minute decision by President Roosevelt changed that to the bald eagle. Just think, the US seal may have been permanently etched with a struttin’ tom. So, let’s talk turkey!

ACKNOWLEDGEMENTS
This guide was brought to you with the help of the National Wild Turkey Federation, The Wisconsin Department of Natural Resources and the South Carolina Department of Natural Resources (SCDNR).

The Wisconsin Turkey Information Supplement is a modified version of the South Carolina DNR supplement for Turkey Trouble in the ‘Wild About Turkey’ education box materials. The author of the guide Sharon L. Donovan and contributors Dave Bauman of the SCDNR and Bryan J. Burhans a
biologist for the NWTF compiled the guide for the NWTF.

All materials related to Wisconsin are from the Wisconsin Department of Natural Resources. The DNR publication, 'Wild Turkey, Ecology and Management in Wisconsin' by John F. Kubisiak, Robert E. Rolley, R. Neal Paisley and Robert G. Wright was used.

Contributing photographs are from R. Neal Paisley.

The author would like to thank the above for the contributions to this guide.

To contact the nearest NWTF representative please call the closest director nearest you.
1. Charley Burke (608) 634-3886 Southwest
2. Shawn Dickey (262) 862-1105 Northeast
3. Scott Slajus (715) 849-8824 Northcentral

Regional biologist - Dave Neu (920) 969-9570 or contact the National Office

Wisconsin DNR
Keith Warnke (608) 264-6023

For opportunities in art contests, literary contests, and calling contests contact the above people.

The state NWTF convention is held usually in late January or early February and contains the afore mentioned contests.
EGGCELENT

OBJECTIVES:
Students will: 1) Identify the makeup of an egg 2) Examine different types of egg laying and their advantages and disadvantages

METHOD
Students will take a close look at eggs.

BACKGROUND
All birds hatch from eggs, which are laid by female birds. A male bird must fertilize an egg in order to produce offspring. The fertilization must be done before the shell surrounds the egg. Female birds typically produce an egg every twenty-five hours. The egg is released by the ovary and begins to develop layers of albumin, after which the hard shell is produced.

Development of the embryo does not begin until incubation occurs. A turkey may lay a clutch as large as fourteen eggs. The first egg that was laid sits in a state of dormancy in the nest for up to fourteen days. The mother typically will rotate the eggs several times a day to insure proper heating of the eggs uniformly. Once incubation begins the vigil usually lasts until the eggs are hatched. This way all the eggs will be hatched on the same day. Success rates of nests hatching varies, typically dependent on the predator population of an area. Fox, badgers, skunks, raccoons, large snakes, opossums and mink are main contributors to nest predation. Turkeys may renest if time allows, and will typically only do so once. The egg is comprised of an embryo that is attached to the yolk. The yolk provides nourishment for the embryo. Surrounding the yolk is the albumin, which gives a cushion for the growing bird. The embryo and yolk are suspended in the middle of the egg by the chalazae, a ligament that runs from either end of the egg. A thin layer of tissue is between the albumin and the shell; you will also find an air space within this area. The shell itself is slightly porous to allow for gas exchange and is comprised of calcium carbonate.
Chicken eggs from the grocery store are unfertilized eggs. To obtain fertilized eggs, contact a local chicken farmer.

MATERIALS
Chicken eggs, flashlights, petri dishes

PROCEDURE
Task 1:
1. Obtain an egg from a teacher, observe the egg and draw a picture of it.
2. Place the egg in one hand and turn your flashlight on, place the light against the egg and look into the egg. You should be able to identify the yolk, if the egg is fertilized you should also see an embryo developing.
3. If the egg is from the grocery store, crack it open into the petri dish. Draw what you see, identify the yolk, chalazae and albumin.
4. Answer the questions on the attached sheet.

EXTENSIONS
1. Take a solution of 1M acetic acid or vinegar and place an egg overnight in it. It will dissolve the shell, resulting in what is called an addled egg.
2. Discuss with students the adaptations that birds make in types of egg laying, discuss determinant vs. in determinant egg laying. Discuss with students the advantages and disadvantages of precocial chicks vs. altricial chicks.
3. Look at the egg cartons, have students develop cartons for the future to prevent egg damage.
4. Design carriers for an egg-dropping contest from the bleachers in the gymnasium.
5. Discuss how turkeys lay eggs and nest, and discuss nest predation.

EVALUATION
1. Create a model of an egg, including all of the various parts of the egg.
2. Answer the following questions in the space provided.

STUDENT CONCLUSION QUESTIONS
1. Why would you feed a chicken broken pieces of clamshells? Discuss how this helps the bird survive.
2. What is the purpose of a turkey laying its eggs once a day and not incubating them until the final egg is laid? What are the advantages and disadvantages of this?
3. What is the largest cell in the animal kingdom? Explain.
4. What is the purpose of the albumin and yolk in a bird?
5. Compare and contrast a completely different organism that lays eggs. How is it similar to a bird and how is it different?
6. What are the advantages and disadvantages of laying eggs compared to development within the mother?
ACADEMIC STANDARDS ADDRESSED

SCIENCE

12TH GRADE STANDARDS

A.12.3 Give examples that show how partial systems, models, and explanations are used to give quick and reasonable solutions that are accurate enough for basic needs

A.12.6 Identify and replace inaccurate personal models and explanations of science-related phenomena using evidence learned or discovered

C.12.1 When studying science content, ask questions suggested by current social issues, scientific literature, and observations of phenomena; build hypotheses that might answer some of these questions; design possible investigations; and describe results that might emerge from such investigations

C.12.2 Identify issues from an area of science study, write questions that could be investigated, review previous research on these questions, and design and conduct responsible and safe investigations to help answer the questions

C.12.5 Use the explanations and models found in the earth and space, life and environmental, and physical sciences to develop likely explanations for the results of their investigations

F.12.1 Evaluate the normal structures and the general and special functions of cells in single-celled and multiple-celled organisms

F.12.12 Trace how the sensory and nervous systems of various organisms react to the internal and external environment and transmit to survival or learning stimuli to cause changes in behavior or responses

8TH GRADE STANDARDS

A.8.4 Collect evidence to show that models developed as explanations for events were (and are) based on the evidence available to scientists at the time.

A.8.5 Show how models and explanations, based on systems, were changed as new evidence accumulated (the effects of constancy, evolution, change, and measurement should all be part of these explanations)

A.8.6 Use models and explanations to predict actions and events in the natural world

A.8.7 Design real or thought investigations to test the usefulness and

B.8.3 Explain how the general rules of science apply to the development and use of evidence in science investigations, model-making, and applications limitations of a model

C.8.1 Identify questions they can investigate using resources and equipment they have available

C.8.5 Use accepted scientific knowledge, models, and theories to

C.8.6 State what they have learned from investigations, relating their inferences to scientific knowledge and to data they have collected explain their results and to raise further questions about their investigations

F.8.1 Understand the structure and function of cells, organs, tissues, organ systems, and whole organisms

F.8.2 Show how organisms have adapted structures to match their functions, providing means of encouraging individual and group survival within specific environments

F.8.4 Investigate and explain that heredity is comprised of the characteristic traits found in genes within the cell of an organism

F.8.5 Show how different structures both reproduce and pass on characteristics of their group

ENVIRONMENTAL EDUCATION

A.8.1 Identify environmental issue questions that can be investigated using resources and equipment available (see SC Inquiry; LA Research)

B.8.10 Explain and cite examples of how humans shape the environment

B.8.15 Analyze how people impact their environment through resource use

B.12.9 Evaluate ways in which technology has expanded our ability to alter the environment and its capacity to support humans and other living organisms
FEATHERS FOR FLIGHT

OBJECTIVES:
Students will: 1) Identify the makeup of a feather 2) Determine the purpose of feathers for flight

METHOD
Students will take a close look at feathers.

BACKGROUND
The feather is what gives the bird its’ distinguishing characteristics. Feathers are made of a strong protein called keratin. The feather is made up of a hollow shaft. Branching off of the shaft are barbs. Branching off of the barbs are two groups of structures. On one side are hooks and the other are barbules. Together they interlock much the same way Velcro does. (See diagram). A bird spends countless hours preening its’ feathers in order to make sure that these junctions are ‘zipped up’.

A bird has three main types of feathers. They are down, contour, and flight feathers. Down feathers lack hooks, thus giving them an unzipped appearance. This allows them to trap more air, keeping the bird warm. Contour feathers are on a bird to give it a streamlined appearance that helps with the aerodynamics of flight. These feathers are often brightly colored on males to attract a mate; on females they are often drab in color for better camouflage. Finally, the flight feathers are located on the wings and tail. These strong feathers allow the bird to lift and maneuver easily in the air.

Bird feathers are dead just like your hair. They do not typically continue to grow, but molt twice a year to replace old, worn or damaged feathers.
The feathers from one turkey should be more than adequate for a classroom set. Because hen contour feathers are buff colored at the ends it may be a good idea to have both male and female feathers. Feathers can be obtained from a turkey hunter. Contact your local NWTF chapter if it is difficult to find a donor.

MATERIALS
Variety of feathers, dissecting microscopes, magnifying lenses, strips of Velcro

PROCEDURE
Task 1:
1. Obtain the three types of feathers from your teacher. Draw each of them and label the shaft, and vane.
2. Place the feather under the microscope and observe. Identify the barbules and hooks, and sketch a picture of what you see. Notice the lack of hooks on the down feather.
3. Take each feather and measure its mass.
4. Flap each feather in the air, which one do you think supports flight the best? Why?

EXTENSIONS
1. A turkey's beard is also made of feathers. Take a closer look at them. What is their purpose? How do they vary from the other groups of feathers? How are they similar?
2. Are feathers the only adaptation that birds have for flight? Take a closer look at the lungs and bone structure of a bird.

EVALUATION
Drawings of the three different types of feathers with all applicable parts labeled.

STUDENT CONCLUSION QUESTION:
1. What are the functions of the three different types of feathers?

2. Why, in the same species of birds, are the colors of the male's feathers different than the females?

3. Compare the barbules and hooks of a feather and explain how this design led to the invention of Velcro.
4. What other inventions do you think may have been inspired by birds?

5. What other adaptations have allowed birds to evolve and survive?

ACADEMIC STANDARDS ADDRESSED

SCIENCE

12TH GRADE STANDARDS:
A.12.6 Identify* and replace inaccurate personal models* and explanations* of science-related phenomena using evidence* learned or discovered
A.12.7 Re-examine the evidence* and reasoning that led to conclusions drawn from investigations*, using the science themes*
B.12.4 Show* how basic research and applied research contribute to new discoveries, inventions, and applications
B.12.5 Explain* how science is based on assumptions about the natural world and themes* that describe the natural world
C.12.2 Identify* issues from an area of science study, write questions that could be investigated*, review previous research on these questions, and design and conduct responsible and safe investigations to help answer the questions
F.12.5 Understand* the theory of evolution*, natural selection, and biological classification
F.12.6 Using concepts of evolution* and heredity, account for changes* in species and the diversity of species, include the influence of these changes on science, e.g., breeding of plants or animals

8TH GRADE STANDARDS:
C.8.3 Design and safely conduct investigations* that provide reliable quantitative or qualitative data, as appropriate, to answer their questions
C.8.5 Use accepted scientific knowledge, models*, and theories* to explain* their results and to raise further questions about their investigations*
C.8.6 State what they have learned from investigations*, relating their inferences* to scientific knowledge and to data they have collected
C.8.11 Raise further questions which still need to be answered
F.8.2 Show* how organisms have adapted structures to match their functions*, providing means of encouraging individual and group survival within specific environments
F.8.7 Understand* that an organism's behavior evolves through adaptation to its environment
G.8.7 Show* evidence* of how science and technology are interdependent, using some examples drawn from personally conducted investigations*
Environmental Education

A.8.1 Identify environmental issues* questions that can be investigated using resources and equipment available (see SC Inquiry; LA Research)
B.8.10 Explain and cite examples of how humans shape the environment
B.8.15 Analyze how people impact their environment through resource use
B.12.9 Evaluate ways in which technology has expanded our ability to alter the environment and its capacity to support humans and other living organisms
GOBBLE FEVER

OBJECTIVES:
Students will: 1) Analyze and graph two distinct groups of variables to look for similarities and differences
2) describe factors that affect the amount of gobbling in a spring season.

METHOD
Students will go into the field, record data and make conclusions based off of data

BACKGROUND
The male turkey makes a distinct gobbling call to attract a mate. This call can be heard year round but is
most often heard during the spring breeding season. Starting around March and ending in June the amount
of gobbling varies depending on several unidentifiable factors. These factors may include the time of year,
temperature, cloud cover, wind speed, and time of day. It may also be due to the location or the
temperment of the bird. Studies have shown that gobbling typically peaks a week before peek breeding
and a week after.

Typically gobbling will start at first light. The tom, will gobble off the roost (up in trees) to let the hens know
where he is. Once it gets light enough out the gobbler will fly down and may begin gobbling again. A typical
tom will not gobble if he has ample hens around and they respond to him either by soft calling or simply
following him around.

In this lesson students will go out to a predetermined location where turkey are evident.
Arrival and departure are determined by the teacher. Typical start time would be one half hour before light
until 7 or 8 a.m.. Locations may be the school forest, local or state public lands or a local landowner.

MATERIALS
Paper; clip board, graph paper; pencils

PROCEDURE
Task 1:
1. Students will arrive at a predetermined location before sunrise to begin recording gobbling.
2. Find a comfortable location to avoid any unnecessary movement as turkeys may be nearby.
3. Record # of gobbles in 10 minute intervals. If possible record number of birds gobbling and direction
   that they are in.
4. Continue to record until time has expired. Leave the woods wearing blaze orange.
5. Repeat as often as necessary, every day, every other day etc. for a given period of time.
Task 2:
1. Select another variable to record during the experiment. See background info above.
Task 3:
1. Graph both sets of data on separate graphs. Compare data and look for similarities and differences
   between the two. Draw conclusions based on this data

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EXTENSIONS
1. Compile data on a yearly basis and compare data obtained from those years.
2. Locate another school doing a similar study, compare data with them, schools may be located in a different part of the state or a completely different state including a different sub-species of turkey.
3. This survey can be done with any bird, especially the sandhill crane or any songbird.
4. Have students create a turkey gobbling contest.

EVALUATION
Graphs should contain the following information: title, x axis labeled, y axis labeled, plots graphed as appropriate, accuracy, neatness.

Students should compare and contrast sets of data and make conclusions based off of the data. Either they believe that there is a correlation or there isn’t.

STUDENTS NEED TO BE ACCOMPANIED BY A TEACHER or CHAPERONE DURING OBSERVATION TIMES.

If you are located on public or private hunting areas, hunters may be out. Avoid wearing colors that are identifiable with the tom turkey. BLUES, REDS and WHITES should be avoided. Wear blaze orange while walking to and away from observation location and display blaze orange if someone approaches site.

ACADEMIC STANDARDS ADDRESSED

SCIENCE
A.12.6 Identify* and replace inaccurate personal models* and explanations* of science-related phenomena using evidence* learned or discovered
A.12.7 Re-examine the evidence* and reasoning that led to conclusions drawn from investigations*, using the science themes*
C.12.2 Identify* issues from an area of science study, write questions that could be investigated*, review previous research on these questions, and design and conduct responsible and safe investigations to help answer the questions
C.12.3 Evaluate* the data collected during an investigation*, critique the data-collection procedures and results, and suggest ways to make any needed improvements
F.12.7 Investigate* how organisms both cooperate and compete in ecosystems
F.12.12 Trace how the sensory and nervous systems* of various organisms react to the internal and external environment and transmit survival or learning stimuli to cause changes in behavior or responses

ENVIRONMENTAL EDUCATION
A.4.1 Make observations, ask questions and plan environmental investigations* (see Science [SC] Inquiry; English/Language Arts [LA] Research)
A.4.2 Collect information, make predictions, and offer explanations about questions asked (see: SC Inquiry)
A.4.3 Develop answers, draw conclusions, and revise their personal understanding as needed based on their investigations* (see SC Inquiry)
A.4.4 Communicate their understanding to others in simple terms (see LA Writing)
A.8.1 Identify environmental issue* questions that can be investigated using resources and equipment available (see SC Inquiry; LA Research)
A.8.2 Collect information from a variety of resources, conduct experiments, and develop possible solutions to their investigations*
A.8.3 Use techniques such as modeling and simulating to organize information gathered in their investigations* (see Mathematics [MA] Process)
A.8.4 Use critical-thinking strategies to interpret and analyze gathered information (see SC Inquiry)
A.8.5 Use the results of their investigations* to develop answers, draw conclusions, and revise their personal understanding
A.8.6 Communicate the results of investigations* by using a variety of media and logically defend their answers (see LA Writing; Math [MA] Process)

A.12.1 Identify questions that require skilled investigation* to solve current problems* cited in literature, media, or observed through personal observations (see LA Research)
A.12.2 Suggest possible investigations* and describe the results that might emerge from the investigations* (see SC Inquiry)
A.12.3 Evaluate personal investigations* and those of others, critiquing procedures, results, and sources of data and suggest improvements to the investigation* (see LA Research; MA Process)
A.12.4 State and interpret their results accurately and consider other explanations for their results (see LA Writing)
A.12.5 Communicate the results of their investigations* to groups concerned with the issue* (see LA Oral Language)
B.8.8 Explain interactions among organisms or populations of organisms
B.12.6 Predict population response to changes* in environmental conditions
C.8.2 Use environmental monitoring techniques; such as, observations, chemical analysis, and computer mapping software to collect data about environmental problems* (see LA Media and Technology; MA Measurement)
## Observing and Recording Turkey Variables

### Data Table A

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Average:
GRINDIN’ GIZZARDS

OBJECTIVES:
Students will: 1) Identify the digestive functions of a gizzard and associating organs 2) Determine the food sources and habitat that the turkey is located in based on gizzard contents.

METHOD
Students will dissect gizzards of a bird.

BACKGROUND
All birds have similar digestive tracts. The pathway of digestion begins with the mouth, followed by the pharynx and then the esophagus. Next is the crop, which is used to store food while the bird eats. This allows the bird to gorge itself and then digest its food as needed in a safe environment. Following the crop is the gizzard. The gizzard is a strong muscular organ that grinds food. The gizzard also contains bits of grit, sand and pebbles that help grind up the food. After the food has been ground up it enters the midgut and then the hindgut. The intestines follow, finishing at the cloaca.

Gizzard contents vary depending on the habitat and the type of the bird. This muscle has the ability to grind up a wide variety of foods including bones, seeds and nuts.

Obtain turkey gizzards from students whose families hunt, offer extra credit to these students. You may do this lab with a variety of birds, such as turkey, duck, pheasant, grouse, or chicken. You may have a student or local supplier that raises chickens, this is an excellent source of gizzards.

MATERIALS
Scalpel, probe, dissection pan dissection pins, gloves.

PROCEDURE
Task 1:
1. Students will collect the necessary lab equipment
2. Obtain a gizzard from the instructor.
3. Observe the outside of the gizzard, write down a description of it, and draw it.
4. Take the scalpel and begin to cut the gizzard in half laterally. The muscle is tough so be careful. Grab the gizzard between the thumb and index finger and hold it down on the pan. Cut the gizzard away from fingers in a downward motion.
5. Observe the contents of the gizzard, and try to identify the type of food that the bird may have been eating. Record the contents of your findings.
6. Dispose of the gizzards and contents as according to your instructor.
7. Clean up dissection materials.
8. Hand in your report, containing the following information.
   a. an internal and external drawing of the gizzard
   b. a list of contents from the gizzard
   c. answers to the following questions, written in complete sentences.

EXTENSIONS
1. Identify the location in which the bird was harvested, and analyze the vegetation in the area.
2. Based on your findings of the turkey gizzard, create a new product or bird food that could be sold.
3. Write a short story about the day-and-life of a bird, including some of the things you learned about the birds diet.
4. Create a model of the intestinal track of a bird to help explain the digestive process.

EVALUATION QUESTION
1. What is the tube that is connected to the gizzard? Where does it lead?

2. What did you find in your gizzard? What does this explain about the lifestyle or habitat location of the bird.

3. Lately, state hunting regulations make it illegal to hunt with lead shot. Non-toxic shot is required to hunt in many areas. Explain why this law is here in association with the gizzards.
ACADEMIC STANDARDS ADDRESSED
SCIENCE

12TH GRADE STANDARDS:
A.12.1 Apply* the underlying themes* of science to develop defensible visions of the future
A.12.3 Give examples that show* how partial systems*, models*, and explanations* are used to give quick and reasonable solutions that are accurate enough for basic needs
A.12.6 Identify* and replace inaccurate personal models* and explanations* of science-related phenomena using evidence* learned or discovered
A.12.7 Re-examine the evidence* and reasoning that led to conclusions drawn from investigations*, using the science themes*
B.12.5 Explain* how science is based on assumptions about the natural world and themes* that describe the natural world
C.12.2 Identify* issues from an area of science study, write questions that could be investigated*, review previous research on these questions, and design and conduct responsible and safe investigations to help answer the questions
F.12.8 Using the science themes*, infer* changes in ecosystems prompted by the introduction of new species, environmental conditions, chemicals, and air, water, or earth pollution
F.12.9 Using the science themes*, investigate* energy* systems* (related to food chains) to show* how energy is stored in food (plants and animals) and how energy is released by digestion and metabolism
F.12.10 Understand* the impact of energy* on organisms in living systems*
F.12.11 Investigate* how the complexity and organization* of organisms accommodates the need for obtaining, transforming, transporting, releasing, and eliminating the matter and energy* used to sustain an organism
G.12.2 Design, build, evaluate, and revise models* and explanations related to the earth and space, life and environmental, and physical sciences
H.12.2 Evaluate* proposed policy recommendations (local, state, and/or national) in science and technology for validity, evidence, reasoning, and implications, both short and long term

8TH GRADE STANDARDS:
C.8.1 Identify* questions they can investigate* using resources and equipment they have available
C.8.3 Design and safely conduct investigations* that provide reliable quantitative or qualitative data, as appropriate, to answer their question
C.8.4 Use inferences* to help decide possible results of their investigations, use observations to check their inferences
C.8.5 Use accepted scientific knowledge, models*, and theories* to explain* their results and to raise further questions about their investigations*
C.8.6 State what they have learned from investigations*, relating their inferences* to scientific knowledge and to data they have collected
F.8.1 Understand* the structure and function* of cells, organs, tissues, organ systems, and whole organisms
F.8.2 Show* how organisms have adapted structures to match their functions*, providing means of encouraging individual and group survival within specific environments
F.8.7 Understand* that an organism's behavior evolves through adaptation to its environment
Environmental Education

A.8.1 Identify environmental issue* questions that can be investigated using resources and equipment available (see SC Inquiry; LA Research)

B.8.10 Explain and cite examples of how humans shape the environment

B.8.15 Analyze how people impact their environment through resource use

B.12.9 Evaluate ways in which technology has expanded our ability to alter the environment and its capacity to support humans and other living organisms
Population Management

OBJECTIVES:
Students will: 1) Evaluate the roles of players involved in management decisions. 2) Assess past population and management trends in evaluating current populations. 3) Explain their position through a debate.

METHOD
Students will investigate the roles of players involved in turkey management and assess the current population and make management decisions in regards to hunting regulations. Students will then share their opinions in what they have discovered in a class debate.

BACKGROUND
The wild turkey in Wisconsin has been a remarkable story. Starting from nothing in 1976, to current population estimates. Management of the turkey has taken on a dynamic attitude in changing practices throughout the state.

Currently the state has a spring and fall hunting season, please refer to the teachers guide for the framework of these seasons. When assessing the permits issued game managers look at several variables including gobbling census, brood counts, winter severity index, location, previous hunter success and carrying capacity. There are two main types of carrying capacity. Biological carrying capacity is the population that can be held by the habitat indefinitely without doing damage to other populations. Social carrying capacity is the number of organisms that humans can put up. Numbers between the two are rarely similar. In this exercise students will decide what the framework of the season will be for next season that will insure proper game management. Factors to consider include maintaining species numbers within carrying capacity both biological and social. Quality of hunt is a major consideration which includes success rates and hunter perception. Many other states provide a different framework other than what Wisconsin provides.

The debate should be student led. It is of the utmost importance that students have ample time to research their player and understand the background of not only their players but others as well. (A good offense always has a good defense)

MATERIALS
DNR website- www.dnr.state.wi. Click on hunting, then wild turkey, then population harvests and permits issued for fall and spring season.
Hard copy of turkey hunting regulations obtained from any licensing outlet.
PROCEDURE

Task 1:
1. Students will investigate the turkey hunting season and structure in Wisconsin.
2. Students will investigate the role a certain player has in regards to the wild turkey.

Players include:

a. I.M. Hunter—is a hunter who enjoys hunting all types of game including deer and turkeys.
b. Jake Gobbler—is a hunter who exclusively hunts turkeys and wants the opportunity to shoot more.
c. Buck Shooter—is a hunter who believes the turkey push out the deer and lower deer populations and his/her chance in shooting a deer.
d. Sam E. Public—is the local dnr biologist who wants to ensure population numbers are well monitored.
   He has a plan in place primarily based off of numerical models.
e. Bob B. Watchynyou—is the local dnr warden who wants to ensure a safe and successful hunt.
f. I. C. Cardinal—Loves to bird watch, and understands the role that a hunter has in managing the populations.
g. Pete/Patti Aa—Loves animals in general and can't understand why anyone would want to hurt such pretty animals.
h. John/Jan Dhere—is a farmer who allows others to hunt turkeys on his land, although he doesn't hunt he feels that turkeys don't do any harm to his fields and likes watching them come to his corn crib in the winter months.
i. Ma/ Pa Nure—is a farmer who also allows all hunters to hunt turkeys on his land, in fact he has been known to encourage a hunter to shoot more than one. He believes that the turkey ruins his fields, and eats too much out of his winter corn cribs.
j. Tom/Tammy Struttin—is president of a local chapter of the National Wild Turkey Federation and believes that proper game management is crucial in the survival of the turkey. This person also believes that they can enhance habitat by planting crops for wildlife and fruit bearing trees.
k. Andy Cashing—Owns a local sports shop and is selling more and more turkey hunting equipment.
l. Hank/Harriet Helper—Represents Wheelin’ Sportsman, a group which promotes handicapped hunters opportunities to hunt. This person wants to maintain hunts for the handicapped.
m. Guy/Gail Corn—Owns a local feed mill and believes that hunters should be allowed to bait turkeys and hunt using bait.
n. Ford/Freida Akids—Believes that the NWTF’s JAKES program is a great way to introduce kids into hunting and wants to see a statewide weekend hunt for juniors prior to the regular turkey season.
o. J.C. Apple—is a teacher who can’t take off during the week and wants the season structure changed to a weekend start date to accommodate the working person.
p. Connie Foney—Believes that the season should end at 12:00 noon to allow turkeys time to breed and provide less interference from hunters.

Task 2:
After investigating their players, students will get in a class debate and discuss their viewpoints and try to come to a consensus in population and season decisions.

Task 3:
Finally students will write down their decisions in permit levels and explain their reasoning as to how they came to their decision.
EXTENSIONS
1. Invite a local game manager from your local dnr station and ask them to explain their techniques in analyzing a population and predicting management techniques.
2. Have some real fun and let student's role play and dress as their player's part.
3. Evaluate the Whitetail deer herd in Wisconsin both pre-CWD and post CWD era.
4. Attend your local spring fish and game hearings and report back to your class on what happened at the forum.

EVALUATION
Students will be evaluated on the quality of their debate, as referred to by the following rubric. Teachers may also wish to accompany this with a written plan derived from the students.

ACADEMIC STANDARDS ADDRESSED

SCIENCE
A.4.2 When faced with a science-related problem, decide what evidence*, models*, or explanations* previously studied can be used to better understand* what is happening now.
A.4.3 When investigating* a science-related problem, decide what data can be collected to determine the most useful explanations*
A.4.4 When studying science-related problems, decide which of the science themes* are important
A.4.5 When studying a science-related problem, decide what changes* over time are occurring or have occurred
A.8.3 Defend explanations* and models* by collecting and organizing evidence* that supports them and critique explanations and models by collecting and organizing evidence that conflicts with them
A.8.4 Collect evidence* to show* that models* developed as explanations* for events were (and are) based on the evidence available to scientists at the time
A.8.5 Show* how models* and explanations*, based on systems*, were changed as new evidence* accumulated (the effects of constancy*, evolution*, change*, and measurement* should all be part of these explanations)
A.8.6 Use models* and explanations* to predict* actions and events in the natural world
A.12.1 Apply* the underlying themes* of science to develop defensible visions of the future
A.12.2 Show* how conflicting assumptions about science themes* lead to different opinions and decisions about evolution*, health, population, longevity, education, and use of resources, and show* how these opinions and decisions have diverse effects on an individual, a community, and a country, both now and in the future
A.12.3 Give examples that show* how partial systems*, models*, and explanations* are used to give quick and reasonable solutions that are accurate enough for basic needs
A.12.4 Construct* arguments that show* how conflicting models* and explanations* of events can start with similar evidence*
A.12.5 Show* how the ideas and themes* of science can be used to make real-life decisions about careers, work places, life-styles, and use of resources
A.12.6 Identify* and, using evidence* learned or discovered, replace inaccurate personal models* and explanations* of science-related events
A.12.7 Re-examine the evidence* and reasoning that led to conclusions drawn from investigations*, using the science themes*
B.4.1 Use encyclopedias, source books, texts, computers, teachers, parents, other adults, journals, popular press, and various other sources, to help answer science-related questions and plan investigations
B.8.6 Explain* the ways in which scientific knowledge is useful and also limited when applied to social issues
C.4.3 Select multiple sources of information to help answer questions selected for classroom investigations*
C.4.6 Communicate the results of their investigations* in ways their audiences will understand by using charts, graphs,
drawings, written descriptions, and various other means, to display their answers
C.4.7 Support their conclusions with logical arguments
C.4.8 Ask additional questions that might help focus or further an investigation*
C.8.4 Use inferences* to help decide possible results of their investigations, use observations to check their inferences
C.8.5 Use accepted scientific knowledge, models*, and theories* to explain* their results and to raise further questions about their investigations*
C.8.6 State what they have learned from investigations*, relating their inferences* to scientific knowledge and to data they have collected
C.8.7 Explain* their data and conclusions in ways that allow an audience to understand the questions they selected for investigation* and the answers they have developed
C.8.8 Use computer software and other technologies to organize, process, and present their data
C.8.9 Evaluate*, explain*, and defend the validity of questions, hypotheses, and conclusions to their investigations*
C.8.10 Discuss the importance of their results and implications of their work with peers, teachers, and other adults
C.8.11 Raise further questions which still need to be answered
C.12.7 Evaluate* articles and reports in the popular press, in scientific journals, on television, and on the Internet, using criteria related to accuracy, degree of error, sampling, treatment of data, and other standards of experimental design
G.8.5 Investigate* a specific local problem to which there has been a scientific or technological solution, including proposals for alternative courses of action, the choices that were made, reasons for the choices, any new problems created, and subsequent community satisfaction
G.12.5 Choose a specific problem in our society, identify* alternative scientific or technological solutions to that problem and argue it merits
H.4.4 Develop* a list of issues that citizens must make decisions about and describe* a strategy for becoming informed about the science behind these issues
H.8.1 Evaluate* the scientific evidence* used in various media (for example, television, radio, Internet, popular press, and scientific journals) to address a social issue, using criteria of accuracy, logic, bias, relevance of data, and credibility of sources
H.8.2 Present a scientific solution to a problem involving the earth and space, life and environmental, or physical sciences and participate in a consensus-building discussion to arrive at a group decision
H.8.3 Understand* the consequences of decisions affecting personal health and safety
H.12.1 Using the science themes* and knowledge of the earth and space, life and environmental, and physical sciences, analyze* the costs, risks, benefits, and consequences of a proposal concerning resource management in the community and determine the potential impact of the proposal on life in the community and the region
H.12.2 Evaluate* proposed policy recommendations (local, state, and/or national) in science and technology for validity, evidence, reasoning, and implications, both short and long-term
H.12.3 Show* how policy decisions in science depend on social values, ethics, beliefs, and time-frames as well as considerations of science and technology
H.12.4 Advocate a solution or combination of solutions to a problem in science or technology
H.12.5 Investigate* how current plans or proposals concerning resource management, scientific knowledge, or technological development will have an impact on the environment, ecology, and quality of life in a community or region
H.12.6 Evaluate* data and sources of information when using scientific information to make decisions
H.12.7 When making decisions, construct a plan that includes the use of current scientific knowledge and scientific reasoning

ENVIRONMENTAL EDUCATION
A.4.2 Collect information, make predictions, and offer explanations about questions asked (see: SC Inquiry)
A.4.3 Develop answers, draw conclusions, and revise their personal understanding as needed based on their investigations* (see SC Inquiry)
A.4.4 Communicate their understanding to others in simple terms (see LA Writing)
A.8.4 Use critical-thinking strategies to interpret and analyze gathered information (see SC Inquiry)
A.8.5 Use the results of their investigations* to develop answers, draw conclusions, and revise their personal understanding
A.8.6 Communicate the results of investigations* by using a variety of media and logically defend their answers (see LA Writing: Math [MA] Process)
A.12.2 Identify questions that require skilled investigation* to solve current problems* cited in literature, media, or observed through personal observations (see LA Research)
A.12.2 Suggest possible investigations* and describe the results that might emerge from the investigations* (see SC Inquiry)
B.4.11 List jobs in the community that result from or are influenced by processing and using natural resources*
B.8.9 Explain how the environment is perceived differently by various cultures* (see
SC Nature of Science
B.8.10 Explain and cite examples of how humans shape the environment
B.8.12 Provide examples of how different cultures* use natural resources reflecting the economic, aesthetic, and other values* of that culture
B.8.15 Analyze how people impact their environment through resource use
B.8.22 Identify careers related to natural resources* and environmental concerns* (see SC Applications)
B.8.23 Identify governmental and private agencies responsible for environmental protection and natural resource* management
B.12.4 Analyze the factors that determine the number of organisms that can exist in a given area
B.12.10 Identify and evaluate multiple uses of natural resources* and how society* is influenced by the availability of these resources
B.12.11 Assess how changes in the availability and use of natural resources* (especially water and energy* sources) will affect society and human activities; such as, transportation, agricultural systems, manufacturing
B.12.12 Evaluate the environmental and societal costs and benefits of allocating resources in various ways and identify management strategies to maintain economic and environmental sustainability* (see SC Earth and Space Science)
B.12.13 Analyze how different political and governmental systems manage resource development, distribution, consumption, and waste* disposal (see SS Political Science and Citizenship: Power, Authority, Governance, and Responsibility)
B.12.21 Research the roles of various careers related to natural resource* management and other environmental fields (see SC Applications)
C.4.1 Identify environmental problems and issues (see SS Political Science and Citizenship: Power, Authority, Governance, and Responsibility)
C.4.2 Apply ideas of past, present, and future to specific environmental issues (see SC Connections)
C.4.3 Identify people and groups of people that are involved in the issue
C.4.4 Identify some of the decisions and actions related to the issue
C.4.5 Identify proposed solutions to the issue and discuss arguments for and against the issue
C.8.1 Define and provide examples of environmental issues*, explaining the role of beliefs*, attitudes, and values* (see SS Political Science and Citizenship: Power, Authority, Governance, and Responsibility)
C.8.3 Use questioning and analysis skills to determine beliefs, attitudes, and values held by people involved in an environmental issue
C.8.4 Evaluate the credibility of information, recognizing social, economic, political, environmental, technological, and educational influences (see LA Writing)
C.12.2 Explain the factors that contribute to the development of individual and societal values* (see SS The Behavioral Sciences: Individuals, Institutions, and Society)
C.12.3 Maintain a historical perspective when researching environmental issues*; include past, present, and future considerations (see SC Connections)
C.12.4 Identify the strengths and weaknesses of different approaches to investigating an environmental issue* and identify some of the assumptions for each approach
D.4.6 Develop a plan, either individually or in a group, to preserve the local environment
D.8.1 Identify options for addressing an environmental issue* and evaluate the consequences of each option
D.8.2 List the advantages and disadvantages of short-term and long-term solutions to an environmental issue* or problem*
D.8.7 Identify examples of how personal beliefs* can influence environmental decisions
D.8.8 Give examples of education, economic, and government institutions' influence on an environmental issue*, and the role of citizens* in policy formation (see SS Political Science and Citizenship: Power, Authority, Governance, and Responsibility)
D.12.1 Identify a variety of approaches to environmental issues*, evaluate the consequences of each, and select and defend a position
D.12.4 Describe the rights and responsibilities of citizenship in regard to environmental problems* and issues* (see LA Oral Language)
D.12.6 Identify and analyze examples of the impact beliefs* and values* have on environmental decisions

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D.12.7 Analyze political, educational, economic, and governmental influences on environmental issues,* and identify the role of citizens* in policy formation (see SS Political Science and Citizenship: Power, Authority, Governance, and Responsibility)

E.4.1 Identify and describe examples of their environmental civic responsibilities and the actions they take to meet them

E.4.2 Understand how their personal actions impact their civic responsibilities toward the environment (see SS Political Science and Citizenship: Power, Authority, Governance, and Responsibility)

E.8.2 Explain the importance of characteristics (such as, trust, patience, self-discipline, respect, and open-mindedness) that enable people to function together to resolve environmental issues*

E.12.2 Write a plan of action based on personal goals of stewardship* for an economically and ecologically sustainable* environment

Assigned topic: ___________________________ Name: ___________________________

**Content:**

<table>
<thead>
<tr>
<th>Good</th>
<th>Excellent</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Information was well researched.</td>
<td>2 3 4 5</td>
</tr>
<tr>
<td>2. Sources of information were cited in your research.</td>
<td>2 3 4 5</td>
</tr>
</tbody>
</table>

Comments:

**Notes/Handout:**

| 1. Notecards and materials were handed in. | 4 6 8 10 |
| 2. The notes included three main points for debate. | 2 3 4 5 |

Comments:

**Organization:**

| 1. Notes were organized. | 2 3 4 5 |
| 2. Presentation was planned and organized. | 2 3 4 5 |

Comments:

**Quality of Visual Aids:**

| 1. PowerPoint, overhead, display boards etc., visible and organized. | 2 3 4 5 |

Comments:

**Presentation Skills:**

| 1. Appropriate presentation skills were demonstrated During the debate. | 23 4 5 |
| 2. Prepared to answer questions during the debate. | 23 4 5 |

Comments:
TURKEY TROUBLE

OBJECTIVES:
Students will: 1) define and give examples of exponential and linear growth rates in wildlife populations in Wisconsin and 2) describe factors that affect and limit growth of wildlife populations.

METHOD
Students will make computations and interpret results.

BACKGROUND
Growth rates can be characterized by two different growth curves: linear and exponential.

Linear growth occurs at a constant rate. Many increases or decreases occur at linear rates. An example of this would be having your salary increase by $1000 per year.

Exponential growth occurs at an increasing rate through time. An example would be having your salary increase (or decrease) at a rate of 5% per year.

Since all populations have the reproductive potential to increase at an exponential rate, it is difficult to comprehend the gravity of problems associated with population growth. Population is limited by many factors, including availability and quality of water, food, shelter, and territory, as well as natural and human-made changes in habitat.

As an example, in 1976, Wisconsin had no Eastern turkeys within its borders. A decision was made to exchange roughed grouse to Missouri for Turkeys. 46 turkeys were planted in the Bad Axe watershed in Vernon County. This activity will provide students with the opportunity to compute the possible growth of the turkey population during its first five years after planting. As background students, should recognize that, in reality, these turkeys will be affected by many natural and human caused limiting-factors. For example, growth of bird populations is effected by factors such as the availability of food, water, shelter and space; disease; predation; climatic conditions; as well as broken or infertile eggs.

The major purpose of this activity is for students to acquire a working knowledge of some factors affecting wildlife populations.

MATERIALS
Paper; graph paper; pencils

PROCEDURE
Task 1
Compute the size of Eastern Turkey populations in Wisconsin for five years, using the following
assumptions. Complete the data table.
1. None of the turkeys left the general area during the five years.
2. There was no disease or shortage of habitat that limited the population.
3. There was an equal number of males and females in each hatch.
4. All sexually mature females successfully hatched a clutch of ten eggs each year.
5. No turkeys reproduced until after they have completed one full year of life.
6. All turkeys died during the winter after their fifth year of life (after hatching their fourth clutch.)
7. All of the turkeys introduced were one year old and sexually mature.
8. There was an equal number of males and females in the original number of 46 turkeys which were planted.

Task 2
Plot the population against the five years on a graph using the x axis as years and y axis as the turkey population. Use a full sheet of paper for the graph, making it as large as the paper allows.

Task 3
Compute the size of the population of Wisconsin's turkeys using a linear growth model for five years based on the following assumptions. Complete the data table.
Assumptions:
1. 230 offspring were produced by the turkey population each year.
2. None of the turkeys left the area.
3. There was no disease or shortage of habitat that limited the population.

Task 4
Plot the data from Task 3 on the same graph used in Task 2.

Task 5
Discuss the following questions as related to the previous tasks:
1. In the examples given, which growth patterns appear to be increasing at a faster rate? Why?
2. The estimate for the true population of the Eastern turkey by the Wisconsin Department of Natural Resources at the end of five years was 2,500. How can we account for the difference? Were any of the original assumptions incorrect? Which ones?
3. All populations have the potential to increase at an exponential rate. What factors limit this potential?

EXTENSIONS
1. Transfer this to a similar situation using the whitetail deer or another Wisconsin animal. Get background information and data from a local wildlife agency.
2. This activity does not address the consequences—potentially beneficial, harmful, or with no appreciable effect—of introducing or reintroducing species to an area. Introduction of non-native species in particular may have negative consequences for other wildlife and the environment.

EVALUATION
1. On an island, a rabbit population is doubling every year for six years. If you started with one pair (one male and one female), what would the population number after six years? This is an example of what type of population?
2. A population of pine martens is increasing by two members per year. If you started with two animals, what would the population be after six years? This is an example of what type of population growth?

3. List three natural limiting factors that could effect the growth of a rabbit population.

BE SURE TO TELL STUDENTS TO DO EACH YEAR FOR DATA BEFORE MOVING TO THE NEXT YEAR.

FOR EXTRA HELP WITH EXTENSION #2- There are several exotic invasive species in Wisconsin. They include the spiny water flea, the zebra mussel, timothy grass, Eurasian millfoil, sea lamprey, purple loosestrife, white perch, Asian lady beetle, carp.

Please visit the website: http://www.dnr.state.wi.us for more information.

There are some exotic species which have not been invasive and have contribute to the states economy. They include the ring necked pheasant, coho and chinook salmon, alewife, rainbow trout.

WISCONSIN STATE STANDARDS ADDRESSED

SCIENCE

A.8.6 Use models* and explanations* to predict* actions and events in the natural world
C.8.5 Use accepted scientific knowledge, models*, and theories* to explain* their results and to raise further questions about their investigations*
C.8.6 State what they have learned from investigations*, relating their inferences* to scientific knowledge and to data they have collected
C.8.7 Explain* their data and conclusions in ways that allow an audience to understand the questions they selected for investigation* and the answers they have developed
C.8.10 Discuss the importance of their results and implications of their work with peers, teachers, and other adults
C.8.11 Raise further questions which still need to be answered
C.12.3 Evaluate* the data collected during an investigation*, critique the data-collection procedures and results, and suggest ways to make any needed improvements
C.12.4 During investigations*, choose the best data-collection procedures and materials available, use them competently, and calculate the degree of precision of the resulting data
F.8.9 Explain* how some of the changes* on the earth are contributing to changes in the balance of life and affecting the survival or population growth of certain species
F.8.10 Project how current trends in human resource use and population growth will influence the natural environment, and show how current policies affect those trends.
F.12.7 Investigate* how organisms both cooperate and compete in ecosystems
F.12.8 Using the science themes*, infer* changes in ecosystems prompted by the introduction of new species, environmental conditions, chemicals, and air, water, or earth pollution
G.12.4 Show* how a major scientific or technological change has had an impact on work, leisure, or the home
G.12.5 Choose a specific problem in our society, identify* alternative scientific or technological solutions to that problem and argue it merits
H.12.3 Show* how policy decisions in science depend on social values, ethics, beliefs, and time-frames as well as considerations of science and technology
H.12.4 Advocate a solution or combination of solutions to a problem in science or technology
H.12.5 Investigate* how current plans or proposals concerning resource management, scientific knowledge, or technological development will have an impact on the environment, ecology, and quality of life in a community or region
H.12.6 Evaluate* data and sources of information when using scientific information to make decisions

Mathematics

A.12.1 Use reason and logic to

- evaluate information
- perceive patterns
- identify relationships
- formulate questions, pose problems, and make and test conjectures
- pursue ideas that lead to further understanding and deeper insight

A.12.2 Communicate logical arguments and clearly show
- why a result does or does not make sense
- why the reasoning is or is not valid
- an understanding of the difference between examples that support a conjecture and a proof of the conjecture

A.12.6 Read and understand
- mathematical texts and other instructional materials
- writing about mathematics (e.g., articles in journals) mathematical ideas as they are used in other contexts

B.12.4 In problem-solving situations involving the application of different number systems (natural, integers, rational*, real*) select and use appropriate
- computational procedures
- properties (e.g., commutativity*, associativity*, inverses*)
- modes of representation (e.g., rationals as repeating decimals, indicated roots as fractional exponents)

B.12.5 Create and critically evaluate numerical arguments presented in a variety of classroom and real-world situations (e.g., political, economic, scientific, social)

B.12.6 Routinely assess the acceptable limits of error when
- evaluating strategies
- testing the reasonableness of results
- using technology to carry out computations

D.12.2 Select and use tools with appropriate degree of precision to determine measurements directly* within specified degrees of accuracy and error (tolerance)

D.12.3 Determine measurements indirectly*, using
- estimation
- proportional reasoning, including those involving squaring and cubing

E.12.1 Work with data in the context of real-world situations by
- formulating hypotheses that lead to collection and analysis of one- and two-variable data
- designing a data collection plan that considers random sampling, control groups, the role of assumptions, etc.
- conducting an investigation based on that plan
- using technology to generate displays, summary statistics*, and presentations

E.12.2 Organize and display data from statistical investigations using
E.12.3 Interpret and analyze information from organized and displayed data when given
- measures of dispersion*, including standard deviation and variance
- measures of reliability
- measures of correlation*

E.12.4 Analyze, evaluate, and critique the methods and conclusions of statistical experiments reported in journals, magazines, news media, advertising, etc.

E.12.5 Determine the likelihood of occurrence of complex events by
- using a variety of strategies (e.g., combinations*) to identify possible outcomes
- conducting an experiment
- designing and conducting simulations*
- applying theoretical probability

F.12.2 Use mathematical functions* (e.g., linear*, exponential*, quadratic*, power) in a variety of ways, including
- recognizing that a variety of mathematical and real-world phenomena can be modeled* by the same type of function
- translating different forms of representing them (e.g., tables, graphs, functional notation*, formulas)
- describing the relationships among variable quantities in a problem
- using appropriate technology to interpret properties of their graphical representations (e.g., intercepts, slopes, rates of change, changes in rates of change, maximum*, minimum*)

F.12.4 Model and solve a variety of mathematical and real-world problems by using algebraic expressions, equations, and inequalities

ENVIRONMENTAL EDUCATION
A.8.4 Use critical-thinking strategies to interpret and analyze gathered information (see SC Inquiry)
A.8.5 Use the results of their investigations* to develop answers, draw conclusions, and revise their personal understanding
A.12.4 State and interpret their results accurately and consider other explanations for their results (see LA Writing)
B.12.4 Analyze the factors that determine the number of organisms that can exist in a given area
B.12.5 Analyze past and current trends in ecosystem* degradation and species extinction (see SC Earth and Space Science)
B.12.6 Predict population response to changes* in environmental conditions
### Appendix A  Exponential Growth Rates

#### Breeding Population Data Table

<table>
<thead>
<tr>
<th>Year</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Total Turkey Population</td>
<td>46</td>
<td>276</td>
<td>506</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(Total turkey populations from Previous year)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Last Year's Hatch</td>
<td>0</td>
<td>230</td>
<td>230</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(Adolescent turkeys)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(Not Yet Breeding)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Death By Old Age</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>46</td>
<td>230</td>
</tr>
<tr>
<td># of turkeys that are 5-yrs. Old</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Total Breeding Population</td>
<td>46</td>
<td>46</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(Adult Turkeys)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Subtract the # of adolescent and dead turkeys from the total population</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. Breeding Pairs</td>
<td>23</td>
<td>23</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(Female Turkeys)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total Breeding Population (above)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Divided by 2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. Number Of Offspring</td>
<td>230</td>
<td>230</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(Baby Turkeys)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Each female can have 10 offspring</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td># Breeding pairs x 10 eggs/ clutch</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7. Adult Turkeys</td>
<td>46</td>
<td>46</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Breeding Population</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8. Adolescent Turkeys</td>
<td>0</td>
<td>230</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Last Year's Hatch</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9. Total Turkey Population</td>
<td>276</td>
<td>506</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Add the # of baby, adult and adolescent turkeys</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Appendix B  Linear Growth Rates

<table>
<thead>
<tr>
<th>Year</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Turkey Population</td>
<td>46</td>
<td>276</td>
<td>506</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Previous Year's Total # of Turkeys</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yearly Hatch</td>
<td>230</td>
<td>230</td>
<td>230</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td># Of Turkeys Born Yearly</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total Turkey Population</td>
<td>276</td>
<td>506</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>= The Summation Of The Columns</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
## Student Data Tables for Turkey Populations (Teacher)

### Appendix A

#### Exponential Growth Rates

<table>
<thead>
<tr>
<th>Breeding Population Data Table</th>
<th>Year</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Total Turkey Population</td>
<td></td>
<td>46</td>
<td>276</td>
<td>506</td>
<td>1886</td>
<td>4416</td>
<td>13570</td>
</tr>
<tr>
<td></td>
<td></td>
<td>276</td>
<td>506</td>
<td>1886</td>
<td>4416</td>
<td>13570</td>
<td>46</td>
</tr>
<tr>
<td>2. Last Years Hatch (Adolescent turkeys)</td>
<td></td>
<td>0</td>
<td>230</td>
<td>230</td>
<td>1380</td>
<td>2530</td>
<td>9200</td>
</tr>
<tr>
<td>(Not Yet Breeding)</td>
<td></td>
<td>230</td>
<td>230</td>
<td>1380</td>
<td>2530</td>
<td>9200</td>
<td>46</td>
</tr>
<tr>
<td>3. Death By Old Age (# of turkeys that are 5-yrs. Old)</td>
<td></td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>46</td>
<td>230</td>
</tr>
<tr>
<td>4. Total Breeding Population (Adult Turkeys)</td>
<td></td>
<td>46</td>
<td>46</td>
<td>276</td>
<td>506</td>
<td>1840</td>
<td>4140</td>
</tr>
<tr>
<td>Subtract the # of adolescent and dead turkeys from the total population</td>
<td></td>
<td>46</td>
<td>46</td>
<td>276</td>
<td>506</td>
<td>1840</td>
<td>4140</td>
</tr>
<tr>
<td>5. Breeding Pairs (Female Turkeys)</td>
<td></td>
<td>23</td>
<td>23</td>
<td>138</td>
<td>253</td>
<td>920</td>
<td>2070</td>
</tr>
<tr>
<td>Total Breeding Population (above) Divided by 2</td>
<td></td>
<td>23</td>
<td>23</td>
<td>138</td>
<td>253</td>
<td>920</td>
<td>2070</td>
</tr>
<tr>
<td>6. Number Of Offspring (Baby Turkeys)</td>
<td></td>
<td>230</td>
<td>230</td>
<td>1380</td>
<td>2530</td>
<td>9200</td>
<td>20700</td>
</tr>
<tr>
<td>Each female can have 10 offspring # Breeding pairs x 10 eggs/clutch</td>
<td></td>
<td>230</td>
<td>230</td>
<td>1380</td>
<td>2530</td>
<td>9200</td>
<td>20700</td>
</tr>
<tr>
<td>7. Adult Turkeys</td>
<td></td>
<td>46</td>
<td>46</td>
<td>276</td>
<td>506</td>
<td>1840</td>
<td>4140</td>
</tr>
<tr>
<td>Breeding Population</td>
<td></td>
<td>46</td>
<td>46</td>
<td>276</td>
<td>506</td>
<td>1840</td>
<td>4140</td>
</tr>
<tr>
<td>8. Adolescent Turkeys</td>
<td></td>
<td>0</td>
<td>230</td>
<td>230</td>
<td>1380</td>
<td>2530</td>
<td>9200</td>
</tr>
<tr>
<td>Last Years Hatch</td>
<td></td>
<td>0</td>
<td>230</td>
<td>230</td>
<td>1380</td>
<td>2530</td>
<td>9200</td>
</tr>
<tr>
<td>9. Total Turkey Population</td>
<td></td>
<td>276</td>
<td>506</td>
<td>1886</td>
<td>4416</td>
<td>13570</td>
<td>34040</td>
</tr>
<tr>
<td>Add the # of baby, adult and adolescent turkeys</td>
<td></td>
<td>276</td>
<td>506</td>
<td>1886</td>
<td>4416</td>
<td>13570</td>
<td>34040</td>
</tr>
</tbody>
</table>

### Appendix B

#### Linear Growth Rates

<table>
<thead>
<tr>
<th>Year</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Turkey Population (Previous Year's Total # of Turkeys)</td>
<td>46</td>
<td>276</td>
<td>506</td>
<td>736</td>
<td>966</td>
<td>1196</td>
</tr>
<tr>
<td>Yearly Hatch # Of Turkeys Born Yearly</td>
<td>230</td>
<td>230</td>
<td>230</td>
<td>230</td>
<td>230</td>
<td>230</td>
</tr>
<tr>
<td>Total Turkey Population = The Summation Of The Columns</td>
<td>276</td>
<td>506</td>
<td>736</td>
<td>966</td>
<td>1196</td>
<td>1426</td>
</tr>
</tbody>
</table>
"I AM" A TURKEY POEM

OBJECTIVE:
Students will demonstrate their understanding of everything they have learned about wild turkeys by writing an "I Am" poem.

METHOD:
Students will write a 15 line poem following a standard format.

BACKGROUND:
Students should do this activity as one of the culminating projects to this unit. They will utilize all the information they have learned and apply their understanding to produce a factually accurate poem.

MATERIALS:
Paper, pencils, computers

PROCEDURE:
1. Students will review through group discussion everything they have learned about wild turkeys.
2. Following the poem template, students will individually write their own poems.
3. Forming editing groups, students will edit and critique other students' poems.
4. Following the editing process, students will use the computer to create an attractive final version of their poems. Students are required to include a computer graphic.
5. Students will deliver a reading of their poems individually in front of the class.
6. Students should seek opportunities to publish their poems in such venues as school and/or local newspapers, literary and/or children magazines, and posting them within the school building.

EXTENSIONS:
1. Students will be able to transfer this procedure to the knowledge or understanding they have about other wild animals.
2. Students will understand how everyday subjects can become topics for their writing.

EVALUATION:
1. Each line of the poem should match the expectations of the template.
2. Proper grammar should be used throughout the poem.
3. The final printout should be eye appealing.
"I AM" A TURKEY POEM TEMPLATE

I AM (a “TURKEY” or give your turkey a name in capital letters)
I have (three characteristics of a turkey)
I want (an actual desire of a turkey)
I feel (something a turkey feels with an explanation)
I AM (a “TURKEY” or give your turkey a name in capital letters)

I AM (a “TURKEY” or give your turkey a name in capital letters)
I need (three needs of a turkey)
I live (an actual habitat of a turkey)
I try (something a turkey tries with an explanation)
I AM (a “TURKEY” or give your turkey a name in capital letters)

I AM (a “TURKEY” or give your turkey a name in capital letters)
I eat (three things a turkey eats)
I look (an actual look of a turkey)
I do (something a turkey does with an explanation)
I AM (a “TURKEY” or give your turkey a name in capital letters)
WISCONSIN STATE STANDARDS ADDRESSED

English

B.12.1 Create or produce writing to communicate with different audiences for a variety of purposes

2 Compose and publish analytic and reflective writing that conveys knowledge, experience, insights, and opinions to an intended audience

8 Write in a variety of situations (impromptu, over time, in collaboration, alone) and adapt strategies, such as revision, technology, and the use of reference materials, to the situation

9 Use a variety of writing technologies, including pen and paper as well as computers

10 Write for a variety of readers, including peers, teachers, and other adults, adapting content, style, and structure to audience and situation

C.12.1 Prepare and deliver formal oral presentations appropriate to specific purposes and audiences

5 Demonstrate confidence and poise during presentations, interacting effectively with the audience, and selecting language and gestures mindful of their effect

9 Speak fluently with varied inflection and effective eye contact, enunciating clearly at an appropriate rate and volume

10 Observe the appropriate etiquette when expressing thanks and receiving praise

D.12.1 Develop their vocabulary and ability to use words, phrases, idioms, and various grammatical structures as a means of improving communication

3 Use language appropriate to the background, knowledge, and age of an audience

4 Recognize and exercise options in modes of expression and choice of words when speaking and writing, especially when revising written work

E.12.1 Use computers to acquire, organize, analyze, and communicate information

1 Design, format, and produce attractive word-processed documents for various purposes

3 Integrate graphics appropriately into reports, newsletters, and other documents

4 Retrieve and reproduce documents across various platforms

Environmental Education

A.4.4 Communicate their understanding to others in simple terms (see LA Writing)

E.12.1 Articulate their personal beliefs* regarding their relationship to the environment (see LA Oral Language)
PERSONAL NON-FICTION NARRATIVE

OBJECTIVE:
Students will demonstrate their understanding of themselves and their ability to creatively write biographical narratives.

METHOD:
Students will write a two-page personal narrative of an outdoor experience.

BACKGROUND:
Students should do this activity as one of the culminating projects to this unit. They will utilize all the information they have learned and apply their understanding to produce a personal narrative.

MATERIALS:
Paper, pencils, computers.

PROCEDURE:
1. Students will review through group discussion everything they have learned about wild turkeys.
2. Students will discuss in groups various experiences they have had outdoors either hiking, camping, hunting, etc.
3. Students will individually write rough drafts of a real personal experience they have had outdoors involving turkeys incorporating any information they learned from this unit. (If a student has not had such an experience, any outdoor experience will do.)
4. Forming editing groups, students will edit and critique other students' narratives.
5. Following the editing process, students will use the computer to create an attractive final version of their narratives.
6. Students will deliver a reading of their narratives individually in front of the class.
7. Students should seek opportunities to publish their narratives in such venues as school and/or local newspapers, literary and/or children magazines, and posting them within the school building.

EXTENSIONS:
1. Students will be able to transfer this writing process to the knowledge or understanding they have about other forms of writing.
2. Students will understand how everyday subjects can become topics for their writing.
EVALUATION:
1. The final narrative should have a clear purpose, maintain a consistent point of view, follow a logical sequence, use effective description and details.
2. Proper grammar should be used throughout the narrative.
3. The final printout should be eye appealing.

WISCONSIN STATE STANDARDS ADDRESSED

English
B.12.1 Create or produce writing to communicate with different audiences for a variety of purposes
  2 Compose and publish analytic and reflective writing that conveys knowledge, experience, insights, and opinions to an intended audience
  6 Write autobiographical and biographical narratives in a mature style characterized by suitable vocabulary, descriptive detail, effective syntax, an appropriate voice, a variety of sentence structures, clear coordination and subordination of ideas, and rhetorical devices that help establish tone and reinforce meaning
  8 Write in a variety of situations (impromptu, over time, in collaboration, alone) and adapt strategies, such as revision, technology, and the use of reference materials, to the situation
  9 Use a variety of writing technologies, including pen and paper as well as computers
  10 Write for a variety of readers, including peers, teachers, and other adults, adapting content, style, and structure to audience and situation
C.12.1 Prepare and deliver formal oral presentations appropriate to specific purposes and audiences
  5 Demonstrate confidence and poise during presentations, interacting effectively with the audience, and selecting language and gestures mindful of their effect
  9 Speak fluently with varied inflection and effective eye contact, enunciating clearly at an appropriate rate and volume
  10 Observe the appropriate etiquette when expressing thanks and receiving praise
D.12.1 Develop their vocabulary and ability to use words, phrases, idioms, and various grammatical structures as a means of improving communication
  3 Use language appropriate to the background, knowledge, and age of an audience
  4 Recognize and exercise options in modes of expression and choice of words when speaking and writing, especially when revising written work
E.12.1 Use computers to acquire, organize, analyze, and communicate information
  1 Design, format, and produce attractive word-processed documents for various purposes

Environmental Education
A.4.4 Communicate their understanding to others in simple terms (see LA Writing)
A.8.6 Communicate the results of investigations* by using a variety of media and logically defend their answers (see LA Writing; Math [MA] Process)
A.12.5 Communicate the results of their investigations* to groups concerned with the issue* (see LA Oral Language)
C.8.3 Use questioning and analysis skills to determine beliefs, attitudes, and values held by people involved in an environmental issue
C.8.4 Evaluate the credibility of information, recognizing social, economic, political, environmental, technological, and educational influences (see LA Writing)
D.8.7 Identify examples of how personal beliefs* can influence environmental Decisions
E.12.1 Articulate their personal beliefs* regarding their relationship to the environment (see LA Oral Language)
Writing from Nature: The “Awe” of It

OBJECTIVE:
A nature writing teacher once taught me that there are absolutely no boring topics when nature is the source of the information. Every living thing has some characteristics or traits that will make the student say, “Wow!” When successfully completing this assignment, students will demonstrate their ability to discover the amazing truths about turkeys by researching the bird using a variety of print and non-print materials, selecting significant material from the information found, taking accurate notes, and using the material to write in prose or poetry.

METHOD:
Students will research turkeys by carefully looking at feathers, a mounted turkey and photos; reading books, magazine articles, and internet sources.

BACKGROUND:
This activity will be part of the writing from nature unit in which the students view a video about nature, take notes, and discuss details about living creatures before writing their own poetry or prose. This activity will follow instruction in the genres from which the students may choose: children’s writing, poetry, creative nonfiction, nonfiction.

MATERIALS:
Paper, pencils, computers, turkey feathers, turkey mount.

PROCEDURE:
1. Students will review the criteria for writing in the different forms.
2. Students will choose one of the forms for the written portion of the assignment: children’s writing, nonfiction article, creative nonfiction (personal essay) or poetry.
3. Students will observe the mount and write observations of details that are not observable from a distance.
4. Students will study feathers closely and write ten similes and/or metaphors about all or part of the feather such as:
   A. The turkey feather looks like a two-dimensional tornado
   B. The copper trim on the feather shines like nail polish
5. Students will take notes from at least three sources about turkeys and correctly cite the sources in bibliography form.
6. Using the list of similes/metaphors and research notes as a starting point, students will create a piece of creative writing in one of the forms listed.
7. Students will turn in their research notes, bibliographies, and finished pieces of writing.

EXTENSIONS:
1. Students will use the research/writing skills in other units in other classes.
2. Students can submit their writing to the literary/art journal.
3. Writing could be submitted to UWSP Writers’ Workshop or other contests.
4. The writing could be put together in a booklet to share with the rest of the class.
5. The writing could be teamed with artwork and displayed as part of the art show.
6. The writing could be the beginning of the individual, semester writing project.
7. The notes could be used later in the course when the class writes "found poems" from printed sources.
8. The pieces of writing could be read at the coffee house or shared with the class.

**EVALUATION:**

1. The writing should contain specific images that emphasize the wondrous qualities of the bird.
2. The language should show rather than tell the reader about turkeys using figurative language.
3. Content and form should be coordinated. For example, nonfiction articles should be in paragraph form and factual, lines of poetry should be divided to enhance understanding or fit pattern in traditional verse, nonfiction essays should have a personal style, and children’s writing should have vocabulary suitable to the level for which the piece is written.
4. Notes should show good choice of detail and ability to paraphrase, correctly quote and document sources.
5. Bibliography should be in correct form.
6. Work should be edited to eliminate punctuation, spelling, and usage errors.
7. All parts of the assignment should be turned in on time.

**WISCONSIN STATE STANDARDS ADDRESSED**

**English**

B.12.1 Create or produce writing to communicate with different audiences for a variety of purposes
2. Compose and publish analytic and reflective writing that conveys knowledge, experience, insights, and opinions to an intended audience
6. Write autobiographical and biographical narratives in a mature style characterized by suitable vocabulary, descriptive detail, effective syntax, an appropriate voice, a variety of sentence structures, clear coordination and subordination of ideas, and rhetorical devices that help establish tone and reinforce meaning
8. Write in a variety of situations (impromptu, over time, in collaboration, alone) and adapt strategies, such as revision, technology, and the use of reference materials, to the situation
9. Use a variety of writing technologies, including pen and paper as well as computers
10. Write for a variety of readers, including peers, teachers, and other adults, adapting content, style, and structure to audience and situation

C.12.1 Prepare and deliver formal oral presentations appropriate to specific purposes and audiences
5. Demonstrate confidence and poise during presentations, interacting effectively with the audience, and selecting language and gestures mindful of their effect
9. Speak fluently with varied inflection and effective eye contact, enunciating clearly at an appropriate rate and volume
10. Observe the appropriate etiquette when expressing thanks and receiving praise

D.12.1 Develop their vocabulary and ability to use words, phrases, idioms, and various grammatical structures as a means of improving communication
3. Use language appropriate to the background, knowledge, and age of an audience
4. Recognize and exercise options in modes of expression and choice of words when speaking and writing, especially when revising written work

E.12.1 Use computers to acquire, organize, analyze, and communicate information
1. Design, format, and produce attractive word-processed documents for various purposes

**Environmental Education**

A.4.4 Communicate their understanding to others in simple terms (see LA Writing)

E.12.1 Articulate their personal beliefs* regarding their relationship to the environment (see LA Oral Language)
Influencing Animals

OBJECTIVE
Students will evaluate the connections between the Wild Turkey in Wisconsin with populations of other species and habitat to propose quality wildlife management decisions.

METHOD
Students will study population and interpret results through spreadsheet analysis.

BACKGROUND
Growth rates of species are often graphed to show linear growth or exponential rates. Since population rates have many factors that influence it, an understanding of inverse and direct variation is necessary. It is through the direct and inverse variation factors (quality of water, food, shelter, territory, and predators) that help predict the populations of species to ensure a healthy species balance. Wildlife managers utilize these factors in making their decisions on management practices.

Students will select two other recorded populations and analyze the impacts they have with the wild turkey. Population numbers may be taken from the DNR website; www.dnr.state.wi.us or you may contact your local DNR field station. Game species and endangered species are best to look at since they are managed most closely. Allowing students some freedom is necessary but students should have a general background as to the habitat requirements of the species studied. Studying duck numbers compared to turkey numbers won't be as valuable as turkey versus deer.

Purpose is to allow students to create a management plan based on analysis of overall species examination. Through this lesson students will determine what is not necessarily best for the species but what is best for the habitat and community.

MATERIALS
Internet ready computer; calculator, spreadsheet program; paper; population maps, pencils

PROCEDURE
Task:
1. Research a portion of the state and evaluate the estimated population of three species (plant/animal) that you believe are influenced by the inhabitance of the wild turkey.
2. Determine the factors that influence population-inverse/direct variation. (i.e. food source, shelter, water, predators, territory, weather).
3. Based on population of species projections-students will create a graph of past population trends. This graph will either represent a linear rate or exponential growth rate of varying degrees. From the population data students will create a linear regression algebraic formula for each of the factors.
4. Apply the Linear Program Theorem for your area and maximize the linear combination expression to determine a maximum population of each species.
5. Create a management plan and be able to defend the policies they stated.
EXTENSION
1. Apply the inverse/direct variation concepts to human population and growth rates.
2. Apply Fundamental Theorem of Variation to apply management strategies of populations to create healthy life cycles.
3. Ask your local wildlife biologist to come in and present how they base their projections and species quotas based on formulas.

EVALUATION
1. Habitat factors data
2. Inverse/Direct variations-algebraic equations
   - Spreadsheet showing the equations
   - Applying Fundamental Theorem of Variation to satisfy maximum population allowance.
3. Projected plan to sustain a healthy population of all species noted

ACADEMIC STANDARDS
Mathematics

.12.1 Use reason and logic to
   • evaluate information
   • perceive patterns
   • identify relationships
   • formulate questions, pose problems, and make and test conjectures
   • pursue ideas that lead to further understanding and deeper insight

A.12.2 Communicate logical arguments and clearly show
   • why a result does or does not make sense
   • why the reasoning is or is not valid
   • an understanding of the difference between examples that support a conjecture and a proof of the conjecture

A.12.3 Analyze non-routine* problems and arrive at solutions by various means, including models* and simulations, often starting with provisional conjectures and progressing, directly or indirectly, to a solution, justification, or counter-example

A.12.4 Develop effective oral and written presentations employing correct mathematical terminology, notation, symbols, and conventions for mathematical arguments and display of data

A.12.5 Organize work and present mathematical procedures and results clearly, systematically, succinctly, and correctly

B.12.3 Perform and explain operations on real numbers (add, subtract, multiply, divide, raise to a power, extract a root, take opposites and reciprocals, determine absolute value)

B.12.5 Create and critically evaluate numerical arguments presented in a variety of classroom and real-world situations (e.g., political, economic, scientific, social)

B.12.6 Routinely assess the acceptable limits of error when
   • evaluating strategies
   • testing the reasonableness of results
using technology to carry out computations

D.12.3 Determine measurements indirectly*, using
   - estimation
   - proportional reasoning, including those involving squaring and cubing (e.g., reasoning that areas of circles are proportional to the squares of their radii)
   - techniques of algebra, geometry, and right triangle trigonometry
   - formulas in applications

E.12.1 Work with data in the context of real-world situations by
   - formulating hypotheses that lead to collection and analysis of one- and two-variable data
   - designing a data collection plan that considers random sampling, control groups, the role of assumptions, etc.
   - conducting an investigation based on that plan
   - using technology to generate displays, summary statistics*, and presentations

E.12.2 Organize and display data from statistical investigations using
   - frequency distributions
   - percentiles*, quartiles, deciles
   - line of best fit* (estimated regression line)
   - matrices

E.12.3 Interpret and analyze information from organized and displayed data when given
   - measures of dispersion*, including standard deviation and variance
   - measures of reliability
   - measures of correlation*

E.12.4 Analyze, evaluate, and critique the methods and conclusions of statistical experiments reported in journals, magazines, news media, advertising, etc.

E.12.5 Determine the likelihood of occurrence of complex events by
   - using a variety of strategies (e.g., combinations*) to identify possible outcomes
   - conducting an experiment
   - designing and conducting simulations*
   - applying theoretical probability

F.12.1 Analyze and generalize patterns of change (e.g., direct and inverse variation) and numerical sequences, and then represent them with algebraic expressions and equations

F.12.2 Use mathematical functions* (e.g., linear*, exponential*, quadratic*, power) in a variety of ways, including
   - recognizing that a variety of mathematical and real-world phenomena can be modeled* by the same type of function
   - translating different forms of representing them (e.g., tables, graphs, functional notation*, formulas)
• describing the relationships among variable quantities in a problem
• using appropriate technology to interpret properties of their graphical representations (e.g., intercepts, slopes, rates of change, changes in rates of change, maximum*, minimum*)

F.12.3 Solve linear and quadratic equations, linear inequalities, and systems of linear equations and inequalities
• numerically
• graphically, including use of appropriate technology
• symbolically, including use of the quadratic formula

F.12.4 Model and solve a variety of mathematical and real-world problems by using algebraic expressions, equations, and inequalities

Environmental Education
A.4.2 Collect information, make predictions, and offer explanations about questions asked (see SC Inquiry)
A.4.3 Develop answers, draw conclusions, and revise their personal understanding as needed based on their investigations* (see SC Inquiry)
A.4.4 Communicate their understanding to others in simple terms (see LA Writing)
A.8.3 Use techniques such as modeling and simulating to organize information gathered in their investigations* (see Mathematics [MA] Process)
A.8.4 Use critical-thinking strategies to interpret and analyze gathered information (see SC Inquiry)
A.8.5 Use the results of their investigations* to develop answers, draw conclusions, and revise their personal understanding
A.8.6 Communicate the results of investigations* by using a variety of media and logically defend their answers (see LA Writing; Math [MA] Process)
A.12.4 State and interpret their results accurately and consider other explanations for their results (see LA Writing)
B.8.8 Explain interactions among organisms or populations of organisms
B.12.3 Evaluate the stability and sustainability* of ecosystems* in response to changes* in environmental conditions (see SC Life and Environmental Science)
B.12.4 Analyze the factors that determine the number of organisms that can exist in a given area

B.12.6
COMPUTER TURKEY HUNT

OBJECTIVES
Students will: 1.) learn to use a computer for research purposes; 2.) for those who enjoy hunting, research the history of wild turkeys in the state of Wisconsin.

METHOD
Students will research the history of the wild turkey utilizing a computer and the internet and then record their findings on a worksheet.

BACKGROUND
This specific assignment could be used with students who would not normally like to do research work, using a computer, that necessarily deals with history. It would be a lesson that would be used with those who enjoy hunting.

Allowing students more freedom will enable them to learn something they are interested in and still meet classroom objectives and state standards. In this lesson students will have that freedom while researching the wild turkey.

MATERIALS
Computer, pen or pencil, notebook, activity sheets

PROCEDURE
1.) Log on to the computer.
2.) Select any four of the following search engines; Yahoo, Excite, Ask Jeeves, Alta Vista, Google, Lycos, Hot-Bot, or Dog Pile.
3.) Search Wild Turkeys of Wisconsin.
4.) Record the title and url of the top 2 or 3 sites in each of the four search engines selected.
5.) Complete the attached Internet Activity Sheet.
6.) Find the answers to the questions attached.

EXTENSIONS
1. Have students research a different Wisconsin wild animal.
2. Create a habitat class, select a major habitat type and have the students each pick a different animal to search. Have them report back to the class and create a concept map of the habitat with information that they have gathered.

EVALUATION
Students will be graded upon the accuracy of information provided and depth of answers given.
ACADEMIC STANDARDS ADDRESSED

SOCIAL STUDIES
A.4.5 Use atlases, databases, grid systems, charts, graphs, and maps to gather information about the local community, Wisconsin, the United States, and the world
A.4.7 Identify connections between the local community and other places in Wisconsin, the United States, and the world
A.8.4 Conduct a historical study to analyze the use of the local environment in a Wisconsin community and to explain the effect of this use on the environment
A.8.5 Identify and compare the natural resource bases of different states and regions in the United States and elsewhere in the world, using a statistical atlas, aerial photographs, satellite images, and computer databases
A.12.1 Use various types of atlases and appropriate vocabulary to describe the physical attributes of a place or region, employing such concepts as climate, plate tectonics, volcanism, and landforms, and to describe the human attributes, employing such concepts as demographics, birth and death rates, doubling time, emigration, and immigration
A.12.11 Describe scientific and technological development in various regions of the world and analyze the ways in which development affects environment and culture
B.4.1 Identify and examine various sources of information that are used for constructing an understanding of the past, such as artifacts, documents, letters, diaries, maps, textbooks, photos, paintings, architecture, oral presentations, graphs, and charts

TECHNOLOGY EDUCATION
A.4.8 Use tools to observe, measure, make things, and transfer information

ENVIRONMENTAL EDUCATION
A.4.2 Collect information, make predictions, and offer explanations about questions asked (see: SC Inquiry)
A.4.3 Develop answers, draw conclusions, and revise their personal understanding as needed based on their investigations* (see SC Inquiry)
A.4.4 Communicate their understanding to others in simple terms (see LA Writing)
A.8.4 Use critical-thinking strategies to interpret and analyze gathered information (see SC Inquiry)
TURKEY HUNT QUESTIONS TO ANSWER

1.) What is the subspecies of wild turkey found in Wisconsin?

2.) What is the Latin name of this turkey?

3.) What are four of the turkeys distinguishable characteristics?

4.) Where did the turkey originate from?

5.) What is the desirable habitat of the turkey?

6.) What is included in the diet of the wild turkey?

7.) How many turkeys are there currently in the state of Wisconsin?

8.) What are the Hunting Season(s)?

9.) Are there specific laws in dealing with hunting of birds? Hours you can hunt? Bag Limits? How they maybe harvested?

10.) What are the turkeys main predators?
1.) What is the subspecies of wild turkey found in Wisconsin? Eastern Wild Turkey.
2.) What is the Latin name of this turkey? Meleagris Gallopavo.
3.) What are four of the turkeys distinguishable characteristics? Beard, spurs, snood, feather color, toms gobble, carnucles.
4.) Where did the turkey originate from? It is believed to originate from the Latin Americas.
5.) What is the desirable habitat of the turkey? 50% agriculture and 50% oak woodland is ideal in Wisconsin.
6.) What is included in the diet of the wild turkey? It is an opportunist feeder and utilizes many grasses, fruits and berries as well as small insects and amphibians.
7.) How many turkeys are there currently in the state of Wisconsin? Estimates range between 200,000 and 300,000 birds.
8.) What are the Hunting Season(s)? There is both a fall and spring season.
9.) Are there specific laws in dealing with hunting of birds? Hours you can hunt? Bag Limits? How may they be harvested? Yes, there are specific laws. See Wisconsin DNR publication on rules and regulations of both spring and fall turkey hunting.
10.) What are the turkeys main predators? Adult turkeys is coyote, wolf and humans, young and eggs include, snakes, fox, raccoon, opossum, hawks, owls, coyotes and skunks.
OBJECTIVES:
The student will 1. design, construct, and finish a mounting board for a wild turkey tail and beard(s). 2. Explain trees that are part of a turkey's habitat and 3. Describe cost/benefit implications of the lumber that is available for purchase.

METHOD:
Students will create a mounting board for a wild turkey tail in the wood shop lab.

BACKGROUND:
Students are always interested in “making a project” in Technology Education courses. Instructors are interested in having students’ complete design work and construct projects that are low in cost, but high in skill application.

Students have a variety of interests and hobbies. As an instructor, one way to “reach” your students is to take an interest in their interests and hobbies. When your students view you as a person with interests and hobbies that are similar to their own, you have their attention and the learning can begin.

Many of your students will be active outdoors persons. Some of them will also be hunters. Some of the hunters will be turkey hunters. Some of your students will have parents, brothers, sisters, friends, or others that are turkey hunters.

A turkey tail and beard mounting board has something to offer many of your students. The student will design the mounting board within material specifications. It will be their design, but you will control the cost and functionality of the design. The construction will require the use of a variety of equipment. The finishing procedure will be the same as a larger project, but will take much less time and material.

A turkey tail and beard mounting board is a useful, low-cost woodworking project that can be used by the student or given as gift.

The turkey fan itself is the tail feathers of the bird. The tail needs to be removed from the bird upon harvesting and all flesh removed. Borax is then applied to the skin and remaining flesh. The fan is spread out and allowed to dry for several weeks. The beard, a group of modified feathers that are located on the breast of the turkey is cut off with as little as skin remaining as possible and dipped in borax. Upon completion of the display board it is ready to mount.

MATERIALS NEEDED:
This activity is designed to be completed in a Technology Education course. The student will have completed all required safety tests and participated in all equipment demonstrations prior to beginning this activity. In addition to following all safety procedures, the student will be expected to follow the proper methods to square a board, prepare the project for finishing, and finish the project.

One Board Foot of Wood (students need to research where the wood comes from, and look at cost vs benefit of locally harvested lumber vs imported lumber). The student should design their plan on wood that is part of the habitat of the wild turkey and be able to explain that when presenting their project in full.
Crosscut Saw or Radial-Arm Saw
Tablesaw
Jointer
Surfacer
Bandsaw
Spindle Sander
Disk Sander
Drill Press
Palm Sander
Electric Hand Drill
Hand Held Router and/or Table Router
Steel Rule
Wood Glue
Variety of Sandpaper Grits
Wood Stain
Clear Finish
Heavy Weight Paper
Scissors
Pencil
1/8” x 9” steel rod (welding or brazing rod)
1-1/4” Drywall Screws
Screwdriver
Hot Glue Gun

PROCEDURE:
Task 1
Design the mounting board to accommodate one tail and either one or multiple beards. You may use or modify one the attached design or you may design your own, but you must use no more than one board foot of material.

1. Sketch your designs, including dimensions, full scale on a piece of paper. Calculate the amount of wood required to complete the mounting board. Remember a board foot of wood is 1” thick by 12” wide by 12” long.
2. Draw your design, full scale, on the heavy weight paper to produce your templates.
3. Cut out your templates.

Task 2
Glue-up and square the board.

1. Rough cut lumber to 13”. Cut enough lengths to equal 11” in width.
2. Joint best face.
3. Joint best edge
4. Surface to 80% clean (about 7/8”).
5. Rip into strips approximately 2 ¾” in width.
6. Alternating annual rings match and mark board.
7. Using two bar clamps, glue and clamp board.
8. After glue has dried, scrap excess glue.  
9. Surface to thickness (3/4’).  
10. Rip to width (about 10 1/2”)  
11. Crosscut best end.  
12. Crosscut to length (12”).

Task 3  
Trace, cut-out, sand, route, and pre-assemble mounting board.  

1. Trace templates onto squared board.  
2. Using a tablesaw, rip the beard mounting board to width.  
3. Layout 3/4” x 3/8” deep beard slots equally along beard mounting board. Five slots are laid-out two inch apart to the center and two inch from the end to the center.  
4. Using a tablesaw with a dado head, cut the dadoes 1 1/4” long.  
5. Using a bandsaw, cut out the tail mounting board and the contours on the beard mounting board.  
6. Using a spindle sander and a disk sander, sand contours of mounting boards.  
7. Sand both the front and back of the boards using 80 grit sandpaper (either by hand or with a palm sander).  
8. Using an appropriate bit (1/4” round over), route the contours of the mounting boards.  
9. Sand both the front and back of the boards using 120 grit sandpaper (either by hand or with a palm sander).  
10. On beard mounting board, layout holes for 1/8” steel rod. See diagram under Task 1 for location and depth.  
12. On beard mounting board layout holes for assembly.  
15. Lay the tail mounting board face down. Align the beard mounting board on top of it.  
16. Holding the board tightly, using an electric hand drill, drill 3/32” pilot holes through previous holes in beard mounting board and 1/4” deep into tail mounting board.  
17. Using screwdriver and 1-1/4” drywall screws, assemble the mounting board.  
18. Check to insure proper alignment. Make any necessary adjustments.  

Task 4  
Stain and clear coat mounting boards.  

1. Touch-up sand both boards with 120 grit sandpaper.  
2. Wipe off dust.  
3. Stain (following your instructors procedure).  
4. Clear coat (following your instructors procedure).  

Task 5  
Assemble mounting board and add tail and beard(s).  

1. Re-assemble tail and beard mounting boards.  
2. Measure 3/8” from each end of the steel rod.  
3. Using a vise, bend each end to a 90 degree angle. Make sure the ends are bent the same direction,
4. Measure and mark the center of the steel rod.
5. Using a vise, bend the steel rod to approximately 45 degrees at the center mark. Make any necessary adjustments to fit the steel rod into the holes on the beard mounting board.
6. Fit the steel rod into the beard mounting board. You may need to tap the steel rod into the holes.
7. Using the hot-glue gun, hot glue a dried beard(s) into the slot(s) on the beard mounting board.
8. Set a fanned out and dried tail between the steel rod and tail mounting board.
9. The completed assembly is ready to hang.

EXTENSION:
1. Have students place a design on the mounting board, students can use a dremel kit or wood burning kit to create a turkey related scene.
2. Contact your local NWTF chapter and create several mounting boards and sell them as a fundraiser at their next banquet.
3. If interested in creating a easy to make, but effective call using many of the same techniques found in this lesson, see the accompanied instructions for making a slot & peg call.

EVALUATION:
The evaluation of the project will be based on the instructors grading criteria. The evaluation should include the design, safety, clean-up, quality of woodworking, quality of finishing, and quality of assembly. The student should also be able to explain why they chose the type of lumber to complete the project and the advantages/disadvantages of it as compared to other varieties that could have been used.

WISCONSIN STATE STANDARDS ADDRESSED

TECHNOLOGY EDUCATION
A.8.2 Explain the need for and application of knowledge and skills from other disciplines when engaging in technological activities
B.8.4 Discover that resources are essential; they must be used effectively to produce a desired outcome, and outputs from one system may be inputs to another system
C.8.1 Research and develop a set of solutions to solve a problem not knowing all constraints
C.8.2 Explain and demonstrate several solutions to a problem or opportunity using technological design, tools, careful planning, experimentation, and testing
C.8.3 Brainstorm and illustrate ways to integrate efficiency into design through the reuse of materials, resources, and waste in technological systems
C.8.5 Explain the value of technical knowledge and teamwork in the development of a device or process
C.8.6 Explain how changing the physical characteristics of material or the format of information can increase its usefulness
C.12.4 Select materials and other resources for a technological design and develop practical solutions
C.12.8 Know that design solutions may have effects that were not predicted
D.12.3 Analyze how the values and beliefs of different people can influence their perceived risks and benefits of a given technology
Environmental Education
A.4.2 Collect information, make predictions, and offer explanations about questions asked (see SC Inquiry)
A.4.3 Develop answers, draw conclusions, and revise their personal understanding as needed based on their investigations* (see SC Inquiry)
A.4.4 Communicate their understanding to others in simple terms (see LA Writing)
B.8.14 Identify the natural resources* that are found in Wisconsin and those that are imported
B.8.15 Analyze how people impact their environment through resource use
B.12.11 Assess how changes in the availability and use of natural resources* (especially water and energy* sources) will affect society and human activities; such as, transportation, agricultural systems, manufacturing
D.4.1 Demonstrate knowledge of a decision-making process that includes selecting and using data, suggesting possible alternatives, predicting consequences, and being aware of available resources (see SC Inquiry; LA Inquiry)
How to Make the Slot & Peg Call

By Mike Warren
It was mid morning, late in the fourth and final week of the New York spring turkey season. I was hunting for a long-beard near my home in turkey-rich, but heavily-hunted Steuben County. The old gobbler first answered my mouth call from the most distant edge of my hearing. Each successive gobble got closer and more insistently until he closed the distance between us to about 100 yards. Then his gobbles became less frequent, his forward progress slowed until it abruptly stopped. He had hung up! Apparently the mouth call had sounded real enough at greater distances, but now that he was up close and personal, he wasn't quite buying it.

Despite my plaintive calls, he barely moved for almost an hour. I was fast approaching the desperation stage of the hunt—the point when the adrenaline rush of the approaching gobbler had worn off and the rocks and roots under my butt had grown harder and sharper. What I needed was a perfect cluck, but my mouth had become sore and dry, and confidence in my ability to manipulate the diaphragm call had waned.

I contemplated the situation for about 10 minutes. I then pulled a small wooden call from my pocket, and with a quick flick of the striker on the slate friction surface, I had my perfect cluck. I was rewarded with an immediate gobble. I answered with a softer cluck, put down the call and got the gun up. Moments later, the old tom strolled casually into a clearing about 25 yards out. I squeezed the trigger and the hunt was finally over... with a quick flick of the striker on the slate friction surface, I had my perfect cluck.

...with a quick flick of the striker on the slate friction surface, I had my perfect cluck.

He had been hunted hard for more than three weeks. But what finally brought him to the gun hadn't been some new type of call. No, what I used to fool the old boy was one of the earliest designs of friction calls—the slate and peg, or, as I refer to it, a slot and peg.

They come in different shapes and sizes. Typically, they feature a hollow wooden body and a friction surface of slate or aluminum in a narrow trough or slot. The peg is the same as used on normal round slate calls. In the hands of a competent caller, they make some of the most realistic yelps, clucks, purrs and keezes of any friction call. They are also among the easiest calls to learn to use.

One advantage of slot and pegs is that the striking surface is below the face of the call. Because your hands can't readily touch it, it stays clean and maintains good friction much longer than other slate-type calls. The upper surface can also be used as a guide, so it is easy to maintain a constant angle between the striker and the striking surface. Thus, consistency in your calling is much greater.

See SLOT CALL on page 68.
Commercial versions of these calls such as the Penn Woods Sweet Talker and the Ben Lee Super Hen were favorites with many of the old-time turkey hunters. They are still effective calls today, but they are usually hard to find, easy to break, and because of their collectability, are often expensive. Fortunately, this type of call is fairly easy and inexpensive to make in a home workshop.

The calls are made of two pieces of wood in which appropriate grooves are cut and the two halves are then glued together to form an open-ended sound chamber. A strip of slate, glass or aluminum is then glued in the top groove to create the striking surface.

I first made these calls as an introductory woodworking project with a class of 9th- and 10th-grade special education students. It was perfect for introducing the tablesaw, jointer and plane. My then-teaching assistant, Dave Strickarz, and I designed the calls; and

One advantage of slot and pegs is that the striking surface is below the face of the call. Because your hands can't readily touch it, it stays clean and maintains good friction much longer than other slate-type calls.

Begin with two pieces of lumber, each one-inch thick and rough cut into 30"x3" boards, then jointed and planed to produce 30"x3"x3/4" pieces of wood. From this material, you should be able to make several calls and experiment with different striking surfaces.

The first cut on the table saw, made with a regular blade, is to rip the boards to the finished width of 23/4 inches. For the next three steps, switch from a regular blade to a dado blade, which can be adjusted for varied-width grooves. The three steps could be made with a regular blade, but would require repetitive cuts.

Second, dado the first piece, which will be the top piece of the call. Use a 3/8-inch dado blade with the table height set to 1/2 inch. Set the guide fence at 1 3/8 inches. This will produce a 3/8-inch groove that measures 3/8 of an inch deep lengthwise in the center of the wide side of the board.

Second, dado the top of the second board. Use the same blade height and width; but set the fence at 1/6 inch. Take one pass, then turn the board 180 degrees and take a second pass. This will produce a one-inch groove in the middle of this board.

The third and fourth dado cuts are made on the bottom face of the first piece of wood. Use a 1/8-inch dado blade with a blade height of one-half inch. Set the fence at 1/8 inch. Before you make this cut, make sure the top side of the board (the side with 1/8-inch dado cut) is face up. Take one pass, then turn the board 180 degrees and make a second pass. This will produce two 3/8"x3/8" grooves on the left and right sides of the board's bottom face; each groove will be 3/8 inch from the edge of the board.

The last two cuts, again on the first piece, is made with a regular blade. Set the blade height at 1/8 inch and the fence at 1/8 inch. With the board on edge and the 1/8-inch groove toward the fence, make a cut down each edge. This will remove 3/8 inch from each edge.

The top piece should nest perfectly inside the bottom piece. Check for a good fit, then run a 1/8-inch bead of wood glue along the mating surfaces of each piece, clamp, wipe off the excess glue that squeezes from the sides and allow to dry. Be sure not to overtighten the clamp and distort the top piece of the call.

With the Super Turkey Choke, world famous Briley choke technology brings you the tools required for the ultimate turkey gun. You'll see dramatic results in increased pattern density and effective range made possible using this straight rifled choke. And, the Briley Super Turkey is available in fits virtually every make manufacturer's shotgun. Call our toll free number today and see why, with Briley, one name says it all.

ODDS ARE, with the "Super Turkey" Choke from Briley, YOU CAN BET ON THE LONG SHOT.

One advantage of slot and pegs is that the striking surface is below the face of the call. Because your hands can't readily touch it, it stays clean and maintains good friction much longer than other slate-type calls.

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much glue is used, it can fill the void in the sound chamber, which will deaden the sound.

When the glue is completely dry, remove the clamps. An optional step is to use a router to round or decorate the bottom edges of the call. Square one end, then cut into 3 1/4-inch lengths. We used a power miter saw, but a number of other tools will work well for this purpose. This should produce seven calls and a short piece of scrap.

The calls can be used as is if you chalk the bottom of the top groove, but a more reliable friction surface can be made taking a 1/4-inch thick strip of slate, glass or aluminum and gluing it inside the bottom of the groove using wood glue.

Once you get started, you will probably want to make several calls with a variety of friction surfaces. An economical source of slate is small chalk boards found in craft stores. The slate can be easily cut by deeply scoring both sides then snapping it along the scores. Sanding and applying a coat of stain to the light-colored woods improves the appearance of the calls. To make them more water resistant, seal them with polyurethane.

A wide variety of wood can be used to make the slot and peg call. I have successfully used cherry, walnut, maple, oak, poplar, pine and cedar. They all sound like turkeys, but each has a slightly different sound from the other. Some of these same woods can be fashioned into a striker or you can just use strikers from your other friction calls. My favorites are poplar and cedar. If you have a supply of some other type of wood, don't hesitate to try it or to change the dimensions to fit the material you have on hand. You may even find that making this slot and peg call is as easy and enjoyable as taking it out and using it in the turkey woods.

One of the earliest designs of friction calls, a slot & peg call renders sweet yelps, clucks and purrs and is fairly easy to make in a home workshop. Making it, in fact, might be as fun as using it.

S. Stankowski
Interpretive Turkey

OBJECTIVE

Students will draw a wild turkey in the artistic style of a famous artist of their choice or a selection of choices presented by their teacher.

MATERIALS NEEDED

One mounted wild turkey or photographs of wild turkeys
Pencils
Oil pastels, paint and/or colored pencils
Paper
Art books on various artists or access to the Internet

BACKGROUND

What if a famous artist from the past or present decided to create an artwork using the wild turkey as the subject matter?

What physical characteristics does the wild turkey have that the artist would observe?
Examples: color, shape, or texture.

Do these design elements change from one part of the turkey's body to another? For example, is the texture of the feathers on the wings different than the texture in the tail?

Which of these characteristics would the famous artist emphasize with his/her artistic style?

ACTIVITY

1. Ask the students to identify the physical characteristics of the wild turkey.
Examples: beak, wattle, beard, tail, wings legs, feet, and feathers.
What various colors, shapes, and textures does the student observe?
What feeling do the colors, shapes and textures express?
2. Instruct the students to do a series of continuous line drawings of the wild turkey based on their discussion and observation. Students should draw the whole turkey, but they could also do more detailed studies of specific parts of the wild turkey. For example, a student could draw a detailed sketch of the feet.
3. Help the students select a famous artist by showing slides of artwork by various artists throughout history. Art books, reproductions or the Internet could also be used as resources.

Interpretive drawing
"Decorative Style" M. Larsen
4. Instruct the students to identify how their artists utilize line, shape, color, texture, and value. For example, Vincent Van Gogh used bright colors and strong patterns in his work. He created shadows using colors, not just black. He frequently placed complimentary colors next to each other. He laid down thick layers of paint to create texture. His vigorous brushstrokes created strong patterns. Van Gogh outlined his figures to make them stand out from the background.

5. Instruct the students to create a series of sketches, color studies, and compositions of the wild turkey attempting to explore and emphasize some of the major stylistic traits of their famous artist.

6. Instruct the students to create a larger work based on their sketches.

7. Instruct the students to write an expository paragraph using a writing prompt of the teacher’s choice. For example: Describe the emotions the wild turkey in your artwork communicates when expressed in the style of your famous artist.

EXTENSIONS
1. A local, National Wild Turkey Federation chapter could donate a mounted wild turkey to its school district to be utilized at all grade levels and in all disciplines.
2. Draw wild turkeys at a local zoo or wild turkey farm.
3. Draw wild turkeys in a local museum.
4. Enter the student artwork in local or state student art shows, contact your local NWTF chapter on state competition held in February.
5. Organize a local art show of the students’ work.
6. Have the artwork schools to school in the district or exchange the work with another district.
7. Display the artwork at a local, state, or national National Wild Turkey Federation meeting.
8. Do the above project postcard size and exchange turkey postcards between high school, junior high, or elementary classes that are also doing turkey postcards.
9. Do the above project in a three-dimensional medium such as clay. Select famous sculptors such as Henry Moore or Claus Oldenburg.
10. Instead of selecting a famous artist, the student could select a major movement in art such as Impressionism, Cubism or Mannerism.
11. Instead of selecting a famous artist, the student could select a major culture such as Egyptian, African or Mexican.

ART VOCABULARY
Elements of design, line, shape, form, value, color, space, texture.
Principles of design, pattern, balance, contrast, emphasis, unity, shape, rhythm.

EVALUATION
1. Compare the artist’s style and the student’s artwork.
2. Compare and contrast the wild turkey and the resulting wild turkeys expressed in a famous artist’s style.

WISCONSIN STATE STANDARDS ADDRESSED

Art
A.4.6 Know that art is a basic way of thinking and communicating about the world.
B.4.2 Recognize that form, function, meaning, and expressive qualities of art and design change from culture to culture and artist to artist.
C.4.1 Explore the elements and principles of design.
D.4.5 Learn basic language used in art.
E.4.1 Communicate basic ideas by producing studio art forms, such as drawing, paintings, prints, sculpture, jewelry, fibers and ceramics.
G.4.3 Talk and write about the meaning of artworks and design.
H.4.1 Study the patterns and color in nature.
I.4.3 Talk or write about feelings in a work of art.
J.4.9 Understand the difference between original artwork, reproductions, and copies.
L.4.5 Explore nature and designs by artists as sources for new ideas for their artwork.

Grades 5 - 8
A.8.4 Know about some styles of art from various times.
B.8.6 Know how to describe, analyze, interpret, and judge art images and objects from various cultures, artists, and designers.
C.8.5 Use thumbnail sketches to experiment and start developing visual ideas.
E.8.5 Use the visual arts to express ideas that can’t be expressed by words alone.
G.8.3 Analyze the meaning of artworks and design.
H.8.3 Be able to draw, paint, and sculpt from life.
I.8.5 Recognize that art reflects the time and place in which it was created.
J.8.10 Develop the ability to reflect and talk about works of art.
L.8.5 Study ways that artists develop personal style that reflects who they are.

Grades 9 - 12
A.12.2 Know advanced vocabulary related to their study of art.
B.8.3 Identify works of art and designed objects as they relate to specific cultures, times, and places.
C.12.4 Use advanced design techniques to improve and/or change artwork.
E.12.5 Continue to use the visual arts to express ideas that can’t be expressed by words alone.
G.12.1 Use visual images as tools for thinking and communicating.
H.12.3 Use careful observation to draw, paint, and sculpt from life.
I.12.4 Look at art and compare their feelings with those of the artist and others.
J.12.2 Choose materials and techniques to influence the expressive quality of art.
L.12.4 Use the knowledge of nature and works of art as sources for new ideas.

Environmental Education
A.4.1 Make observations, ask questions and plan environmental investigations* (see Science [SC] Inquiry; English/Language Arts [LA] Research)
A.4.3 Develop answers, draw conclusions, and revise their personal understanding as needed based on their investigations* (see SC Inquiry)
A.4.4 Communicate their understanding to others in simple terms (see LA Writing)
A.8.2 Collect information from a variety of resources, conduct experiments, and develop possible solutions to their investigations*
A.8.3 Use techniques such as modeling and simulating to organize information gathered in their investigations* (see Mathematics [MA] Process)
A.8.4 Use critical-thinking strategies to interpret and analyze gathered information (see SC Inquiry)
A.8.6 Communicate the results of investigations* by using a variety of media and logically defend their answers (see LA Writing; Math [MA] Process)
A.12.5 Communicate the results of their investigations* to groups concerned with the issue* (see LA Oral Language)
A Classroom Strategy for Interactive Learning: Predicting and Confirming Guide

OBJECTIVES:
Students will: 1) make and confirm predictions; 2) skim a text to pick up information; 3) locate evidence to support thinking.

METHOD:
Students will collaborate with each other to make and confirm their predictions regarding the validity of statements given about the eastern wild turkey (Meleagris gallopavo silvestris).

BACKGROUND:
Turning students from passive receivers to active constructors of meaning involves asking them to use reading rather than “do” reading. Classroom strategies that encourage students to actively think about what they are reading and to apply what they have learned, lead to students more deeply engaged in making sense from print. Activities that permit students to interact with other students tend to increase both motivation to learn and as a result, active involvement.
In addition, classroom strategies that guide students in assessing the learning situation and evaluating their success lead to more self-sufficient individuals capable of becoming lifelong learners. (Doug Buehl, Classroom Strategies for Interactive Learning, International Reading Association, Inc., 2001).

BACKGROUND INFORMATION ABOUT TURKEYS:
Benjamin Franklin would have preferred to have the Wild Turkey- not the Bald Eagle- as the national symbol of the U.S. The gobble has limited use and affects turkeys in two ways: hens hear a potential mate and gobblers hear a potential rival.
Turkeys nest on the ground. The nest is often a simple depression in the leaf litter. Hens do not normally have beards. However, in rare cases (approximately less that 5% of the time) hens will have a sparse beard. Clutch size varies, averaging 11 eggs, and requires about 2 weeks to complete. Annual survival rates for both adult hens and gobblers average about 50%. Stocking of pen-reared turkeys is illegal- and for good reason. These birds are considered genetically inferior and could contaminate the gene pool of native turkeys that are better adapted to the rigors of the wild. In addition, pen-reared turkeys have a higher incidence of disease and may transmit these diseases to healthy birds. Hunting turkeys using a bow and arrow is legal in Wisconsin. Hunting turkeys with bow and arrow is an exciting and challenging sport for a growing number of hunters.

MATERIALS:
“Predicting and Confirming” handouts; paper; pencils; computers with Internet access

PROCEDURE:
1. Divide students into pairs.
2. Pass out the “Predicting and Confirming Guide” (See below)
3. Review the directions given on the handout before giving students a chance to complete the activity.
EXTENSIONS:
Have students continue practicing interactive classroom strategies:

1. Model the attached "If I" Strategy. Have students use this strategy to help them formulate position statements regarding an issue related to the eastern wild turkey.
2. To help students practice distinguishing between fact and opinion, have them read an expository text about the eastern wild turkey, i.e., excerpts from the Wisconsin DNR publication entitled "Wisconsin Turkey Hunter's Guide" (PUB-WM-214 98REV). Then have students play the attached "Fact and Opinion" game.

EVALUATION:
Have students demonstrate that they can verify their answers. Give students another piece of expository text to read. Then ask questions related to the text. Students should not only answer each question, but verify each answer, as well.
## Predicting and Confirming Guide

Read the following statements about the eastern wild turkey (Meleagris gallopavo silvestris). After discussing each statement with your partner, respond true or false. Put your response in the “Predict” column. Then support your answer, using information found in the web sites that follow this page. Put this information in the “Confirm” column.

<table>
<thead>
<tr>
<th>Predict</th>
<th>Confirm</th>
</tr>
</thead>
<tbody>
<tr>
<td>Benjamin Franklin would have preferred to have the Wild Turkey - not the Bald Eagle - as the national symbol of the U.S.</td>
<td><a href="http://www.petersononline.com/birds/month/witu/">Web Site</a></td>
</tr>
<tr>
<td>Both male and female turkeys gobble</td>
<td></td>
</tr>
<tr>
<td>Turkeys nest in trees</td>
<td></td>
</tr>
<tr>
<td>Just like male turkeys, sometimes a female turkey can have a beard</td>
<td></td>
</tr>
<tr>
<td>Clutch size (number of eggs laid) averages about 11 eggs</td>
<td><a href="http://www.dnr.state.wi.us/org/caer/ce/cek/critter/bird/wildturkey.htm">Web Site</a></td>
</tr>
<tr>
<td>Annual survival rates for both hens and gobblers average about 50%</td>
<td></td>
</tr>
<tr>
<td>Pen-reared turkeys are used by the Wisconsin Department of Natural Resources as a way to increase the turkey population in our state</td>
<td><a href="http://birding.about.com/library/weekly/aa112297.htm">Web Site</a></td>
</tr>
<tr>
<td>Hunting turkeys using a bow and arrow is legal in Wisconsin</td>
<td></td>
</tr>
</tbody>
</table>

Now check your answers using these awesome sites:

### Web Sites

- This web site gives many interesting facts about the Wild Turkey, including size, voice, range, food habits, and more.
  [Web Site](http://www.petersononline.com/birds/month/witu/)

- This web site was developed by the Wisconsin Department of Natural Resources to help teach elementary students about the Wild Turkey.
  [Web Site](http://www.dnr.state.wi.us/org/caer/ce/cek/critter/bird/wildturkey.htm)

- This web site includes a picture of a male turkey in “full display”.
  [Web Site](http://birding.about.com/library/weekly/aa112297.htm)

- This web site features a map showing where Wild Turkeys can be found.
Written by National Geographic, this web site is both interesting and informative.


If available, you might also want to look for information using these handy references:

Wisconsin Department of Natural Resources Publication: “Wisconsin Turkey Hunter’s Guide” (PUB-WM-214 98REV


ACADEMIC STANDARDS ADDRESSED:

MEDIA AND TECHNOLOGY
E.8.1 Use computers to acquire, organize, analyze, and communicate information: Collect information from various on-line sources, such as web pages, news groups, etc.

ORAL LANGUAGE
C.8.3 Participate effectively in discussion, i.e., Explain and advance opinions by citing evidence and referring to sources; Distinguish between supported and unsupported statements.

SCIENCE
A.8.3 Defend explanations and models by collecting and organizing evidence that supports them and critique explanations and models by collecting and organizing evidence that conflicts with them.

B.8.3 Explain how the general rules of science apply to the development and use of evidence in science investigations, model-making, and applications.

C.8.1 Identify questions they can investigate using resources and equipment they have available.

C.8.2 Identify data and locate sources of information including their own records to answer the questions being investigated.

C.8.9 Evaluate, explain, and defend the validity of questions, hypotheses, and conclusions to their investigations.

C.8.10 Discuss the importance of their results and implications of their work with peers, teachers, and other adults.

H.8.1 Evaluate the scientific evidence used in various media (for example, television, radio, Internet, popular press, and scientific journals) to address a social issue, using criteria of accuracy, logic, bias, relevance of data, and credibility of sources.

Environmental Education
A.4.2 Collect information, make predictions, and offer explanations about questions asked (see: SC Inquiry)
A.4.3 Develop answers, draw conclusions, and revise their personal understanding as needed based on their investigations* (see SC Inquiry)
A.4.4 Communicate their understanding to others in simple terms (see LA Writing)
A.8.4 Use critical-thinking strategies to interpret and analyze gathered information (see SC Inquiry)
A.8.5 Use the results of their investigations* to develop answers, draw conclusions, and revise their personal understanding
A.8.6 Communicate the results of investigations* by using a variety of media and logically defend their answers (see LA Writing; Math [MA] Process)
"If I" Strategy

"Convincing others of my opinion is easier if I can clarify, justify, and verify. To modify or solidify my stance is also an important part of the whole process!"
"If I" Strategy

STEP ONE:
THINK ABOUT BOTH SIDES OF AN ISSUE.

Possible issues:

1) Turkey hunters should have to take a hunter safety course.
2) Citizens should be fined for trying to reintroduce pen-reared turkeys into the wild.
3) Severe penalties should be given to those who poach turkeys.

DECIDE WHICH POSITION YOU WANT TO TAKE.

"If I" Strategy

STEP TWO:
CLARIFY OR CLEARLY STATE YOUR POSITION.
"If I" Strategy

STEP THREE:

JUSTIFY YOUR POSITION BY WRITING DOWN A LIST OF REASONS WHICH SUPPORT YOUR STANCE. THE LONGER YOUR LIST, THE BETTER!

"If I" Strategy

STEP FOUR:

VERIFY YOUR POSITION. LOOKING FOR EVIDENCE TO SUPPORT YOUR IDEA IS A GOOD WAY OF CONVINCING OTHERS TO AT LEAST CONSIDER YOUR POINT OF VIEW.
STEP FIVE:

TALK TO OTHERS. NOW IS THE TIME TO MODIFY/CHANGE YOUR IDEAS OR SOLIDIFY/STRENGTHEN YOUR ORIGINAL STANCE.

STEP SIX:

SHARE YOUR POSITION WITH THE GROUP.
BE READY TO CLARIFY, JUSTIFY, OR VERIFY YOUR STANCE.
Fact and Opinion

What is the difference between fact and opinion?

Read the DNR publication about turkeys.

Then get ready to prove that you know the answer to this question!
Identifying Fact and Opinion

To practice distinguishing between fact and opinion, you will take turns rolling two dice.

Even numbers = facts
Odd numbers = opinions

Fact and Opinion: Prove You Know the Difference!

If one die shows fact and other shows opinion, you must give 1 fact and 1 opinion.

If both dice show fact, you must give 2 facts.

If both dice show opinion, you must give 2 opinions.
Your Goal:
Be the first student to reach 10 points!

You get one point for each appropriate fact given and two points for each opinion.

You get zero points if your facts or opinions have already been used by a previous student.

Fact and Opinion

How skilled are you at distinguishing between fact and opinion?
PROJECT WILD LESSONS

What's wild

State Art standards
C.4.5 Look at nature and works of art as visual resources.
H.4.1 Study the patterns and color in nature.
H.4.2 Use drawing to examine objects closely.
H.4.3 Show differences among color, shapes, textures, and other qualities of objects in their artwork.

State Science standards
B.4.1 Use encyclopedias, source books, texts, computers, teachers, parents, other adults, journals, popular press, and various other sources, to help answer science-related questions and plan investigations
C.4.1 Use the vocabulary of the unifying themes* to ask questions about objects, organisms, and events being studied
C.4.2 Use the science content being learned to ask questions, plan investigations*, make observations*, make predictions*, and offer explanations*
C.4.6 Communicate the results of their investigations* in ways their audiences will understand by using charts, graphs, drawings, written descriptions, and various other means, to display their answers
C.4.7 Support their conclusions with logical arguments
C.4.8 Ask additional questions that might help focus or further an investigation*

State Environmental Education standards
A.4.1 Make observations, ask questions and plan environmental investigations* (see Science [SC] Inquiry; English/Language Arts [LA] Research)
A.4.2 Collect information, make predictions, and offer explanations about questions asked (see: SC Inquiry)
A.4.3 Develop answers, draw conclusions, and revise their personal understanding as needed based on their investigations* (see SC Inquiry)
A.4.4 Communicate their understanding to others in simple terms (see LA Writing)

TRACKS

State Art standards
C.4.8 Explore the natural characteristics of materials and their possibilities and limitations.
G.4.1 Know that art communicates ideas.
H.4.1 Study the patterns and color in nature.
H.4.2 Use drawing to examine objects closely.
H.4.5 Be able to read simple maps, charts and plans.
H.8.4 Create three-dimensional models.

State Science standards
B.4.1 Use encyclopedias, source books, texts, computers, teachers, parents, other adults, journals, popular press, and various other sources, to help answer science-related questions and plan investigations
C.4.3 Select multiple sources of information to help answer questions selected for classroom investigations*
C.4.4 Use simple science equipment safely and effectively, including rulers, balances, graduated cylinders, hand lenses, thermometers, and computers, to collect data relevant to questions and investigations*
C.4.5 Use data they have collected to develop explanations* and answer questions generated by investigations*
C.4.6 Communicate the results of their investigations* in ways their audiences will understand by using charts, graphs, drawings, written descriptions, and various other means, to display their answers
C.4.7 Support their conclusions with logical arguments
C.4.8 Ask additional questions that might help focus or further an investigation*
C.8.4 Use inferences* to help decide possible results of their investigations, use observations to check their inferences
C.8.5 Use accepted scientific knowledge, models*, and theories* to explain* their results and to raise further questions about their investigations*

C.8.6 State what they have learned from investigations*, relating their inferences* to scientific knowledge and to data they have collected

C.8.7 Explain* their data and conclusions in ways that allow an audience to understand the questions they selected for investigation* and the answers they have developed

State Environmental Education standards
A.4.1 Make observations, ask questions and plan environmental investigations* (see Science [SC] Inquiry; English/Language Arts [LA] Research)
A.4.2 Collect information, make predictions, and offer explanations about questions asked (see: SC Inquiry)
A.4.3 Develop answers, draw conclusions, and revise their personal understanding as needed based on their investigations* (see SC Inquiry)
A.4.4 Communicate their understanding to others in simple terms (see LA Writing)

HABITAT LAP SIT

State Physical Education standards
D.4.1 Experience the opportunity for enjoyment while participating in physical activity
D.4.4 Use physical activity as a means of self-expression
D.8.3 Enjoy learning new activities
F.8.2 Solve problems by analyzing causes and potential solutions

State Science Standards
A.8.6 Use models* and explanations* to predict* actions and events in the natural world
C.4.7 Support their conclusions with logical arguments
C.4.8 Ask additional questions that might help focus or further an investigation*
F.4.1 Discover* how each organism meets its basic needs for water, nutrients, protection, and energy* in order to survive
F.8.9 Explain* how some of the changes* on the earth are contributing to changes in the balance of life and affecting the survival or population growth of certain species

State Environmental Education standards
A.4.1 Make observations, ask questions and plan environmental investigations* (see Science [SC] Inquiry; English/Language Arts [LA] Research)
A.4.2 Collect information, make predictions, and offer explanations about questions asked (see: SC Inquiry)
A.4.3 Develop answers, draw conclusions, and revise their personal understanding as needed based on their investigations* (see SC Inquiry)
A.4.4 Communicate their understanding to others in simple terms (see LA Writing)
A.8.3 Use techniques such as modeling and simulating to organize information gathered in their investigations* (see Mathematics [MA] Process)
A.8.4 Use critical-thinking strategies to interpret and analyze gathered information (see SC Inquiry)
A.8.5 Use the results of their investigations* to develop answers, draw conclusions, and revise their personal understanding
B.4.4 List the components of an ecosystem,* including the qualities of a healthy habitat* (see SC Life and Environmental Science)
B.4.5 Describe natural and human-built ecosystems* in Wisconsin
B.4.6 Cite examples of how different organisms adapt to their habitat*
B.8.2 Explain how change is a natural process, citing examples of succession,* evolution,* and extinction
B.8.3 Explain the importance of biodiversity*
B.8.5 Give examples of human impact on various ecosystems*
B.8.8 Explain interactions among organisms or populations of organisms
B.12.2 Describe the value of ecosystems* from a natural and human perspective; e.g., food, shelter, flood control, water purification
B.12.3 Evaluate the stability and sustainability* of ecosystems* in response to changes* in environmental conditions (see SC Life and Environmental Science)
B.12.7 Evaluate the importance of biodiversity*
B.12.8 Relate the impact of human activities in ecosystems* to the natural process of change, citing examples of succession,* evolution,* and extinction (see SC Earth and Space Science)
C.4.1 Identify environmental problems and issues (see SS Political Science and Citizenship: Power, Authority, Governance, and Responsibility)

OH DEER
State Physical Education standards
D.4.1 Experience the opportunity for enjoyment while participating in physical activity
D.4.4 Use physical activity as a means of self-expression
D.8.3 Enjoy learning new activities
F.8.2 Solve problems by analyzing causes and potential solutions

State Social Studies Standards
A.4.4 Describe and give examples of ways in which people interact with the physical environment, including use of land, location of communities, methods of construction, and design of shelters
A.4.6 Identify and distinguish between predictable environmental changes, such as weather patterns and seasons, and unpredictable changes, such as floods and droughts, and describe the social and economic effects of these changes
A.4.7 Identify connections between the local community and other places in Wisconsin, the United States, and the world
A.4.9 Give examples to show how scientific and technological knowledge has led to environmental changes, such as pollution prevention measures, air-conditioning, and solar heating
A.8.4 Conduct a historical study to analyze the use of the local environment in a Wisconsin community and to explain the effect of this use on the environment
A.8.10 Identify major discoveries in science and technology and describe their social and economic effects on the physical and human environment
A.12.2 Analyze information generated from a computer about a place, including statistical sources, aerial and satellite images, and three-dimensional models
A.12.7 Collect relevant data to analyze the distribution of products among global markets and the movement of people among regions of the world
A.12.11 Describe scientific and technological development in various regions of the world and analyze the ways in which development affects environment and culture
B.4.8 Compare past and present technologies related to energy, transportation, and communications and describe the effects of technological change, either beneficial or harmful, on people and the environment
B.8.4 Explain how and why events may be interpreted differently depending upon the perspectives of participants, witnesses, reporters, and historians
B.12.9 Select significant changes caused by technology, industrialization, urbanization, and population growth, and analyze the effects of these changes in the United States and the world
D.4.4 Give examples to explain how businesses and industry depend upon workers with specialized skills to make production more efficient
D.8.2 Identify and explain basic economic concepts: supply, demand, production, exchange, and consumption; labor, wages, and capital; inflation and deflation; market economy and command economy; public and private goods and services

State Math standards
A.12.1 Use reason and logic to
- evaluate information
- perceive patterns
• identify relationships
• formulate questions, pose problems, and make and test conjectures
• pursue ideas that lead to further understanding and deeper insight

A.12.2 Communicate logical arguments and clearly show
• why a result does or does not make sense
• why the reasoning is or is not valid
• an understanding of the difference between examples that support a conjecture and a proof of the conjecture

A.12.3 Analyze non-routine* problems and arrive at solutions by various means, including models* and simulations, often starting with provisional conjectures and progressing, directly or indirectly, to a solution, justification, or counterexample

A.12.4 Develop effective oral and written presentations employing correct mathematical terminology, notation, symbols, and conventions for mathematical arguments and display of data

A.12.5 Organize work and present mathematical procedures and results clearly, systematically, succinctly, and correctly

A.12.6 Read and understand
• mathematical texts and other instructional materials
• writing about mathematics (e.g., articles in journals) mathematical ideas as they are used in other contexts

B.12.2 Compare real numbers using
• order relations (>,<) and transitivity*
• ordinal scales including logarithmic (e.g., Richter, pH rating)
• arithmetic differences
• ratios, proportions, percents, rates of change

B.12.3 Perform and explain operations on real numbers (add, subtract, multiply, divide, raise to a power, extract a root, take opposites and reciprocals, determine absolute value)

B.12.4 In problem-solving situations involving the application of different number systems (natural, integers, rational*, real*) select and use appropriate
• computational procedures
• properties (e.g., commutativity*, associativity*, inverses*)
• modes of representation (e.g., rationals as repeating decimals, indicated roots as fractional exponents)

B.12.5 Create and critically evaluate numerical arguments presented in a variety of classroom and real-world situations

C.12.3 Present convincing arguments by means of demonstration, informal proof, counter-examples, or any other logical means to show the truth of
• statements

State Science standards

A.8.6 Use models* and explanations* to predict* actions and events in the natural world

A.8.7 Design real or thought investigations* to test the usefulness and limitations of a model*

A.12.3 Give examples that show* how partial systems*, models*, and explanations* are used to give quick and reasonable solutions that are accurate enough for basic needs

C.4.7 Support their conclusions with logical arguments

C.4.8 Ask additional questions that might help focus or further an investigation*

F.4.1 Discover* how each organism meets its basic needs for water, nutrients, protection, and energy* in order to survive

F.8.7 Understand* that an organism's behavior evolves through adaptation to its environment
F.12.7 Investigate* how organisms both cooperate and compete in ecosystems

State Environmental Education standards
A.4.1 Make observations, ask questions and plan environmental investigations* (see Science [SC] Inquiry; English/Language Arts [LA] Research)
A.4.2 Collect information, make predictions, and offer explanations about questions asked (see SC Inquiry)
A.4.3 Develop answers, draw conclusions, and revise their personal understanding as needed based on their investigations* (see SC Inquiry)
A.4.4 Communicate their understanding to others in simple terms (see LA Writing)
A.8.3 Use techniques such as modeling and simulating to organize information gathered in their investigations* (see Mathematics [MA] Process)
A.8.4 Use critical-thinking strategies to interpret and analyze gathered information (see SC Inquiry)
A.8.5 Use the results of their investigations* to develop answers, draw conclusions, and revise their personal understanding
A.8.6 Communicate the results of investigations* by using a variety of media and logically defend their answers (see LA Writing; Math [MA] Process)
A.12.1 Identify questions that require skilled investigation* to solve current problems* cited in literature, media, or observed through personal observations (see LA Research)
B.4.4 List the components of an ecosystem,* including the qualities of a healthy habitat* (see SC Life and Environmental Science)
B.4.6 Cite examples of how different organisms adapt to their habitat*
B.8.2 Explain how change is a natural process, citing examples of succession,* evolution,* and extinction
B.8.3 Explain the importance of biodiversity*
B.8.5 Give examples of human impact on various ecosystems*
B.8.8 Explain interactions among organisms or populations of organisms
B.12.2 Describe the value of ecosystems* from a natural and human perspective; e.g., food, shelter, flood control, water purification
B.12.3 Evaluate the stability and sustainability* of ecosystems* in response to changes* in environmental conditions (see SC Life and Environmental Science)
B.12.4 Analyze the factors that determine the number of organisms that can exist in a given area
B.12.5 Analyze past and current trends in ecosystem* degradation and species extinction (see SC Earth and Space Science)
B.12.6 Predict population response to changes* in environmental conditions
B.12.7 Evaluate the importance of biodiversity*
B.12.8 Relate the impact of human activities in ecosystems* to the natural process of change, citing examples of succession,* evolution,* and extinction (see SC Earth and Space Science)
C.4.2 Apply ideas of past, present, and future to specific environmental issues (see SC Connections)
C.12.1 Compare the effects of natural and human-caused activities that either contribute to or challenge an ecologically and economically sustainable* environment (see SC Nature of Science)
D.4.2 Identify and give examples of short-term and long-term solutions to a problem*
HARD COPY LESSON PLANS DEVELOPED FOR NATIONAL USE

ENGLISH
State English standards
B.12.1 Create or produce writing to communicate with different audiences for a variety of purposes

10. Write for a variety of readers, including peers, teachers, and other adults, adapting content, style, and structure to audience and situation

State Environmental Education standards
A.4.4 Communicate their understanding to others in simple terms (see LA Writing)

CREATIVE WRITING
State English standards
B.12.1 Create or produce writing to communicate with different audiences for a variety of purposes

4. Write creative fiction that includes an authentic setting, discernible tone, coherent plot, distinct characters, effective detail, believable dialogue, and reasonable resolution of conflict.

6. Write autobiographical and biographical narratives in a mature style characterized by suitable vocabulary, descriptive detail, effective syntax, an appropriate voice, a variety of sentence structures, clear coordination and subordination of ideas, and rhetorical devices that help establish tone and reinforce meaning.

C.12.2 Listen to, discuss, and comprehend oral communications

3. Distinguish between relevant and irrelevant information

6. Relate a speaker’s ideas and information to prior knowledge and experience

7. Consider the specific situation and current conditions when responding to instructions

C.12.3 Participate effectively in discussion

2. Consider the ideas and opinions of other speakers thoughtfully before responding

4. Be aware of and try to control counterproductive emotional responses to a speaker or ideas conveyed in a discussion

5. Appraise the purpose of discussions by examining their context and the motivation of participants

6. Perform various roles in a discussion, including leader, participant, and moderator

7. Demonstrate the ability to extend a discussion by adding relevant information or asking pertinent questions

8. Explain and advance opinions by citing evidence and referring to authoritative

State Environmental Education standards
A.4.1 Make observations, ask questions and plan environmental investigations* (see Science [SC] Inquiry; English/Language Arts [LA] Research)
A.4.4 Communicate their understanding to others in simple terms (see LA Writing)

MATH
State Math standards
A.12.1 Use reason and logic to

- evaluate information

- perceive patterns
- identify relationships
- formulate questions, pose problems, and make and test conjectures
- pursue ideas that lead to further understanding and deeper insight

A.12.2 Communicate logical arguments and clearly show
- why a result does or does not make sense
- why the reasoning is or is not valid
- an understanding of the difference between examples that support a conjecture and a proof of the conjecture

A.12.3 Analyze non-routine* problems and arrive at solutions by various means, including models* and simulations, often starting with provisional conjectures and progressing, directly or indirectly, to a solution, justification, or counter-example

A.12.4 Develop effective oral and written presentations employing correct mathematical terminology, notation, symbols, and conventions for mathematical arguments and display of data

A.12.5 Organize work and present mathematical procedures and results clearly, systematically, succinctly, and correctly

A.12.6 Read and understand
- mathematical texts and other instructional materials
- writing about mathematics (e.g., articles in journals) mathematical ideas as they are used in other contexts

State Environmental Education standards
A.4.1 Make observations, ask questions and plan environmental investigations* (see Science [SC] Inquiry; English/Language Arts [LA] Research)
A.4.2 Collect information, make predictions, and offer explanations about questions asked (see: SC Inquiry)
A.4.3 Develop answers, draw conclusions, and revise their personal understanding as needed based on their investigations* (see SC Inquiry)
A.4.4 Communicate their understanding to others in simple terms (see LA Writing)
A.8.2 Collect information from a variety of resources, conduct experiments, and develop possible solutions to their investigations*
A.8.3 Use techniques such as modeling and simulating to organize information gathered in their investigations* (see Mathematics [MA] Process)
A.8.4 Use critical-thinking strategies to interpret and analyze gathered information (see SC Inquiry)
A.8.5 Use the results of their investigations* to develop answers, draw conclusions, and revise their personal understanding
A.12.4 State and interpret their results accurately and consider other explanations for their results (see LA Writing)

HISTORY
State History standards
A.4.8 Identify major changes in the local community that have been caused by human beings, such as a construction project, a new highway, a building torn down, or a fire; discuss reasons for these changes; and explain their probable effects on the community and the environment
B.4.1 Identify and examine various sources of information that are used for constructing an understanding of the past, such as artifacts, documents, letters, diaries, maps, textbooks, photos, paintings, architecture, oral presentations, graphs, and charts
B.4.10 Explain the history, culture, tribal sovereignty, and current status of the American Indian tribes and bands in Wisconsin

State Environmental Education standards
A.4.1 Make observations, ask questions and plan environmental investigations* (see
Science [SC] Inquiry: English/Language Arts [LA] Research)
A.4.2 Collect information, make predictions, and offer explanations about questions asked (see: SC Inquiry)
A.4.3 Develop answers, draw conclusions, and revise their personal understanding as needed based on their investigations* (see SC Inquiry)
A.4.4 Communicate their understanding to others in simple terms (see LA Writing)
A.8.3 Use techniques such as modeling and simulating to organize information gathered in their investigations* (see Mathematics [MA] Process)
A.8.4 Use critical-thinking strategies to interpret and analyze gathered information (see SC Inquiry)
A.8.5 Use the results of their investigations* to develop answers, draw conclusions, and revise their personal understanding
A.8.6 Communicate the results of investigations* by using a variety of media and logically defend their answers (see LA Writing; Math [MA] Process)
B.8.9 Explain how the environment is perceived differently by various cultures* (see SC Nature of Science)
B.8.12 Provide examples of how different cultures* use natural resources reflecting the economic, aesthetic, and other values* of that culture

TECHNOLOGY AND DESIGN
State Technology Education standards
A.8.1 Show that technology has allowed us to further the efforts of science and, in turn, science has enabled us to develop better technology
A.8.2 Explain the need for and application of knowledge and skills from other disciplines when engaging in technological activities
A.8.3 Identify and contrast the connections and differences between technology and other disciplines
A.8.7 Discover that human will or desire can lead to the design of new technology in order to seize an opportunity or solve a problem
A.12.3 Explain why decisions regarding the use of technology are dependent on the situation, application, or perception of the group using it
A.12.7 Explain how scientific and technological research can contribute to improved quality of life and a better standard of living
B.8.1 Compare and contrast the function of each of the following common elements of technological systems: inputs, processes, outputs, and feedback
B.8.6 Identify all the resources necessary for a given system; analyze how the use of the resources will be affected by consideration for cost, availability, appropriate application, and regard for the environment
B.12.5 Assess the impact new and improved products and services have had on the quality of life; explain how the development of new tools, materials, and processes is necessary to maintain and improve high productivity and quality
C.8.1 Research and develop a set of solutions to solve a problem not knowing all Constraints
C.8.2 Explain and demonstrate several solutions to a problem or opportunity using technological design, tools, careful planning, experimentation, and testing
C.8.5 Explain the value of technical knowledge and teamwork in the development of a device or process
C.12.1 Implement and evaluate strategies to solve technological problems that are likely to be successful
C.12.2 Measure, collect, and analyze data in order to solve a technological problem
C.12.3 Defend solutions to technological problems and opportunities
C.12.4 Select materials and other resources for a technological design and develop practical solutions
C.12.8 Know that design solutions may have effects that were not predicted
C.12.10 Evaluate a technological solution and make necessary improvement if needed
State Environmental Education standards

A.4.1 Make observations, ask questions and plan environmental investigations* (see Science [SC] Inquiry; English/Language Arts [LA] Research)

A.4.2 Collect information, make predictions, and offer explanations about questions asked (see SC Inquiry)

A.4.3 Develop answers, draw conclusions, and revise their personal understanding as needed based on their investigations* (see SC Inquiry)

A.4.4 Communicate their understanding to others in simple terms (see LA Writing)

A.8.1 Identify environmental issue* questions that can be investigated using resources and equipment available (see SC Inquiry; LA Research)

A.8.2 Collect information from a variety of resources, conduct experiments, and develop possible solutions to their investigations*

A.8.3 Use techniques such as modeling and simulating to organize information gathered in their investigations* (see Mathematics [MA] Process)

A.8.4 Use critical-thinking strategies to interpret and analyze gathered information (see SC Inquiry)

A.8.5 Use the results of their investigations* to develop answers, draw conclusions, and revise their personal understanding

A.8.6 Communicate the results of investigations* by using a variety of media and logically defend their answers (see LA Writing; Math [MA] Process)

A.12.2 Suggest possible investigations* and describe the results that might emerge from the investigations* (see SC Inquiry)

A.12.3 Evaluate personal investigations* and those of others, critiquing procedures, results, and sources of data and suggest improvements to the investigation* (see LA Research; MA Process)

B.8.15 Analyze how people impact their environment through resource use

B.8.22 Identify careers related to natural resources* and environmental concerns (see SC Applications)

C.4.2 Apply ideas of past, present, and future to specific environmental issues (see SC Connections)

C.4.4 Identify some of the decisions and actions related to the issue

C.4.5 Identify proposed solutions to the issue and discuss arguments for and against the Issue

D.4.6 Develop a plan, either individually or in a group, to preserve the local Environment

D.8.6 Develop a plan for improving or maintaining some part of the local environment and identify their role in accomplishing this plan

D.12.1 Identify a variety of approaches to environmental issues,* evaluate the consequences of each, and select and defend a position

E.12.3 Take action in regard to environmental issues* in the home, school, or Communities

SCIENCE

State Science standards

B.4.1 Use encyclopedias, source books, texts, computers, teachers, parents, other adults, journals, popular press, and various other sources, to help answer science-related questions and plan investigations

C.4.6 Communicate the results of their investigations* in ways their audiences will understand by using charts, graphs, drawings, written descriptions, and various other means, to display their answers

C.4.7 Support their conclusions with logical arguments

C.8.2 Identify* data and locate sources of information including their own records to answer the questions being investigated

State Environmental Education standards

A.4.2 Collect information, make predictions, and offer explanations about questions
asked (see: SC Inquiry)

A.4.3 Develop answers, draw conclusions, and revise their personal understanding as needed based on their investigations* (see SC Inquiry)
A.4.4 Communicate their understanding to others in simple terms (see LA Writing)
A.8.4 Use critical-thinking strategies to interpret and analyze gathered information (see SC Inquiry)
A.12.4 State and interpret their results accurately and consider other explanations for their results (see LA Writing)

ART
State Art standards
None addressed

State Environmental Education standards
A.4.2 Collect information, make predictions, and offer explanations about questions asked (see: SC Inquiry)
A.4.4 Communicate their understanding to others in simple terms (see LA Writing)
A.8.4 Use critical-thinking strategies to interpret and analyze gathered information (see SC Inquiry)
A.8.5 Use the results of their investigations* to develop answers, draw conclusions, and revise their personal understanding

Habitat Management
State Science standards
B.4.1 Use encyclopedias, source books, texts, computers, teachers, parents, other adults, journals, popular press, and various other sources, to help answer science-related questions and plan investigations
B.8.6 Explain* the ways in which scientific knowledge is useful and also limited when applied to social issues
C.4.2 Use the science content being learned to ask questions, plan investigations*, make observations*, make predictions*, and offer explanations*
C.4.3 Select multiple sources of information to help answer questions selected for classroom investigations*
C.4.5 Use data they have collected to develop explanations* and answer questions generated by investigations*
C.4.6 Communicate the results of their investigations* in ways their audiences will understand by using charts, graphs, drawings, written descriptions, and various other means, to display their answers
C.4.7 Support their conclusions with logical arguments
C.4.8 Ask additional questions that might help focus or further an investigation*
C.8.1 Identify* questions they can investigate* using resources and equipment they have available
C.8.2 Identify* data and locate sources of information including their own records to answer the questions being investigated
C.8.6 State what they have learned from investigations*, relating their inferences* to scientific knowledge and to data they have collected
C.8.7 Explain* their data and conclusions in ways that allow an audience to understand the questions they selected for investigation* and the answers they have developed
C.12.1 When studying science content, ask questions suggested by current social issues, scientific literature, and observations* of phenomena, build hypotheses that might answer some of these questions, design possible investigations*, and describe results that might emerge from such investigations
F.8.10 Project how current trends in human resource use and population growth will influence the natural environment, and show how current policies affect those trends.

G.8.1 Identify* and investigate* the skills people need for a career in science or technology and identify the academic courses that a person pursuing such a career would need.

G.8.2 Explain* how current scientific and technological discoveries have an influence on the work people do and how some of these discoveries also lead to new careers.

G.8.3 Illustrate* the impact that science and technology have had, both good and bad, on careers, systems, society, environment, and quality of life.

H.12.5 Investigate* how current plans or proposals concerning resource management, scientific knowledge, or technological development will have an impact on the environment, ecology, and quality of life in a community or region.

State Environmental Education standards

A.4.1 Make observations, ask questions and plan environmental investigations* (see Science [SC] Inquiry; English/Language Arts [LA] Research).

A.4.2 Collect information, make predictions, and offer explanations about questions asked (see: SC Inquiry).

A.4.3 Develop answers, draw conclusions, and revise their personal understanding as needed based on their investigations* (see SC Inquiry).

A.4.4 Communicate their understanding to others in simple terms (see LA Writing).

A.8.1 Identify environmental issue* questions that can be investigated using resources and equipment available (see SC Inquiry; LA Research).

A.8.2 Collect information from a variety of resources, conduct experiments, and develop possible solutions to their investigations*.

A.8.5 Use the results of their investigations* to develop answers, draw conclusions, and revise their personal understanding.

A.8.6 Communicate the results of investigations* by using a variety of media and logically defend their answers (see LA Writing; Math [MA] Process).

A.12.5 Communicate the results of their investigations* to group.

B.8.15 Analyze how people impact their environment through resource use.

B.8.16 Recognize the economic, environmental, and other factors that impact resource availability and explain why certain resources are becoming depleted.

B.8.17 Explain how human resource use can impact the environment; e.g., erosion, burning fossil fuels, concerned with the issue* (see LA Oral Language).

B.8.5 Give examples of human impact on various ecosystems*.

B.8.22 Identify careers related to natural resources* and environmental concerns (see SC Applications).

B.8.23 Identify governmental and private agencies responsible for environmental protection and natural resource* management.

B.12.10 Identify and evaluate multiple uses of natural resources* and how society* is influenced by the availability of these resources.

B.12.11 Assess how changes in the availability and use of natural resources* (especially water and energy* sources) will affect society and human activities; such as, transportation, agricultural systems, manufacturing.

C.4.3 Identify people and groups of people that are involved in the issue.

C.4.4 Identify some of the decisions and actions related to the issue.

C.4.5 Identify proposed solutions to the issue and discuss arguments for and against the Issue.

C.12.1 Compare the effects of natural and human-caused activities that either contribute to or challenge an ecologically and economically sustainable* environment (see SC Nature of Science).

C.12.2 Explain the factors that contribute to the development of individual and societal values* (see SS The Behavioral Sciences: Individuals, Institutions, and Society).
D.12.5 Develop a plan to maintain or improve some part of the local or regional environment, and enlist support for the implementation of that plan (see SS Political Science and Citizenship: Power, Authority, Governance, and Responsibility; SC Nature of Science)

E.12.3 Take action in regard to environmental issues* in the home, school, or communities
Complete list of standards addressed by Wisconsin Turkey Education Box.

Art
A. 4.6, 8.4, 12.2
B. 4.2, 8.3, 8.6
C. 4.1, 4.5, 4.8, 8.5, 12.4
D. 4.5
E. 4.1, 8.5, 12.5
G. 4.1, 4.3, 8.3, 12.1
H. 4.1, 4.2, 4.3, 4.5, 8.3, 8.4, 12.3
I. 4.3, 8.5, 12.4
J. 4.9, 8.10, 12.2
L. 4.5, 8.5, 12.4

English
B. 12.1, 12.2, 12.6, 12.8, 12.9, 12.10
C. 8.3, 12.1, 12.2, 12.3, 12.5, 12.9, 12.10
D. 12.1, 12.3, 12.4
E. 12.1, 12.3, 12.4

Environmental Education
A. 4.1, 4.2, 4.3, 4.4, 8.1, 8.2, 8.3, 8.4, 8.5, 8.6, 12.1, 12.2, 12.3, 12.4, 12.5
B. 4.4, 4.5, 4.6, 4.11, 8.2, 8.3, 8.5, 8.8, 8.9, 8.10, 8.12, 8.14, 8.15, 8.16, 8.17, 8.22, 8.23
C. 4.1, 4.2, 4.3, 4.4, 4.5, 8.1, 8.2, 8.3, 8.4, 12.1, 12.2, 12.3, 12.4
D. 4.2, 4.6, 8.1, 8.2, 8.6, 8.7, 8.8, 12.1, 12.4, 12.5, 12.6, 12.7
E. 4.1, 4.2, 8.2, 12.2, 12.3

Math
A. 12.1, 12.2, 12.3, 12.4, 12.5, 12.6
B. 12.2, 12.3, 12.4, 12.5, 12.6
C. 12.3
D. 12.2, 12.3
E. 12.1, 12.2, 12.3, 12.4, 12.5
F. 12.1, 12.2, 12.3, 12.4

Physical Education
D. 4.1, 4.4, 8.3
F. 8.2

Science
A. 4.2, 4.3, 4.4, 4.5, 8.3, 8.4, 8.5, 8.6, 8.7, 12.1, 12.2, 12.3, 12.4, 12.5, 12.6, 12.7
B. 4.1, 8.3, 8.6, 12.4, 12.5
C. 4.1, 4.2, 4.3, 4.4, 4.5, 4.6, 4.7, 4.8, 8.1, 8.2, 8.3, 8.4, 8.5, 8.6, 8.7, 8.8, 8.9, 8.10, 8.11, 12.1, 12.2, 12.3, 12.4, 12.5, 12.7
F. 4.1, 8.1, 8.2, 8.4, 8.5, 8.9, 8.10, 12.1, 12.4, 12.5, 12.6, 12.7, 12.8, 12.9, 12.10, 12.11, 12.12
G. 8.1, 8.2, 8.3, 8.5, 8.7, 12.2, 12.4, 12.5
H. 4.4, 8.1, 8.2, 8.3, 12.1, 12.2, 12.3, 12.4, 12.5, 12.6, 12.7

Social Studies
A. 4.4, 4.5, 4.6, 4.7, 4.8, 4.9, 8.1, 8.4, 8.5, 8.10, 12.1, 12.2, 12.7, 12.11
B. 4.1, 4.8, 4.10, 8.4, 12.9
D. 4.4, 8.2

Technology Education
A. 4.8, 8.1, 8.2, 8.3, 8.7, 12.3, 12.7
B. 8.1, 8.4, 8.6, 12.5
C. 8.1, 8.2, 8.3, 8.5, 8.6, 12.1, 12.2, 12.3, 12.4, 12.8, 12.10
D. 12.3
E. 8.1
CURRICULUM DEVELOPMENT EDUCATION PANEL

Lead teacher

Scott Stankowski: B.S., UW Stevens Point, WI, Biology/Education
Masters Degree, UW Stevens Point, Environmental Education
Science Teacher four years at Pacelli High School in Stevens Point. Currently teach Honors Human Anatomy/Physiology at Lincoln High School. Instructor for BOW (Becoming an Outdoors Woman). Chapter President and Banquet Chairman of Central Wisconsin Struttin' Toms of the NWTF.

Panel

Martha Kronholm: Bachelor of Science Degree, UW-Lacrosse, WI. Elementary Education.
Masters Degree, UW-Stevens Point, WI. Emphasis in Science and Environmental Education
Doctorate, SIU, Carbondale, Illinois. Curriculum and Instruction.
Currently teach a mulitage classroom at Grove Elementary School, where I’ve taught since 1992. Served as ad hoc faculty for UW-SP and as curriculum consultant for NCREL and the DPI during the last five years. Have taught preservice classes in Science, EE, and Natural Resources since the late 1980’s to the present. Assisted in taking high school students to Panama for “Save the Rainforest” courses in 1996, 1998, and 2000.

Brian Daliege: B.S. UW-Stevens Point; Mathematics/Education. MA- Silver Lake College: Teacher Leadership.


Kurt Jensen: B.S. UW-La Crosse, Accounting; Master’s in English Education UW-La Crosse. English teacher two years at Pacelli High School in Stevens Point. English teacher two years at Waupaca High School in Waupaca. English teacher for the past five years at Lincoln High School in Wisconsin Rapids. Currently teach English 2 (Sophomores), English 3 (Junior American Literature), and Senior English Literature and Composition.

Jeffrey Johannes: Bachelor of Science Degree, UW Stevens Point, WI, Art Education
Masters Degree, UW Superior, WI, Fine Arts
Lincoln High School art teacher since 1974
Bloodstone/Student Art & Poetry Publication, Advisor since 1978
1986 DPI Arts World Instructor, UW Platteville, WI
1987 “100 Winning Curriculum Ideas” American School Board Association
1987-88 Lincoln High School Teacher of the Year
1991 Recipient of a Kohl Fellowship

Joan Johannes has been teaching Language Arts at Lincoln High School in Wisconsin Rapids, WI since 1973. She holds BS and MST degrees from UWSP and has taken graduate classes at Northwestern, Oberlin, and Ball State, in addition to UWSP, UW Eau Claire, and UW Platteville. She won a Kohl Fellowship and was named WI Secondary Teacher of the Year in 1993. In 1999 she won the Chisholm Award from the WI Council of Teachers of English for meritorious service to the profession. She has also won two national fellowships for summer study in American Literature and Speech, in addition to two state fellowships. An advisor of the award-winning literary/art journal. Bloodstone. Johannes has also published her own poetry, music, articles, and creative nonfiction

Jim Fisher: B.S. degree from U.W.St.Point in 1972, M.S. degree from U.W.St.Point in 1981. I have been teaching at L.H.S. since Jan. of 1973. I have worked on committees which have dealt with curriculum changes, introducing usage of the 7 intelligences in the classroom, as well as the use of Brain-Based Learning. I have attended conferences on Learning and the Brain in Boston, Mass., been a participant in the People to People Ambassador Program visiting mainland China in 1994 with the purpose of visiting their schools K through University levels. In the summer of 2001 I was a presenter for the CELT Project through U.W.St.Point.

John Kleinhaus: B.S., UW La Crosse, WI, Major in Broad Field Science, Minor in Chemistry
Lincoln High School teacher since 2001. Taught Comprehensive Natural Science in 9th and 10th grade as well as Chemistry.
2000-01 Taught Chemistry and Physics at Plainview, MN
As a graduate student in environmental education at UWSP I need to complete a masters project. My project is to redesign the National Wild Turkey Federations ‘Wild About Turkey’ education box. This box was designed by the Federation in an effort to infuse knowledge of the wild turkey into the classroom. It has a good overall design but lacks in many areas, especially with its’ pertinence to Wisconsin. It also does not address state standards; therefore teachers may be reluctant to use it. It is my goal to coordinate an effort to adjust this.

I am looking for teachers to be part of a panel. This panel will help develop useful lessons in conjunction with the box. (From a teacher for a teacher!). I need teachers in the following disciplines. Two K-8 teachers, 8-12 Science, 8-12 English, 8-12 Math, 8-12 Social Studies, Art, Consumer Ed and Tech Ed. Specifically I have ideas in many of these areas that only need some fine-tuning and the state standards addressed. The federation has written a WEEB grant for my project and I am hopeful that there will be funds to pay you for your efforts. I can not guarantee this. If you are interested at the very least in improving your resume or helping a swell guy like me out, please email me back and let me know.

The panel would get together to look at what the box currently has and how it can be improved upon. The next step would be to develop a lesson or two in your particular field and address the state standards. I will take care of the EE standards for your lesson. The box will then be distributed to teachers across the state to which you have contact with for the 2002-03 school year. In the 2003 spring a final meeting will occur in which we will assess how the pilot studies went and make any necessary adjustments.

If you have any further questions let me know, I know all of you and am selecting you because I know you will do quality work. You can reach me at school at (715) 422-7202 and email at stankowssh@wrps.org

Scott Stankowski
CURRICULUM DEVELOPMENT EDUCATION PANEL

Project Coordinator
Scott Stankowski: B.S., UW Stevens Point, WI, Biology/Education
Masters Degree, UW Stevens Point, Environmental Education
Science Teacher four years at Pacelli High School in Stevens Point. Currently teach Honors Human Anatomy/Physiology at Lincoln High School. Instructor for BOW (Becoming an Outdoors Woman). Chapter President and Banquet Chairman of Cnetral Wisconsin Struttin' Toms of the NWT.

Panel
Scott Benitz: B.S. University of Wisconsin - Stout with Technology Education major. M.S.E. University of Wisconsin - Stevens Point with ED/LD teaching certification. Technology Education Instructor for 15 years. Currently teaching Welding Technology, Automotive Technology and Graphic Productions


Jim Fisher: B.S. degree from U.W.St.Point in 1972, M.S. degree from U.W.St.Point in 1981. I have been teaching at L.H.S. since Jan. of 1973. I have worked on committees which have dealt with curriculum changes, introducing usage of the 7 Intelligences in the classroom, as well as the use of Brain-Based Learning. I have attended conferences on Learning and the Brain in Boston, Mass., been a participant in the People to People Ambassador Program visiting mainland China in 1994 with the purpose of visiting their schools K through University levels. In the summer of 2001 I was a presenter for the CELT Project through U.W.St.Point.

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Masters Degree, UW-Stevens Point, WI. Emphasis in Science and Environmental Education
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Currently teach a multitage classroom at Grove Elementary School, where I've taught since 1992. Served as ad hoc faculty for UW-SP and as curriculum consultant for NCREL and the DPI during the last five years.
Have taught preservice classes in Science, EE, and Natural Resources since the late 1980's to the present. Assisted in taking high school students to Panama for "Save the Rainforest" courses in 1996, 1998, and 2000.
AGENDA
Thursday May 23rd 3:10 p.m.
Meeting #1 Panel Information

Introduction:
To other members of panel
  Brian Daliege- math
  Jim Fisher- social studies
  John Kleinhaus- science
  Kurt Jensen- english
  Jeff/ Joan Johannes- Art
  Scott Benitz- Technology ed.
  Martha Kronholm- k-6

To turkey education box
  See attached sheet
  Cd rom
  Posters and bulletin board
  Supplemental lesson plans

To establishing supplemental material for “Wild About Turkey” education box
  My masters project is to make the turkey ed box more “placed based” for Wisconsin. Also to align it with Wisconsin educational standards including environmental education

Expectations:
  For you
    *Take current lessons in your discipline and apply state standards to them
    *Include a lesson that ties in with the box and your discipline and addresses state standards.
    *Adhere to timeline.
    *Adhere to template for lesson plans.(see attached sheet- Turkey trouble)
  For me
    *$100
    *addressing the EE standards for your lesson.
    *support for background knowledge in reference to turkeys in Wisconsin.

Questions?:
  About box?
  About project?
  About NWTF?
  About turkeys?

Set next meeting date:
  We will peer review lessons and handing in final project to me.
  Ultimate Completion date is September 1, 2002.
APPENDIX G
I would like to thank you for selecting to use the Wisconsin version of the National Wild Turkey Federation’s ‘Wild About Turkey’ education box. I created the supplement as part of my masters degree in Environmental Education at UWSP. I am really excited about what it can offer our youth. Studies show that materials that are place-based provide a higher degree of retention of materials. You are one of the select few who will get to pilot the new curriculum. In return for being on the cutting edge of this project I am asking for you to review the lesson plans and any supplements that you used in relationship to the new curriculum. Pass this on to another teacher in a different discipline so that I may get a review of all supplemental lesson plans. Please take a few moments to answer the following questions. Use additional space for comments. I need this returned to me by Jan. 10th 2003.

1. What grade level do you teach? _______________________

2. What class did you use the lesson in? _______________________

3. What lesson plan did you use? _______________________

4. Did you find the lesson to meet state standards that you need addressed? Y or N

5. Did you find the lesson easy to understand? Y or N

6. Was the lesson applicable to your curriculum specifically? Y or N

7. Was the supplemental information adequate to give you background knowledge of the Wisconsin Turkey? If not what would you like to see added? Y or N

Please provide your name, school address and phone number in case clarification or follow up questioning is necessary. Thank You for you time

Name ______________________ Address ______________________

_____________________ ph # ______________________

Email ______________________

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Email: stankowssh@wrps.org
SUMMARY OF RESPONSES
Number of field studies distributed: 25
Number of responses: 20

What grade level do you teach? 3-12

What class did you use the lesson in? Science, English, art

What lesson plan did you use? Most science lessons were used while all were reviewed.

Did you find the lesson to meet state standards that you need addressed? Y or N
All were yes

Did you find the lesson easy to understand? Y or N
All were yes

Was the lesson applicable to your curriculum specifically? Y or N
All were yes

Was the supplemental information adequate to give you background knowledge of the Wisconsin Turkey? If not what would you like to see added? Y or N
All were yes

Comments: Some grammatical errors were identified throughout the copy. Standards were uniformed according to grade levels. Some urban teachers indicated that the application of some of the lessons would be difficult to address (such as Gobbling Census).