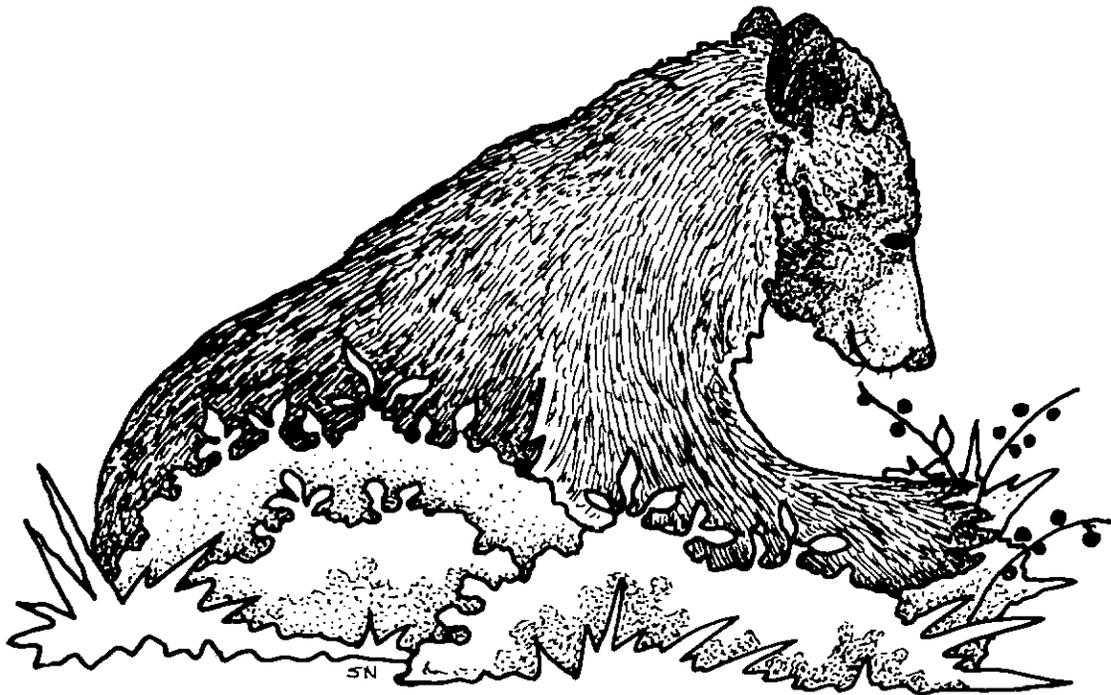


THE FLORIDA BLACK BEAR

CURRICULUM GUIDE

FACILITATOR MANUAL



THE FLORIDA BLACK BEAR CURRICULUM GUIDE
IS A JOINT PROJECT OF
FLORIDA FISH & WILDLIFE CONSERVATION COMMISSION
AND
DEFENDERS OF WILDLIFE

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THE FLORIDA BLACK BEAR CURRICULUM GUIDE FACILITATOR TRAINING MANUAL

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INTRODUCTION

This manual serves as a source of information and materials for all *Florida Black Bear Curriculum Guide* workshop facilitators. It is not intended to be prescriptive, but rather, includes a wide variety of materials workshop facilitators may choose to use in their workshops. The manual is designed to be used and distributed as part of Fish and Wildlife Conservation Commission-sponsored facilitator training workshops.

For ease of use, the manual is divided into three sections. **Section One** contains brief summaries of support information facilitators can use to help make their workshop experiences more enjoyable and successful for participants. The information in this section is also designed to help facilitators become more effective and confident workshop leaders and change agents.

Section Two contains master copies and answer keys for instruments which may be used as pre and post assessment, instruction and evaluation tools at all *Florida Black Bear Curriculum Guide* workshops. This section includes instruments for assessing the impact of the workshop experience on participants' knowledge of, attitudes toward, and behavioral intentions on behalf of Florida black bears. This section also includes a "Bear Trek" instrument to familiarize workshop participants with the contents and organization of the *Curriculum Guide* and a "Workshop Evaluation Form" for collecting valuable feedback from participants.

Section Three contains a set of 16 blackline master transparencies. Depending on the needs, interests, and backgrounds of workshop participants, facilitators can select the transparencies they think are most appropriate for each workshop they offer. Some of these transparencies summarize key points from the "Introduction" section of the *Curriculum Guide* while others contain additional information and review materials not found in the actual *Curriculum Guide*.



FLORIDA BLACK BEAR CONSERVATION ACTIVITIES

notes

The Florida Black Bear Curriculum Guide is an environmental education tool designed specifically for Grade K-6 teachers and their students. The *Curriculum Guide* is just one part of a network of related current activities designed to secure the future of Florida's black bear. Although the education of children is an important component of a long-range species conservation plan, a comprehensive conservation effort for a species like the Florida black bear requires a diverse array of educational, legislative, enforcement, and protection initiatives. As described on page v of the *Curriculum Guide*, the Florida Fish and Wildlife Conservation Commission (FWC) and Defenders of Wildlife have formed a partnership dedicated to Florida black bear protection and conservation. The following is a summary of key activities sponsored and administered by these two groups:

Defenders of Wildlife

- Habitat for Bears Campaign – The Habitat for Bears Campaign, a joint project of Defenders of Wildlife and the Florida Chapter of the Sierra Club, aims to protect the Florida black bear, black bear habitat and associated biodiversity. The campaign has been active since 1993 working on behalf of the bear through grassroots advocacy and public education at the local, regional, state and national levels. For more information contact: Christine Small at 863-467-6343 or Laurie Macdonald at 727- 821-9585.
- “The Imperiled Bears of Florida” Media Program - Includes an 8' x 8' multi-media display available free to libraries, museums, and nature centers throughout Florida. A 40-minute slide presentation is also available.
- “Kids for Cubs” Classroom Program – A 30-60 minute slide presentation geared toward students in grades K-7. The program, which is available free to schools throughout Florida, is meant to educate children about the Florida black bear, threats to its survival and conservation of bears and other wildlife.
- Transportation Advocacy – The Habitat for Bears Campaign advocates retrofitting roads that are dangerous to bears and other wildlife with underpasses and bridge improvements.

Florida Fish and Wildlife Conservation Commission

- Statewide Black Bear Coordinator – The Bear Management Section Leader is responsible for developing and coordinating the Florida Fish and Wildlife Conservation Commission's bear management efforts. Major activities include providing technical guidance to staff, designing research projects, cooperating with other organizations and providing information to the public. The ultimate goal of these efforts is to ensure the continued survival of the black bear in Florida.
- Florida Department of Transportation Interface – Biologists from the FWC provide technical assistance to the Florida Department of Transportation (FDOT) to identify and resolve transportation-related wildlife and habitat issues. Major issues addressed on FDOT highway projects include habitat loss, fragmentation and isolation of large contiguous habitat systems, management and protection of public lands and highway mortality of black bears and other threatened and endangered species. Information from the FWC's wildlife and habitat geographic information system data base is provided to FDOT for use in highway alignment analysis and impact assessment. The FWC also provides input on the justification, design and siting of wildlife underpasses and bridge extensions over river floodplains to maintain habitat connectivity and reduce wildlife roadkills.
- “Living with the Florida Black Bear” Educational Pamphlet - Free 16-page color pamphlet designed to educate the general public about the life history and distribution of Florida black bears as well as strategies for minimizing negative/harmful interactions with bears.

- “Living in Bear Country: A Homeowner’s Guide” – Free brochure describing ways to discourage bears at home and what to do if you encounter a black bear.
- “Understanding Human-Bear Conflicts in Florida” (7.5 minute video) free to *Curriculum Guide* educators, otherwise cost is \$3.50 each (to obtain an order form go to <http://www.wildflorida.org/bear/conflicts.htm>).

Joint Activities

- Conserve Wildlife License Plate (commonly known as the “Bear Tag”) – This plate was created to generate additional revenue needed to implement FWC programs aimed at conserving our state’s natural heritage. The license plate is the product of a four-way, public-private partnership involving the FWC, the Wildlife Foundation of Florida (Foundation), Defenders of Wildlife and the Florida Chapter of the Sierra Club. A conserve wildlife license plate costs \$17 more than a regular plate. Two dollars of this additional cost goes to the Department of Highway Safety and Motor Vehicles and the remaining \$15 is managed by the Wildlife Foundation of Florida, Inc. (a not-for-profit organization supporting activities of the FWC). The Foundation uses these funds to award restricted grants for wildlife conservation programs administered by the FWC. Examples of funded programs include species and habitat research, law enforcement and educational programs about Florida’s diverse wildlife. Recently the Foundation provided a \$35,000 grant to FWC’s Conservation Education Section to develop and implement the Be Bear Aware Campaign in Seminole County. Special emphasis will be placed on projects involving the Florida black bear and preservation of black bear habitat.
- Florida Black Bear Festival – The Florida Black Bear Festival is a free annual event, usually held in the Fall, sponsored by the Florida Fish and Wildlife Conservation Commission, Defenders of Wildlife, the U.S. Forest Service, the Florida Chapter of the Sierra Club, the City of Umatilla, the Umatilla Chamber of Commerce and WalkAbout Adventures in Umatilla (just south of the Ocala National Forest). The festival provides an entertaining forum for communicating bear conservation messages, providing information about reducing or avoiding human/bear conflicts and portraying the black bear as an economic asset rather than a liability, especially in the host community of Umatilla. Festival activities include seminars with naturalists and biologists, demonstrations, musical entertainment with a wildlife/nature theme, field trips into bear habitat and children’s activities. For more information visit the festival Web site at www.flblackbearfestival.org or contact: Joni Ellis at 352-955-6588, Sherre Dabanian at 407-323-8903 or Christine Small at 863-467-6343.
- Be Bear Aware Campaign – Be Bear Aware (BBA) is a joint educational project of FWC, Defenders of Wildlife and the U.S. Forest Service. Materials include a 7.5 minute video titled, “Understanding Human Bear Conflicts in Florida,” the Living in Bear Country” brochure, a refrigerator magnet with a checklist of BBA actions, a Bear Food Attractants page, a Bear Encounters page and information on the Conserve Wildlife tag. These materials are distributed to homeowners in bear country. Contact Judy Gillan at 850-921-4484 or Joni Ellis at 352-955-6588.
- The Florida Black Bear Curriculum Guide project – A joint project of FWC and Defenders of Wildlife. The project targets teachers of and students in grades 3-5. Implemented through facilitated workshops. Administered by the FWC through the K-12 Programs Office, contact Carrie Hamby at 850-488-4679 or Judy Gillan at 850-921-4484.

BLACK BEAR WORKSHOP PREPARATION TIPS

notes

The following information regarding workshop preparation, agendas, and tips for successful workshops builds upon the information already provided via existing Fish and Wildlife Conservation Commission facilitator training workshops. While these same general topics are covered in the regular facilitator handbook, the information provided here has been tailored specifically for facilitators planning and implementing Florida black bear workshops.

Advertising and scheduling workshops – Florida black bear workshops will be naturally appealing to past Project WILD and Schoolyard Wildlife Project participants while also opening the door for recruitment and participation of many new educators who have not previously completed any environmental education training. For educators who are already environmentally focused, the *Florida Black Bear Curriculum Guide* complements existing programs such as Project WILD and the Schoolyard Wildlife Project by providing a set of thematic lessons focusing on significant, current, Florida-specific conservation issues. For educators who see environmental education as an add-on to an already crowded curriculum, the *Curriculum Guide* can be marketed as an easy-to-implement set of interdisciplinary activities designed to help teachers directly address the required skills and competencies outlined in the Sunshine State Standards. Rather than being an “extra” component, the *Curriculum Guide* provides teachers with activities and assessments that can help students better prepare for the annual FCAT and Florida Writes subject area tests.

When advertising black bear workshops via flyers, brochures, newsletters, posters or media exposure, the following components should be included:

- A brief description of the *Florida Black Bear Curriculum Guide* contents and sponsoring organizations
- A summary of the educational goals of the curriculum
- A rationale outlining the benefits of the curriculum and training for educators and their students
- A brief profile of the workshop facilitator(s)
- Specific information regarding workshop date and starting and ending times
- Brief summary of workshop agenda and format
- List of supplies, materials, and/or clothing participants need to bring
- Explanation of provisions for meals, snacks, beverages
- Brief description of workshop site including map and directions if necessary
- Registration and contact person information
- List of materials participants will receive (including the *Curriculum Guide* and color poster insert)
- Information regarding in-service credit, if applicable

Choosing a site

If necessary, all 10 of the activities in this guide can be completed indoors, however, the two role-playing activities “The Black Bear Necessities” and “Bear Barriers” work best if they are conducted outside in a large open area. All of the activities in this guide include a hands-on activity component and small group work, therefore the workshop site should contain several large flat table top work areas rather than individual desks or seats without tables. All lessons also include a whole-class lecture/discussion component, which requires all participants to have a good view of the facilitator and a visual presentation area such as a blackboard, flip chart, or overhead projector. To facilitate easy distribution of workshop materials a central supply table should also be set up. Finally, in order to facilitate sharing of group work with fellow participants, wall space for displaying work products should also be available.

Arranging for in-service credit

Many counties have in-service components that are broad enough to include the concepts taught in the *Florida Black Bear Curriculum Guide*. If you would like to offer in-service credit, it is important that you consult with the county Teacher Education Coordinator (TEC) or staff development personnel to determine if a component has been established that could include the *Florida Black Bear Curriculum Guide*. You can also consult with FWC's K-12 Programs Coordinator, Carrie Hamby, at 850-488-4679 or e-mail carrie.hamby@fwc.state.fl.us.

Essential Workshop Materials

In addition to adequate copies of the transparencies and student worksheets/handouts required for each lesson, the following list summarizes additional materials facilitators should have on hand in order to implement each lesson in the *Curriculum Guide*.

General workshop materials:

- Scissors
- Glue sticks or paste
- Crayons or colored pencils
- Calculators
- Rulers
- Colored transparency markers

Lesson 1:

- "The World of Bears" Color Poster
- Double-sided sample of Worksheet Two (bear outline and bear skeleton)
- Sample of completed black bear skull model
- 8.5 x 11 inch file folders or poster board and brass paper fasteners for black bear skull models

Lesson 2:

- "The World of Bears" Color Poster
- Assembled sets of "The World of Bears" Map, Summary Cards, and Stickers

Lesson 3:

- Samples of local or state newspaper or magazine articles regarding Florida black bear issues
- Sets of "Bear Dilemmas" Scenario Cards

Lesson 4:

- Pictures or photographs of bears at different stages in their life cycle, including cubs and adults.
- Assembled sets of dice, "It's a Bear's Life" Game Boards, Rule Sheets, Bear Tokens, and Game Cards

Lesson 5:

- Blindfold
- Color pictures or photographs of different Florida black bear foods
- Laminated set of "The Black Bear Necessities" Food Cards

Lesson 6:

- 200 feet of string or rope
- Laminated sets of Limiting Factor Badges
- Zip-lock bags or envelopes of Bear Cards
- Set of colored Dispersal Cards
- Five bowls or small containers
- 100 AIMS Friendly Bears or other small counting objects

Lesson 7:

- Sample completed color versions of male and female Habitat Maps

Lesson 8:

- Assembled sets of Plant Community Sheets and Animal Cards
- Sample completed "Bear Neighbors" Plant Community Sheets

Lesson 9:

- Samples of local or state newspaper or magazine articles regarding Florida black bear roadkills

Lesson 10:

- Large road map of Florida illustrating urban areas and major highways
- Sample completed “Oh Where, Oh Where is Florida’s Bear?” Map

Supplemental Workshop Materials

The following list summarizes supplemental materials facilitators may want to have on hand in order to implement particular lessons in the *Curriculum Guide*.

Lesson 1:

- Sample completed K-W-L chart
- Color photographs or pictures of Florida black bears and Florida panthers
- Replica of a black bear skull, canine tooth or claw

Lesson 2:

- Sample completed “The World of Bears” Map
- Sample hand-colored version of the black and white “The World of Bears” Poster

Lesson 3:

- Samples illustrating different cultural views of bears, such as bear totems, stuffed bear toys, bear carvings or statues, bear jewelry, bear cartoons, children’s stories or fairy tales depicting bears, advertisements, posters, signs, or flags containing bears

Lesson 4:

- Black bear hand puppet

Lesson 5:

- Replica of black bear scat

Lesson 6:

- One whistle
- At least four marker flags

Lesson 7:

- Replica of black bear track or track mold

Lesson 8:

- Color pictures or photographs of sand pine scrub, pine flatwoods and fresh-water swamp communities



SAMPLE WORKSHOP AGENDAS – 6 HOURS

The following two sample agendas are designed to serve as suggested time and activity guidelines for primary and upper elementary/middle school-oriented workshops. Both workshop agendas are designed to be completed in six hours with an additional 30 minute lunch break. Agendas should be modified as needed to suit the needs of your particular group of participants.

PRIMARY WORKSHOP (Grade K-3 Teachers)

Due to the limited computational, reading and writing skills of primary grade students, this agenda highlights lesson components focusing on general awareness, attitudes, outdoor role playing and art activities. Each lesson contains specific suggestions for modification for younger students.

| ACTIVITY | SUGGESTED TIME |
|--|----------------|
| Welcome and introductions | 10 minutes |
| Administer Pre-Assessments | 20 minutes |
| Play “Fact or Fiction” | 20 minutes |
| Complete and review Black Bear Trek | 20 minutes |
| Overview of curriculum purpose/rationale/organization | 20 minutes |
| Modified awareness activity (Lesson 1) | 30 minutes |
| Break | 15 minutes |
| Modified attitude/value activity (Lesson 3) | 30 minutes |
| Review “How do kids feel about Florida black bears?” | 20 minutes |
| Modified role playing activity (Lesson 5) | 30 minutes |
| Lunch | 30 minutes |
| Modified art activity (Lesson 8) | 30 minutes |
| Discuss techniques for modifying lessons for primary students | 20 minutes |
| Break | 15 minutes |
| Complete and share Action Commitment Forms | 20 minutes |
| Review “What do kids want to do to help Florida black bears?” | 20 minutes |
| Play “Bear Biologist Trivial Pursuit” | 20 minutes |
| Complete Workshop Evaluation Forms and Post Assessments | 20 minutes |

UPPER ELEMENTARY AND MIDDLE SCHOOL WORKSHOP (Grade 4-6 Teachers)

In addition to an emphasis on improving environmental awareness and attitudes, this agenda highlights academic subject area activities including mathematics and social studies. A stronger action-oriented component is also included for this target age level.

| ACTIVITY | SUGGESTED TIME |
|--|-----------------------|
| Welcome and introductions | 10 minutes |
| Administer Pre-Assessments | 20 minutes |
| Play "Fact or Fiction" | 20 minutes |
| Complete and review Black Bear Trek | 20 minutes |
| Overview of curriculum purpose/rationale/organization | 20 minutes |
| Sample awareness activity (Lesson 1) | 30 minutes |
| Break | 15 minutes |
| Sample attitude/value activity (Lesson 3) | 30 minutes |
| Review "How do kids feel about Florida black bears?" | 20 minutes |
| Sample math activity (Lesson 4, Lesson 6 or Lesson 9) | 35 minutes |
| Lunch | 30 minutes |
| Sample geography/mapping activity (Lesson 2, Lesson 7, or Lesson 10) | 30 minutes |
| Discussion of potential individual and group action activities for students | 15 minutes |
| Break | 15 minutes |
| Complete and share Action Commitment Forms | 20 minutes |
| Review "What do kids want to do to help Florida black bears?" | 20 minutes |
| Play "Bear Biologist Trivial Pursuit" | 20 minutes |
| Complete Workshop Evaluation Forms and Post Assessments | 20 minutes |

TIPS FOR SUCCESSFUL WORKSHOPS

By far, the most common suggestions cited (from a study previously done on FWC's Schoolyard Wildlife Project) for improving curriculum workshops involved increasing the time allocated to hands-on activities and increasing opportunities for group interaction and discussion. As a facilitator, you can easily address these concerns by considering two areas when planning and conducting workshops, namely workshop format and time allocation.

Workshop Format

Unlike traditional presentations which provide relatively little opportunity for participant input, *Florida Black Bear Curriculum Guide* workshops should provide extensive opportunities for active participant involvement. Just as we expect classroom teachers implementing the activities in the *Curriculum Guide* to focus on facilitative instruction rather than direct instruction, workshop leaders should serve as models of facilitative instruction during workshops. As discussed on page xiii of the *Curriculum Guide*, the most common techniques used in facilitative instruction are discussion and hands-on small group work. Rather than simply telling learners what is "correct," facilitative instructors use questions to help learners refine and correct their ideas. To achieve these facilitative instruction goals, workshops should be structured using an interactive round-table format rather than a lecture format. Participants should feel free to share and contribute ideas or ask questions throughout the entire workshop experience. In addition, rather than simply telling participants how an activity should be implemented or telling them what students should learn or discover as a result of an activity, the workshop should allow participants to play the role of young students and actually conduct each activity. This will allow participants to experience the activity from their students' point of view and help them identify modifications they may need to make for their own particular groups of learners.

Time Allocation

While participants may feel the information presented is useful, interesting, and valuable, too much information presented at once can lead to information overload. One way to reduce the cognitive overload experienced by participants is to intersperse informational presentations with hands-on experiences during workshops. Recommended guidelines for time allocation include taking at least two breaks during a four-hour workshop, presenting no more than 15 minutes of information at a time, using game-like formats such as "Fact or Fiction" and "Bear Biologist Trivial Pursuit" as information presentation tools, and using overhead transparencies or large written bulleted lists as visual guides for participants during presentations. As a rule, when allocating time during your workshops, **try to spend at least 50% of your total workshop time engaging participants in hands-on activities or interactive discussions.**

A final time-related concern is that of facilitator time management during workshops. In order to maximize the limited amount of time available during a four-hour workshop, facilitators need to be good time monitors and minimize the time lost during transitions between activities, during breaks, etc. Recommendations for improving time management include orienting participants to important details such as break times and restroom and water fountain locations at the beginning of the workshop, preparing and organizing sets of all hands-on materials and print materials in advance for easy distribution, designating one person from each group to pick up and return each group's materials, and keeping whole-group discussions focused on the topic of interest.

Like Project WILD, the Schoolyard Wildlife Project, Project Learning Tree and Project WET, *The Florida Black Bear Curriculum Guide* is intended to serve as an environmental education supplement for elementary and middle school teachers. Although environmental education is considered a relatively new discipline in the U.S. educational system, an extensive body of literature exists regarding environmental education theory and practice. The following paragraphs contain brief summaries of relevant research findings in the area of formal K-6 environmental education.

Barriers to Environmental Education

Despite the fact that formal environmental education (EE) has existed in the U.S. for more than 30 years, the vast majority of K-6 classroom teachers rarely, if ever, engage in environmental education activities with their students. Numerous survey and interview studies have identified four major categories of barriers that limit the widespread implementation of environmental education programs in U.S. elementary and middle schools. These four categories of barriers include conceptual, attitudinal, educational and logistical barriers.

Conceptual barriers include numerous misconceptions teachers have about EE, including the view that environmental education belongs in science classes and that environmental education represents an add-on to an already crowded curriculum.

Attitudinal barriers include negative perceptions about EE, such as the view that environmental education involves outdoor work where students and teachers get dirty and the potential for accidents and behavior problems is high. Other significant attitudinal barriers include the view that environmental education isn't as important as other academic subjects since it isn't included on statewide or national assessments and the view that environmental education is too "touchy-feely" and student learning outcomes are too difficult to assess using traditional paper and pencil tests.

Educational barriers include the fact that most K-6 teachers have never had a course in environmental education teaching methods and the fact that most K-6 teachers do not know about the numerous EE curriculum resources and other educational materials readily available to them. Thus, even K-6 teachers who have overcome conceptual and attitudinal barriers rarely engage in EE activities with their students because they don't know how to implement EE and they don't know what EE activities to conduct. Many teachers also cite their own lack of substantive environmental content knowledge as a major educational barrier. They may want to teach about the environment, but they don't know enough about environmental topics to adequately address student questions and successfully design their own lessons.

Finally, logistical barriers include a wide variety of practical concerns, such as lack of administrative support for EE, lack of adequate time to plan and/or implement EE activities, lack of access to supplies, materials, and curriculum resources, lack of funding for field trips, pressure to teach a prescribed curriculum to prepare for statewide assessments, and large class sizes. For teachers who have overcome conceptual, attitudinal and educational barriers, these logistical barriers may still prove insurmountable. Environmental education workshop facilitators need to be aware of these major categories of barriers and provide participants with strategies and skills for overcoming these barriers when possible.

Environmental Education Philosophy

Traditionally, most subjects included in the formal education curriculum have focused on two major domains: the cognitive domain (knowledge of facts and concepts related to a particular content area) and the psychomotor domain (mastery of thinking skills and technical or motor skills related to a particular content area). Environmental education

differs from many other subjects in the formal curriculum in that it also directly addresses a third domain, the affective domain, which focuses on attitudes, values and belief systems related to a particular content area. The philosophy underlying all successful environmental education programs is that education should progress along a continuum leading students from initial awareness of an environmental concept or issue to ultimate action related to the concept or issue. To accomplish this goal, environmental education programs need to focus on six different categories of student outcomes, namely: awareness, knowledge, attitudes/values, problem solving skills, evaluative ability and ultimately individual and group action. The lessons in the *Florida Black Bear Curriculum Guide* are organized along this continuum in order to help teachers and students move from awareness to action, but it is important to note that students should always be free to express their own personal attitudes and choose their own courses of action, even if they are different from the attitudes or behaviors demonstrated by their peers, teachers or parents.

Environmental Knowledge, Attitude and Behavior Relationships

Historically, formal education programs were structured based on the underlying assumption that knowledge directly influences behavior. The view was that “knowledge is power.” If students understand the facts and concepts related to a topic, they will adjust their behavior accordingly. Extensive research on the link between knowledge and resulting behavior has proven this assumption incorrect. Educational researchers now agree that, in order to influence behavior, learners also need to develop positive attitudes related to a topic. Content knowledge alone does not guarantee the development of desirable behaviors. For example, in the past, it was assumed that if students learned more about the natural history, ecological importance and behaviors of an animal like a spider, bat or snake, they would naturally be less inclined to harm or kill these animals. Research showed that knowledge alone did not necessarily lead to more positive behaviors toward these less charismatic animals. Students may know that spiders have two body segments, eight legs and are arachnids, but they may still kill one when they see it. We now know that the sequence of learning influencing behavior is more complex, and involves the interaction of both knowledge and attitude components. As indicated in the popular Theory of Reasoned Action, cognitive (knowledge) and affective (attitude) components interact to influence an individual’s intention to behave in a particular way. Thus, effective environmental education programs aimed at promoting positive environmental behaviors need to focus on the development of positive environmental attitudes just as much as they focus on the acquisition of accurate content knowledge.

Techniques for Increasing Environmental Knowledge

As is the case with any other body of knowledge, environmental content can be viewed as a pyramid of knowledge classified into three major categories. Numerous basic facts form the base of the pyramid followed by clusters of related facts called concepts that form the middle portion of the pyramid. Finally, the apex of the pyramid consists of a limited number of significant “big” ideas that tie together numerous concepts. These big ideas are often labeled theories, laws or generalizations. When teaching this body of knowledge to young students, you can start at the top of the pyramid with the big ideas and work down to the supporting facts (deductive teaching) or start with the facts at the base of the pyramid and work up to the big ideas (inductive teaching). Either way, students will not develop a thorough, integrated understanding of any environmental topic unless they are exposed to all three levels of content: facts, concepts, and generalizations. To accomplish this goal, a mix of deductive and inductive instructional techniques should be used. Deductive instructional techniques center on theory testing and focus on information delivery approaches such as lectures, demonstrations, audiovisual presentations, and verification-type laboratory activities. Inductive instructional techniques center on theory building and focus on inquiry/information gathering approaches such as discussions, debates, role playing activities, and inquiry-type laboratory activities. The lessons in the *Florida Black Bear Curriculum Guide* directly address all three levels of knowledge related to black bears and include a mix of both

deductive and inductive instructional techniques.

Techniques for Fostering Positive Environmental Attitudes

Educational experts have long argued that teaching is not a process of indoctrination, but rather a process of gentle persuasion. Environmental educators need to be especially sensitive to this distinction and avoid the temptation to impose their own value systems on their students. When dealing with the affective domain in environmental education, the ultimate goal is to help students develop a positive environmental ethic that influences their lifelong decisions and behaviors. However, since an environmental ethic can take more than a decade, or even a lifetime to develop, K-6 teachers need to focus more on the building blocks on an environmental ethic, namely, positive environmental attitudes.

The first step in the process of developing a personal attitude is an awareness of the variety of possible attitudes people can have toward a given topic, such as Florida black bears. Next, students need to have opportunities to discuss their different attitudes and perspectives in a non-threatening environment, and finally students need to consider these different perspectives and identify and clarify their own personal views. At the K-6 level, one of the most popular techniques for exploring attitudes in this three-step manner is the use of moral dilemmas. Moral dilemmas, like those used in Lesson 3 of the *Curriculum Guide*, are short hypothetical scenarios based on actual events or situations that ask students to choose one course of action from a variety of potential actions, each reflecting a different underlying attitude. Instead of prescribing a particular course of action and imposing a particular underlying attitude, students engaging in moral dilemma activities learn how to discuss and clarify their own attitudes rather than merely adopting the attitudes of a respected authority figure or influential peer.

Techniques for Developing Problem Solving and Evaluation Skills

A major weakness identified in many past environmental education programs is the fact that many of these programs did a great job fostering environmental awareness, conveying accurate environmental knowledge and promoting positive environmental attitudes, but then left children with a sense of frustration and hopelessness. Children became aware of a major environmental issue, knew a lot about the issue and cared deeply about it but had no idea how to resolve the issue or make informed decisions about it. We now know that once awareness, knowledge and attitude development goals have been met, effective EE curricula need to empower students with the creative and critical thinking and problem solving skills they need to successfully deal with environmental issues. Although it can be time-consuming, we now know that problem solving and evaluation skills can be taught and can improve with practice. Thus, the best way to foster the development of these skills in students is to first expose students to different problem solving and decision making skills and then let them practice using these skills under the guidance of a teacher.

At the K-6 level the focus should primarily be on the development of introductory creative and critical problem solving skills, such as brainstorming, distinguishing between fact and opinion, organizing and interpreting data, communication skills such as active listening and speaking skills, and reaching group consensus via compromise. All of the lessons in the *Curriculum Guide* include an emphasis on these basic thinking skills and provide learners with multiple opportunities to practice using these skills in both small group and whole class settings.

Techniques for Integrating Environmental Education Into the Curriculum

Historically, environmental education curriculum developers have focused on two different techniques for integrating EE into the formal education curriculum, namely insertion and infusion. An **insertion approach** involves offering environmental education as a separate, stand-alone component in an existing course or as a completely separate elective course in the curriculum. One advantage of this approach is that one teacher, usually a science teacher, can be responsible for implementing EE at a given

school. A disadvantage is that it sends the message that environmental education is an optional extra and does not really relate to most academic subjects. An **infusion approach** involves incorporating environmental education concepts and skills throughout all academic subjects or using the environment as a context or theme for an entire school's curriculum. When using this approach, the environment is made an educational priority and environmental education activities are usually more interdisciplinary. A disadvantage is that it takes a tremendous amount of time and collaboration among an entire school faculty to infuse EE throughout the curriculum. The *Florida Black Bear Curriculum Guide* can be used as part of an insertion model or an infusion model. Teachers can implement the entire set of 10 lessons as a stand-alone unit, or they can infuse components of the lessons in their math, science, social studies, and language arts curriculum.

The Importance of an Interdisciplinary Focus

One trait common to all exemplary environmental education programs is an interdisciplinary focus. One of the greatest strengths of environmental education is that it transcends traditional subject area boundaries and truly integrates all of the core subjects (math, science, social studies and language arts) as well as the enrichment subjects (such as art, music, drama, foreign language and physical education). What makes environmental education unique is the fact that it is not a separate subject but rather a composite of all subjects. A relatively recent movement in the area of environmental education supports the notion of using the environmental as the unifying theme or context for all areas of education (commonly referred to as the EIC approach). This approach challenges the commonly held misconception that environmental education is only appropriate in science and social studies classes. It is important for teachers and other educators to realize that environmental education allows students to see the relationships between the discrete subjects they study in school and provides opportunities for students to practice applying the knowledge and skills they have developed in other subjects. To help reinforce this interdisciplinary view, all of the lessons in this curriculum have been correlated to the Sunshine State Standards for a variety of subject areas, including science, social studies, mathematics, language arts, and the arts.

Cooperative versus Competitive Goal Structures

Whether they are overtly articulated or not, all educational activities center around the achievement of some tangible or intangible goal or objective, such as high achievement scores on a standardized test or mastery of a skill. Students develop a sense of the world and how it works by observing how teachers and administrators structure learning experiences and by inferring what goals teachers and administrators think are important. Unfortunately, until recently, most U.S. schools and classrooms adopted a competitive goal structure. Competitive goal structures are, by their nature, rewarding for a few and disappointing for many. Students who excel in competitive goal structures are motivated by their egos. They want to be recognized for their individual successes. Unfortunately, competitive goal structures are set up so that only a few students can achieve the highest level of success (a.k.a. the "bell curve"). There is only so much room "at the top," so students have to compete against each other in order to get there. The result is that the 10% of students who receive A grades in competitive classrooms feel successful, while the other 90% who receive grades of B or lower feel they have failed or aren't as good as their more successful peers.

An alternative that provides opportunities for success for all students rather than a few is a cooperative goal structure. The underlying philosophy of cooperative goal structures is that students are responsible for their own successes and failures as well as the success or failure of their peers. In order to succeed in a cooperative goal structure, students must work together to achieve a shared group goal. If the group achieves the goal, everyone in the group receives an A. If the group does not achieve the goal, everyone in the group receives the same lower grade. This "sink or swim together" philosophy has proven to be extremely successful in team sports such as football and basketball and can easily be applied to academic environments as well. Students who

excel in cooperative goal structures value social interaction more than personal ego gratification. They enjoy working with others, both learning from them as well as supporting and helping them. Cooperative goal structures are set up so that everyone can achieve the highest level of success if they do their part and work together as part of a team. As a result, the potential exists for all students to feel successful.

Several hundred research studies have been conducted comparing the effectiveness of competitive versus cooperative goal structures in classrooms and the positive findings are impressive. In every instance, achievement levels for students in cooperative settings were higher than those of students in competitive settings. In addition, social skills, race relations, leadership skills, self concept and respect for others all significantly increased when cooperative goal structures were used. Given the complex nature of the environmental problems we are facing today, it is clear that cooperation, not competition, will be essential in order to find acceptable solutions. To help promote the development of these essential cooperative skills, all of the lessons in this curriculum involve small group work with shared work products rather than independent seat work with individual student work products.

Small Group Learning

In order to successfully implement a cooperative goal structure in a traditional classroom, whole class instruction should be minimized and replaced with more opportunities for small group discussion and interaction. To ensure success, groups should contain odd numbers of students (3 or 5) and should be heterogeneous for gender, ability level, race and personality. At first, teachers should assign groups rather than allowing students to select their own groups. Otherwise, clusters of cliques will tend to group together. Often, some students are resistant to working in groups at first, but after about six weeks of group work at least once a week, the vast majority of students report that they prefer group work over the traditional individual competitive setting. The biggest challenge to successful small group learning experiences is ensuring that all students participate and do their part. One simple technique for dealing with this concern is to assign different roles to each student in a group (such as recorder, equipment manager, discussion leader, artist, reporter). Ideally, students should first be assigned to roles that match their strengths, but then as their confidence increases, they should rotate through each of the different roles in following weeks. An additional benefit of small group instruction over whole class instruction is that it allows teachers to circulate more freely and interact personally with more students in a non-threatening, relaxing environment.

Assessment Concerns

Whether we like it or not, assessment drives the curriculum in Florida schools. School accountability is a major issue and standardized tests such as the FCAT and Florida Writes have a powerful influence on what is taught in Florida's schools and how things are taught in our schools. Although the major focus in recent years has been on math and language arts, new FCAT assessments for science and social studies will commence in 2003. This represents a positive shift for environmental education since many of the Sunshine State Standards for science and social studies have an environmental focus. Since this curriculum is correlated to Sunshine State Standards in all subject areas, it can help teachers address the content and skills that are assessed in all of the statewide standardized tests.

Although year-end summative assessments like the FCAT are important, as educators we also have a responsibility to assess students throughout the learning process in order to make sure they have mastered one area of content or skills before moving on to something new. These formative assessments can be used solely as a source of feedback or they can be graded and used to evaluate individual student progress. The assessment suggestions provided at the end of each lesson in this curriculum are directly related to the stated objectives for each lesson. Teachers can choose which assessments to use and they are free to whether or not assessments will be graded.

The important idea is that some sort of assessment should occur after each lesson.

Traditionally, most formal graded assessments in elementary and middle school classes have been in the form of paper and pencil tests of factual content knowledge. Although these traditional assessments are useful, the education community has recently recognized the value of alternative assessments, especially for classrooms containing students with diverse learning styles, ability levels and English language skills. The assessment suggestions provided in this curriculum include a wide variety of these alternative assessment types, including drawings, charts and graphs, essays, oral presentations, interviews and teacher observations. These alternative assessment tools can be useful additions to individual student work portfolios and are specifically designed to assess other learning outcomes besides low level factual knowledge.



WHAT WE DO AND DON'T KNOW ABOUT THE FLORIDA BLACK BEAR

As explained in the "Introduction" section of the *Curriculum Guide*, all of the lessons in the guide are based on the most current scientific data available at the time of printing. Unfortunately, although we have learned a great deal about Florida black bears in the past 50 years, there are still many questions left unanswered regarding certain aspects of their natural history, behavior, distribution and status. Although many of these aspects are currently being studied, the information available is not complete and much more Florida black bear research needs to be conducted before we can more fully understand these complex creatures and the human-related issues related to their future survival.

Workshop participants need to be aware of the fact that some of the information presented in the guide is based on limited or incomplete data and much of the information presented in the guide is subject to change as more data become available. The following paragraphs expand on the background information presented in each of the 10 lessons and identify key questions that still need to be answered regarding the Florida black bear.

Big Question #1: How Many Florida Black Bears Are There?

Throughout the entire guide, virtually every lesson directly or indirectly addresses the idea that historically Florida's black bear population has declined. Unfortunately, even scientists specializing in Florida black bear research do not know exactly how many bears remain in the state. Today, bear biologists are conducting studies to estimate bear abundances and distributions across the state and our hope is that there will be an answer to this vexing question in the near future. Experts do agree that prior to 1500 Florida was home to an estimated 11,000 to 12,000 individuals and about 1600 the Florida population began to decline. Experts also agree that the number of Florida black bears has declined significantly in the past century. At present we don't know if the decline is continuing, if the population is stable or if it is increasing. Florida black bears have been difficult to census because they prefer densely vegetated woodland habitats making it difficult to count them on foot or from the air without radio collars, most wild Florida black bears are very timid around humans and retreat or hide from approaching people making them even harder to spot, males usually have extensive home ranges (more than 80 square miles in some parts of the state).

Given the difficulties associated with direct black bear counts, scientists often use indirect measures to estimate black bear populations. Indices used to estimate Florida's black bear population are observation surveys and records of known Florida black bear deaths. A more rigorous method that yields abundance estimates is mark-recapture modeling.

The most interesting technique employed to date is the mark-recapture modeling used on fur samples collected at barbed wire-enclosed bait sites or as these sites are commonly called, "hair-snares." Individuals can be identified from genetic analyses of the hair samples, and the proportion of new to previously identified bears that visit the bait sites will be used to estimate the abundance of bears in each area. Regional bear distributions will be identified and mapped using Geographic Information System maps and will be combined with estimated densities to calculate the total bear population. This information soon will be available, most likely in mid-2004.

During annual deer track count surveys, biologists also record actual bear sightings as well as any observed evidence of black bear activity, such as tracks, scat or tree rubbings. Data collected during these surveys is used to provide a very rough estimate of the relative abundance of black bears in an area.

Accurate and detailed records of all known Florida black bear deaths have been kept by the Florida Fish and Wildlife Conservation Commission since 1976. Information

contained in this data base includes the geographic location and county of each bear death as well as the gender, size, estimated age, overall health and probable cause of mortality of each dead bear found. Unfortunately, scientists aren't sure exactly how many Florida black bear deaths are left unreported or undiscovered each year, either because the bears die in remote areas or because the bears are killed illegally. As a result, records of known Florida black bear deaths can only provide a crude estimate of the actual number of bear deaths each year.

At the time of printing, published Florida black bear population estimates ranged from a low of 1,500 bears to a high of 3,000 bears. It should always be emphasized that these numbers represent a very rough estimate and are subject to correction as more accurate data are collected.

Big Question #2: What is the status of the Florida black bear?

The Florida black bear has been listed as "threatened with extinction" at the state level since 1974, except in Apalachicola National Forest and Baker and Columbia counties. The Florida black bear was petitioned for listing as a threatened species under the federal Endangered Species Act in 1990. The U.S. Fish and Wildlife Service is the agency in charge of federal listing of threatened and endangered species, and in December, 1998 the U.S. Fish and Wildlife Service declined to list the Florida black bear as a federally threatened species. Conservation groups such as Defenders of Wildlife filed a lawsuit against the Fish and Wildlife Service to reverse this decision and the outcome of this suit is still pending. To date, the Florida black bear receives no federal protection. Currently available evidence from sightings and nuisance trends and research indicate that bear populations across Florida are stable to increasing.

Lesson One - "What Makes a Bear a Bear?"

The Florida Black Bear as a Subspecies

The Florida black bear was originally thought to be a distinct species and was named the Everglades bear by C.H. Merriam in 1896. His designation was based on the examination of a single male specimen from Key Biscayne and several bear skulls from the Everglades region. Later, scientists determined that the Florida black bear is actually one of 16 subspecies of the American black bear. Although nearly indistinguishable from each other in the field, the three subspecies of black bears in the southeastern U.S., including the Florida black bear and the Louisiana black bear, can be differentiated by slight variations in skull size. Generally, Florida black bears have more highly arched foreheads and longer, narrower braincases than other black bear subspecies. Other than these measurable differences in skull shape and size, there are no major physical differences between Florida black bears and American black bears. The only factor precluding interbreeding of Florida black bears and American black bears is geographic isolation.

Average Size of Florida Black Bears

Published estimates of the "average" size and weight of mature adult male and female Florida black bears vary widely. These variations are due to seasonal activity, age, habitat quality and social dominance.

Reported weights of adult Florida black bears range from 80 pounds to more than 600 pounds. The largest black bear ever documented in Florida was a 630-pound male killed by a car near Naples in 1990. We do know that, in general, adult male Florida black bears are larger and weigh 100 to 200 pounds more than adult females in a given area. When the *Curriculum Guide* was first printed in 1999, the bear biologists reviewing lessons recommended using 250 pounds as an average weight for adult male Florida black bears and 200 pounds as an average weight for adult females. Fieldwork in 2001 by FWC biologists now show average weights for Ocala population bears as being somewhat different – males are approximately 350 pounds and females are approximately 175 pounds.

Lesson 2 – “The World of Bears”

Classification of the Giant Panda

For many years, the giant panda was not classified as a true bear, but rather was classified in the family Procyonidae and considered to be related to the raccoon. With the development of advanced genetic technology, scientists were able to examine the DNA of giant pandas and determine that they are indeed true bears in the family Ursidae. However, other species of pandas, like the red panda, are not true bears.

Other Bear Subspecies

Although there are only eight species of bears in the world, many of these species have distinct subspecies. For purposes of this *Curriculum Guide*, however, only three subspecies (the Florida black bear, the grizzly bear, and the Kodiak bear) were included. It is important to note that there are other subspecies of black and brown bears in the world. Three important subspecies of the American black bear that are not addressed in this guide include the endangered Louisiana black bear, the Kermode (ghost) bear of British Columbia, and the eastern black bear. The Louisiana black bear has been federally listed as a threatened species since 1992. Other brown bear subspecies not addressed in this guide include the Siberian bear, the Manchurian bear, the horse bear of China and Tibet, the Hokkaido bear of Japan and the red bear of northern India.

Lesson 3 – “Bear Dilemmas”

Categories of Attitudes Toward Florida Black Bears

In 1994, Stephen Kellert published results of a study of public attitudes toward bears and their conservation. Kellert’s extensive research in the affective domain indicates that attitudes toward any type of wildlife, including Florida black bears, are determined in part by the basic values individuals have regarding wildlife. He has identified eight basic wildlife values that influence attitudes (aesthetic, dominionistic, ecologicistic, humanistic, naturalistic, negativistic, scientific and utilitarian). His model of attitude formation indicates that three other factors besides basic values influence attitudes toward wildlife, including: 1. perceptions of individual species (e.g. perceived danger or presumed intelligence of a species); 2. knowledge of the biology, ecology and issues associated with the species; and 3. the current wildlife/human relationship of the species (e.g. conservation status or current people/wildlife conflicts).

For this lesson, Kellert’s research findings regarding the attitudes of young people toward bears and other wildlife guided the development of the dilemmas and accompanying decision choices for each dilemma. In reality, elementary and middle school students, as well as their parents and teachers, possess a wide range of attitudes toward Florida black bears and wildlife in general. To facilitate discussion and make the topic of attitude exploration easier for both students and teachers to understand, only four specific categories of attitudes were identified in this lesson. These four categories do reflect the most common types of attitudes Floridians have expressed regarding black bears and other wildlife.

Classification of the Florida Black Bear as a Game Species

Until 1994, black bear hunting was legal in Florida. Currently, black bear hunting is illegal in all Florida counties. Although the Florida black bear is classified as a “threatened” species in Florida, it is not listed as such in three areas of the state: the Apalachicola National Forest and Baker and Columbia counties. The population of Florida black bears in these three rural, undeveloped areas is relatively high and the human population is relatively low. It is important to note that hunting of black bears is still legal in many other parts of the United States where black bear populations are stable. It is also important to note that, in extreme cases, when all other efforts to deter a bear have failed, the Fish and Wildlife Conservation Commission may euthanize a nuisance bear.

Relocation of Nuisance Bears

One strategy commonly recommended for handling nuisance bears is relocation. Many people think relocation is an ideal way to solve the nuisance bear problem. Unfortunately, the overall long-term success rate of nuisance bear relocation is still unknown. In addition, relocation of bears is very expensive and potentially dangerous for the bear. In order to relocate a bear, it must first be live-trapped, restrained and tranquilized. Each of these phases poses a potential risk of injury or death for the bear. An even more important consideration is finding available, unoccupied quality bear habitat to move the bear to. Almost all of the available quality bear habitat in Florida is already occupied by other bears with established home ranges. When relocated bears are released into these areas they almost surely encounter resident bears. These potentially aggressive encounters can lead to the severe injury or death of the bears involved and they add a great deal of stress to the existing dominance hierarchy. Finally, relocated bears often try to return to their former home ranges and are more vulnerable to being killed on roads while attempting to return. Relocated bears are also more vulnerable to starvation, disease and collisions with vehicles because they often have to keep moving over great distances in search of an unoccupied home range.

It is important to note that many nuisance bears are weaker or younger bears who had trouble establishing home ranges in their original habitat in the first place. Their search for available food and an unoccupied home range often leads them to areas occupied by people because there are no other choices left for them. It is unlikely that these bears can successfully establish a home range when relocated when they often haven't been successful in their own habitats. It now appears that, without more abundant available quality black bear habitat, there is no easy solution to the nuisance bear problem. Scientists aren't sure exactly what the success rate for Florida black bear relocation is, but they believe the success rate is low. As a result, relocation of bears is only considered as a last resort, as is killing a nuisance bear.

Reducing Human/Bear Conflicts

Annual reports of human/bear conflicts in Florida are on the rise. In 1978 only one human/bear conflict was reported while 450 were reported in 1998, 1,136 were reported in 2000, 794 in 2001 and approximately 1,500 in 2002. As Florida's human population continues to grow and development spreads into remaining areas of black bear habitat, human/bear conflicts will continue to increase in both frequency and intensity. Although no Florida black bear attacks on humans have ever been documented, numerous incidents of bears attacking (and sometimes killing) livestock and pets have been reported since 1978. In addition, many cases of Florida black bears destroying buildings, beeyards and other property have also been reported. Most of these conflicts seem to be related to black bears searching for food. Thus, one of the easiest ways to reduce potential human/bear conflicts is to reduce a bear's attractive food sources near homes and property.

Simple strategies for deterring black bears include never feeding bears directly, keeping household trash indoors until trash pick-up day, not putting animal waste in compost piles, turning compost piles regularly, burning off all food residue after each use of a barbecue grill, covering barbecue grills and storing them in secure areas, storing animal food/birdseed indoors, keeping birdfeeders out of a bear's reach, fencing livestock areas, strapping beehives together and setting beehives on high platforms or inside electric fencing. If a black bear does wander onto someone's property, the best course of action is to first bring all pets, people and food sources indoors and then let the bear pass through on its own.

These simple steps reduce food opportunities for bears and help ensure your family's safety as well as the bear's safety.

Lesson 4 – “It’s a Bear’s Life”

Life Spans of Florida Black Bears

Relatively little long-term life span data have been collected on wild Florida black bears. Therefore, life span estimates for wild Florida black bears are based on studies of captive Florida black bears or populations of American black bears in other parts of the country, especially in states such as Michigan, Pennsylvania, and Minnesota. We do know that wild Florida black bears usually do not live as long as captive bears. We also know that female Florida black bears usually outlive their male counterparts by several years. Female bears tend to outlive males primarily due to behavioral factors, rather than genetic or anatomical factors. Female black bears are less aggressive and are thus less likely to be injured or killed in an encounter with another bear. They also spend more time denning and traverse much smaller home ranges than male bears. They are less vulnerable to roadkills because they do not travel as far in search of food or denning sites as their male counterparts. Based on the limited data available, the life span of an adult male Florida black bear in the wild can be between 12 and 20 years while a female black bear’s life span in the wild can be between 15 to 25 years. These estimates may change as more research data becomes available.

Lesson 5 – “The Black Bear Necessities”

Florida Black Bear Diets

Like their American black bear relatives, Florida black bears are omnivores. But interestingly, Florida black bears actually consume more plant material than other black bears. In studies of American black bears in other parts of the country, such as Arizona, scientists found that their diets consist of 75% plant matter and 25% animal matter. Studies of Florida black bear feeding preferences indicate that about 80% of the Florida black bear diet consists of vegetation while only 20% of their diet consists of animal matter (mostly insects). In addition, studies of American black bears report that their 10% of their diet consist of meat while only 5% of the Florida black bear’s diet consists of meat. These differences in percentages are not based on differences in food preferences of Florida black bears versus American black bears, but rather reflect a difference in food type availability. Florida black bears in different parts of the state eat different types of food. The specific food items and percentages listed for each major food category in this lesson are based on Maehr and Brady’s analysis of stomach and scat contents collected from Florida black bears throughout the state over a five year period.

Because the climate in Florida is milder and growing seasons are longer, plant food sources are more abundant and available for a greater period of the year than they are in colder parts of the country. Bears are opportunistic feeders, and it is obviously a lot easier to rake a gallberry bush for berries or collect acorns from the ground than it is to capture a young white-tailed deer. It is also important to note that Florida black bears readily take advantage of exotic food sources. Although armadillos are not native to Florida, black bears will readily eat them if available. In fact, armadillos have sometimes been referred to as “lunchboxes for bears.” Florida black bears also readily take advantage of exotic plants when they are available. In fact, in south Florida the ripe berries of exotic Brazilian pepper plants constitute a large portion of the winter diet of many black bears. The extensive use of exotic berries as a food source by Florida black bears is problematic because the bears act as seed dispersers and actually introduce Brazilian pepper into new areas via their scat.

Lesson 6 – “Bear Barriers”

Florida Black Bear Mortality Rates

Because Florida black bears are so wide ranging and prefer densely wooded habitats, they are extremely difficult to study in the wild. As a result, no comprehensive, long term studies of Florida black bear mortality rates and causes have ever been

conducted. As indicated in the “Background” section of the lesson, we do know the most common natural and human-related causes of Florida black bear mortality, nor do we know exactly how many bear deaths result from each of these causes each year. Scientists do agree that the number of Florida black bear deaths resulting from human activities is steadily increasing and that roads are the leading direct cause of black bear mortality in Florida. Estimates of the percent of Florida’s black bear population killed by vehicular collisions, poisoning and shooting each year were provided by former FWC bear biologist Terry DeBryun and should only be cited as “educated guesses.”

Unfortunately, there is no reliable way to estimate how many Florida black bears are killed indirectly by humans when their habitats are altered or destroyed for development. We do know that some displaced bears die due to starvation or aggressive encounters with other bears and we do know that the number of Florida black bear roadkills increases when black bear habitat is developed. Although exact numbers are not known, most bear researchers believe that human-caused factors now contribute to more Florida black bear deaths each year than natural factors.

Mortality Rates for Each Stage of the Black Bear’s Life Cycle

Because no long-term, comprehensive studies of Florida black bear mortality rates have been conducted, the mortality estimates used for each stage of the bear’s life cycle in this lesson are based on survival rate data collected for different age classes of bears in other areas of North America (Alaska, Arizona, Massachusetts, Minnesota, Montana, and Alberta, Canada). Mortality rates for each age class of bear were averaged across these six studies. It is important to note that the mortality rates used in this lesson are very raw estimates and could change once data from long-term studies of Florida black bear mortality becomes available. Although actual mortality rates were not known at the time of the first printing of the curriculum guide, scientists agree that Florida black bear mortality rates are highest for cubs and sub-adult male bears during their first Fall and Winter on their own. It appears that almost half of all sub-adult male Florida black bears die before reaching adulthood. Scientists also agree that mortality rates are then highest for cubs and yearling Florida black bears of both sexes.

Lesson 7 – “Tracking Bears”

Florida Black Bear Home Range Size

According to former FWC biologist John Wooding, the average home range of an adult female Florida black bear is about 11 square miles (7,000 acres) while a male’s home range averages 66 square miles (42,000 acres). However, home ranges for bears living in different parts of the state vary widely. Home ranges of bears living in the Ocala National Forest are some of the smallest in the state while home ranges of bears living in Apalachicola National Forest and the Big Cypress Preserve area tend to be largest. In a study of black bears in the Apalachicola National Forest, Steven Seibert reported average home range sizes of 81 square miles for adult males and 25 square miles for adult females. It is important to note that even in a given area of the state, home ranges of individual bears also vary widely. The largest individual home range ever reported for a black bear in Florida was 174 square miles for one adult male. Scientists do agree that home range size of black bears is directly related to habitat quality, especially food abundance. The larger the home range of a Florida black bear, the poorer the quality of the habitat. Home range sizes for this lesson are based on long-term studies of the movements of radio-collared bears in north central Florida and represent average, rather than actual, home range sizes for male and female black bears in that area.

Seasonal Variations

The seasonal activities, foods eaten, habitats used and distances traveled by male and female Florida black bears vary widely throughout the state. For purposes of illustration, the monthly and seasonal activity, diet, and habitat use information provided in this

lesson represents a composite of data reported in several studies of radio collared black bears in Florida. These descriptions highlight the major differences in the monthly and seasonal lives of male and female Florida black bears but do not directly represent the actual activities of any individual male or female bear. In addition, although the resulting zig-zag diagram of each bear's monthly movements looks very similar to monthly movement patterns reported in the research literature, the habitat layouts, sizes, and components are just hypothetical and do not reflect the composition of any actual bear's home range. In addition, the monthly travel distances provided for male and female bears in this lesson represent approximate mean bear movements rather than actual movements of any individual bears.

Winter Denning Periods

In a 1992 study of Florida black bear denning activity, Wooding and Hardisky found that the denning period for pregnant Florida black bears is comparable to that of other black bears in the southeastern United States. However, the denning period of non-pregnant female and male Florida black bears is shorter than that of any other black bears in the U.S. Because black bear cubs are so small and helpless when they are born, female Florida black bears must care for their altricial cubs and den for at least three months regardless of food availability, temperature, or other external factors. This lesson uses a one month denning period for the adult male black bear. It is important to note that some male black bears, especially those in south Florida, do not den at all during some winters.

Lesson 8 – “Bear Neighbors”

Preferred Habitat Types

Florida black bears clearly prefer forested habitats and in studies of Florida black bear habitat composition, forested areas represent 93% or more of the average bear's home range. In addition, the home ranges of most Florida black bears are composed of approximately 60% upland forest habitat and 40% wetland forest habitat. The specific types of upland and wetland forest plant communities used by bears differ in different regions of the state. The three plant communities featured in this lesson represent typical communities used by black bears in northern Florida. A similar composite of plant community types used by black bears in south Florida could include cabbage palm forests, dry prairies, and mangrove forests.

Status of Endangered, Rare and Threatened Species

Many species of amphibians, reptiles, birds and mammals found in Florida have conflicting status designations on state and federal lists. This is partially due to the fact that many of these animals are found in other areas of the country besides Florida, so a species with a stable population in Florida may be rare elsewhere or conversely, a species that is very rare in the state may be common in other parts of the county. To avoid confusion, the species status information provided in this lesson reflects each species' designation on the state's official list of endangered, threatened and species of special concern (rare) species. In addition, to make the designations easier for young students to comprehend, the term “rare” is used instead of the actual scientific designation “species of special concern.”

Lesson 9 – “Population Problems”

Areas with Highest Roadkill Rates

Four and a half miles of new roads are constructed in Florida every day and people drive an estimated 246 million miles on Florida roads each day. More than 40% of all black bear roadkills occur in the Ocala National Forest area and more black bear roadkills occur in Lake County than any other county in Florida. Roadkill totals are highest in counties in and around the Ocala National Forest, Apalachicola National

Forest and Collier County near the Big Cypress Preserve. Since record-keeping began in 1976, Florida black bear roadkills have been recorded in 45 of Florida's 67 counties. Highways with the greatest number of Florida black bear roadkills include S.R. 40 and S.R. 19 in Lake and Marion counties, S.R. 84 in Collier County, and S.R. 46 in Lake County.

Effectiveness of Highway Underpasses

Currently, there are more than 20 highway underpasses for wildlife in Florida and the first land bridge for people and wildlife in the state (over I-75 in Ocala) was completed and dedicated in September, 2000. Although originally built to provide safe passage for the endangered Florida panther, the 24 underpasses along I-75 between Naples and Miami are regularly used by Florida black bears and many other species of mammals and reptiles. The first underpass constructed specifically for the Florida black bear was built in 1994 along S.R. 46 in Lake County. More than 50 black bear crossings have been documented at this underpass since 1994. Even with the existence of the underpass, more black bears are still killed along S.R. 46 than any other road in the state. The Florida Fish and Wildlife Conservation Commission has identified the 15 most dangerous sections of road for bears in the state and is currently working with the Florida Department of Transportation to install underpasses or other structures like fences in these areas. For example, a new wildlife underpass has been approved and will be constructed on SR 46 in Lake County.

Correlation Between Roadkill Rates and Nuisance Bear Complaints

Although this topic was not directly addressed in the guide, there is a high correlation between the number of Florida black bear roadkills and the number of nuisance bear complaints received by the Fish and Wildlife Conservation Commission. In 1978 only one Florida black bear roadkill was reported and no nuisance bear complaints were received. The number of Florida black bear roadkills has increased steadily over the past 20 years to a high of almost 100 in 1999. During that same time period the number of nuisance bear complaints has also risen steadily to more than 380 in 1999. This correlation between roadkill rates and nuisance bear complaints exists for all regions of the state.

Lesson 10 –“Oh Where Oh Where is Florida's Bear?”

Current Range of the Florida Black Bear

Although the exact range and number of black bears in Florida is not known, we do know that more than eight million of Florida's 37 million acres of land have been cleared for development in the past 50 years. We also know that the Florida black bear currently occupies only about 20% of its original range. Finally, we do know that Florida loses about 20 acres of wildlife habitat to development every hour. Even without exact statistics, it is clear that the amount of habitat available for black bears is declining and as a result, the projected future of Florida's black bear population is uncertain. Interestingly, although the Florida black bear is considered unique to our state, Florida black bears also range into areas of eastern Alabama and southern Georgia. Currently, Florida black bears are not protected by law in either of those states, but efforts are underway to protect land in these states in an effort to conserve the Florida black bear.

Another interesting topic not addressed in this guide is the fact that some areas of Florida are still relatively undeveloped and contain adequate potential habitat to support a population of Florida black bears even though no bears currently live there. The most significant of these areas is the Big Bend Region extending along the western Gulf coast from Jefferson and Taylor counties to Levy county. Historically, it appears that black bears did inhabit the area but were extirpated as a result of hunting pressure in the last century. With proper management, it appears this area could support a large population of Florida black bears (300 to 600 individuals) and could potentially connect the existing Apalachicola National Forest and Chassahowitzka National Wildlife Refuge Populations.

Actual Florida Black Bear Population and Habitat Sizes

notes

When developing this lesson, more than 20 different research journal articles and technical reports were reviewed to determine the actual acreage and estimated population of bears in each remaining Florida black bear habitat area. Depending on the criteria used to delineate the boundaries of each habitat area, more than 20 different habitat sizes and population estimates were found. The biggest problem is that some studies only include the actual portion of publicly-owned land in each area while others include surrounding privately-owned land regularly used by bears living in the area. In addition, some studies only include areas of optimal habitat in their size estimates while others include areas of both optimal and marginal habitat in their size calculations. For purposes of illustration, state bear biologists reviewed these conflicting estimates and agreed upon some raw estimates for use in this lesson only. The habitat sizes used in this lesson reflect very rough estimates of the amount of land actually used by Florida black bears living in each region. Both public and private lands have been included in these size estimates. Likewise, the black bear population numbers in each of these regions also represent very rough estimates based on data from conflicting studies. As bear censusing and record-keeping techniques improve, these black bear population estimates and habitat size estimates will surely change.

Recommended Florida Black Bear Population and Habitat Sizes

Recommended sizes of conservation areas for the Florida black bear are based on estimates contained in the "GAPS" report (officially titled: *Closing the Gaps in Florida's Wildlife Habitat Conservation System*) published by the Fish and Wildlife Conservation Commission in 1994. Based on studies of the density of black bears with stable populations in other areas of the southeastern United States, a secure population of Florida black bears requires between 490,000 and 980,000 acres of suitable habitat to withstand year-to-year fluctuations in environmental conditions and reduce the threat of inbreeding. The recommended population size for each conservation area is 200 to 300 individuals. The GAPS report contends that 10 such habitat conservation areas (with a total population of 2000 to 3000 bears) distributed throughout the state are necessary to ensure the Florida black bear's future.

When the *Florida Black Bear Curriculum Guide* was printed in 1999, Florida black bear researchers agreed that only six areas of the state were large enough to potentially support a healthy black bear population (Apalachicola, Big Cypress, Osceola, Ocala, Eglin and St. John's) and of those, only three (Apalachicola, Big Cypress and Ocala) contained enough publicly-owned, protected land to provide long-term habitat for a population of Florida black bears. The GAPS report recommended that the first area of priority for land acquisition should be the Big Cypress Preserve area due to the large number of other threatened and endangered species residing there. The Ocala National Forest area is considered the second priority for land acquisition in order to establish a safe habitat corridor connecting the Ocala National Forest and St. John's River populations. The Pinhook Swamp area near the Osceola National Forest is ranked as the third priority for land acquisition because of its proximity to Georgia's Okefenokee Swamp (home to a small population of Florida black bears) and the fact that few people and roads currently exist in the area.

In 2001, another 57,379 acres of the Pinhook Swamp was acquired by the state bringing the total Pinhook holding up to 111,361 acres. These additions now provide enough publicly owned, protected land to provide long-term habitat protection for the Osceola black bear population.

MAJOR MISCONCEPTIONS

As part of the field testing process for *The Florida Black Bear Curriculum Guide*, a sample of almost 200 elementary and middle school students throughout Florida completed pre and post assessments of their content knowledge regarding Florida black bears. Student responses to items on the pre-assessments revealed that Florida's children have many persistent and widespread misconceptions about Florida black bears. In addition, when compiling background information for lessons contained in the *Guide*, numerous articles and editorials published in local newspapers throughout the state were also collected and reviewed. Many comments made by adults quoted in these articles reveal that many Floridians also harbor many misconceptions about Florida black bears. Four major categories of Florida black bear misconceptions have been identified: behavior, human-bear interactions, natural history, and population trends. The following paragraphs further describe the misconceptions workshop participants and their students may have about Florida black bears and include the most correct, recent information related to each misconception.

FLORIDA BLACK BEAR BEHAVIOR

Florida black bears are gentle and friendly.

In the 1960s, *Gentle Ben* was a very popular Florida-based television series featuring a young boy and his friendly "pet" Florida black bear. Like *Lassie*, *Flipper*, *Grizzly Adams*, and other animal-based television series, *Gentle Ben* portrayed Florida black bears as gentle, cuddly, almost human-like creatures. For many Floridians, this inaccurate view of black bears still exists. In reality, Florida black bears are wild animals that display neither "gentle" nor "friendly" natural behaviors with humans. Except for brief breeding periods, male black bears are solitary and will fight with other bears over home range feeding areas, mating opportunities and social dominance, if necessary. While female black bears are protective of their cubs, they do not maintain long-term contact with their young after they are yearlings and adult female black bears do not even socialize with each other. As ecologist and environmental educator Denny Olson explains, "What bears really do well is mind their own business, eat, and sleep." (In *Black Bear*, 1990, by Daniel J. Cox, Chronicle Books, San Francisco, CA, pg. 6).

Florida black bears are aggressive and ferocious.

At the opposite end of the continuum, a number of Floridians, including young children, have been negatively influenced by fairy tales portraying bears, wolves and other large mammals as man-eaters and sensationalized television shows featuring videotape footage of bears attacking people, often in remote camping areas. While it is true that male black bears may aggressively defend resources within their home range areas from other bears, they are not usually aggressive toward people unless threatened. By the same token, female black bears may display aggressive behaviors toward people when they feel their cubs are threatened. The paths of humans and bears are crossing more and more frequently. While black bears are normally shy and reclusive and try to avoid contact with humans, one must remember that they are wild animals and must be respected.

HUMAN-BEAR INTERACTIONS

Florida black bears kill and eat people.

Interestingly, the only species of bear in the world that has historically stalked and eaten human beings as a major food source is the polar bear. However, other species of bears, including brown bears and black bears, have attacked and killed people. American black bears may act aggressively toward a person if they are surprised while feeding or if their personal space is invaded. Usually the intent is to threaten. There are also documented cases of predatory behavior where a person may be viewed as food, although this is extremely rare. Most bear attacks on humans occur when bears are attracted to campsites by the smell of food that campers have not stored properly. While most campsite raids by bears do not result in harm to humans, some campers

have been severely injured or killed while trying to fend off marauding bears. Finally, a few people, mostly hikers, have been killed by mother brown bears trying to protect their cubs. These rare incidents usually occur when hikers accidentally separate a mother from her cubs while walking on a trail. Black bear mothers tend to be more tolerant than brown bears. While children are fascinated by scary or gory stories of wild animal attacks, the fact remains that, to date, there has NEVER BEEN a documented case of a Florida black bear injuring or killing a human being. Although Florida black bears do not normally kill and eat people, they are wild animals and can be dangerous and must be respected as such. There are many ways people can avoid conflicts and mishaps, and people should avoid interacting with wild Florida black bears for their own safety and the safety of the bears.

For more information see Stephen Herrero's book, *Bear Attacks: Their Causes and Avoidance*.

Florida black bears enjoy being around people.

Cartoon strips featuring bears like Yogi Bear, popular children's stories like "Winnie the Pooh," and public awareness campaigns featuring bears like Smoky the Bear have all led many people to believe that bears are very human-like and enjoy human company. Unfortunately, past national and state park management practices also contributed to this erroneous perception by tolerating, and at times even encouraging, feeding of bears in our parks. Some parks, like Yellowstone National Park, even set up bleacher seating areas near trash dumpsters so park visitors could comfortably watch bears foraging for food thrown away by people. Since bears are opportunistic and voracious eaters, they can be inadvertently "trained" to regularly visit feeding areas set up by people. But it is important to note that they are not coming to these areas to seek out human companionship, they are simply taking advantage of an easily-accessible food source. Without the presence of food, and given a choice, Florida black bears try to avoid contact with humans whenever possible.

Feeding Florida black bears is helpful.

During the pre-assessment phase of the field test for the *Guide*, students were asked to identify things they could do to help save the Florida black bear. A significant number of students indicated that putting out food for black bears would be one way to help them. Unfortunately, many children and adults in Florida erroneously believe that feeding black bears is helpful. While birdseed feeders, hummingbird feeders, butterfly feeders, squirrel feeders and even deer feeding stations have gained popularity with backyard wildlife enthusiasts, purposeful feeding of Florida black bears is a very dangerous practice and should never be done. Intentional feeding of bears also is against Florida law. Black bears that become acclimated to backyard feeding stations eventually lose their natural fear of humans, lose their natural food foraging behaviors and often become destructive pests. In addition, bears that are purposefully lured to backyard feeding stations are at greater risk of being struck and killed by vehicles. Often, these bears have to be relocated at great expense and sometimes even have to be killed because they become a threat to property, pets and people. To quote a popular saying among bear researchers, "A fed bear is a dead bear." **Adults and children in Florida must realize that feeding Florida black bears is one of the worst things they can do to these animals.**

Relocating Problem Bears is the Best Solution

Although relocation sometimes is necessary, it is a last resort after other options, such as removing food sources and exclusion from attractants by electric fencing, have been attempted. If a bear is relocated and the thing attracting the bear is not addressed or eliminated, another bear could move in and possibly become a nuisance as well.

Relocating a bear requires that the bear be captured, restrained and tranquilized. All of these actions are potentially dangerous to the bear's health and are costly. If the bear is moved it must be put into good bear habitat and far enough away from people so it won't become a nuisance in a new place. Good habitat usually is already occupied by bears with established home ranges. Plus, there are few (if any) places left in Florida that are not close to people and their food attractants. The relocated bear generally will

suffer the wrath of resident bears and may stress the established social structure. Also, bears are subject to increased mortality as they likely will attempt to return to their former home range and this often involves crossing busy highways.

Bears are believed to have the uncanny ability to navigate homeward from unfamiliar areas, called "homing." During a Minnesota berry-crop failure, one male black bear wandered a record 125 miles into a new area to forage. Nuisance bears have been able to return to their home range after being drugged and transported up to 168 miles away. How they do this is unknown, but apparently there is a limit, because bears transported 870 miles away (from Minnesota to Arkansas) moved in random directions after their release.

FLORIDA BLACK BEAR NATURAL HISTORY

Florida black bears are very large.

Many children and adults have been impressed by large wood carvings, stone statues, and mounted specimens of standing bears that tower over human visitors in museums, hotels and restaurants. Very few Floridians have ever seen an actual Florida black bear and few people realize how small they are. While adult male brown bears in the U.S. average 600 pounds and adult male polar bears average 1000 pounds, American black bear males in most parts of the country only average 300 pounds. Adult female Florida black bears average about 150 pounds while the average adult male weighs about 300 pounds. Florida black bears are less than three feet tall when walking on all fours and about as tall as most adult male humans when they stand up on their two hind legs.

Florida black bears live in caves.

Images of bears living in caves are abundant in fairy tales, popular stories, and picture books. While it is true that many American black bears do den in caves during the winter, neither American black bears nor Florida black bears live in one "place" or home. Black bears range widely in search of food, and spend their sleeping hours in makeshift bedding areas as they move from place to place in their home range. In Florida, when bears do den in the winter, they usually den in the hollow of a tree or in a thicket of vines or saw palmetto. If caves were abundant in Florida, black bears probably would use them during their denning periods.

Florida black bears hibernate.

Unfortunately, the term "hibernation" is commonly used to describe the winter sleep of bears living in cold northern climates. Technically, denning is a more accurate term to describe a bear's winter sleep. Mammals like chipmunks and squirrels, that truly hibernate, do not give birth or nurse their young during the winter. In addition, true hibernators actually use protein stored in their bodies as an energy source, while bears like the Florida black bear actually burn body fat during this inactive time. In addition, true hibernators urinate and defecate during hibernation while bears do neither during the denning period unless they wake up and venture out of their dens. Lastly, the body temperature of true hibernators falls to within a few degrees of ambient temperature where the body temperature of denning bears does not. Consequently, black bears do not hibernate in the true sense of the word.

Florida black bears sleep through the entire winter.

Like other black bears, Florida black bears are opportunistic feeders. When food is plentiful, they eat as much of it as they can consume, a behavior called hyperphagia. In most parts of the American black bear's range, food is most abundant during the summer and scarce or nonexistent during the winter. As an adaptation for long-term species survival in these colder climates, black bears den for close to five months. This denning behavior appears to be triggered by several factors, including snowfall, temperature drops, changes in atmospheric pressure and shorter day length (photoperiod). A popular recent hypothesis contends that the final trigger for denning is reduced thyroid activity resulting from a buildup of body fat. During the denning period, their body temperature drops about 10 degrees Fahrenheit but their breathing and heart rates drop

only slightly. Black bears in northern climates do not leave their dens during the entire winter. In Florida, snowfall and cold weather are rare, changes in day length are not as radical, growing seasons are much longer and food is available throughout most of the year. As a result, an extensive denning period isn't a necessary adaptation for long-term species survival. Denning periods for Florida black bears are longer in northern Florida and shorter or non-existent for black bears in south Florida. In addition, during the denning period, many Florida black bears do venture out of their dens in search of food on warm winter days.

Like their American black bear relatives, female Florida black bears do give birth while denning in the winter, and a female Florida black bear with cubs will den for a longer period of time than a male bear or a female bear without cubs. Denning periods for nursing female Florida black bears average three to four months while denning periods for males or non-nursing females average one month.

Florida black bears eat fish.

Striking photographs of huge brown bears catching salmon leaping out of a rushing stream are familiar to many people. As a result, many people think that all bears eat fish. If fish were easier to catch, they probably would be a part of the Florida black bear's diet, but like all bears, Florida black bears eat whatever foods are easiest to obtain. Not only do Florida black bears eat very little animal matter, but the vast majority of animal matter they do eat consists of insects. Only 5% of the Florida black bear's diet consists of animals other than insects. If they are lucky enough to catch a vertebrate to eat, it is usually an armadillo, a young white-tailed deer, a young feral hog, or young birds and bird eggs. Fish are not a major part of the Florida black bear's diet.

A Florida black bear family consists of a momma bear, a daddy bear and cubs.

Due to familiar fairy tales and stories like "Goldilocks and The Three Bears," many children think a black bear family is structured like a traditional human family with a father, mother and sibling children. In reality, Florida black bears do not form long-lasting or stable family or extended social groups. They exist in a competitive rather than a cooperative social structure and live highly solitary lives. Male Florida black bears do not participate in the care or rearing of young and have even been known to kill and even eat young black bear cubs and yearlings they encounter in their home range. Female black bears aggressively force out their yearling young after they are about 18 months old. They do not interact with their male offspring after they go out on their own and only occasionally interact with their female offspring if their home ranges overlap.

FLORIDA BLACK BEAR POPULATION TRENDS

Florida's black bear population is declining.

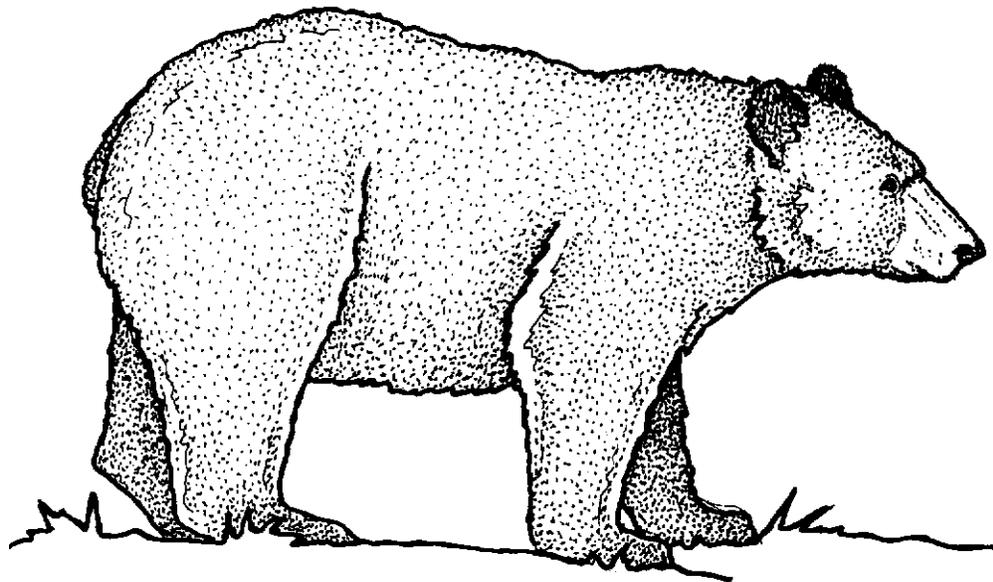
To help provide more accurate information about bears in the state, the Florida Fish and Wildlife Conservation Commission has partnered with the Florida Department of Transportation to estimate bear abundances and distributions across the state. Fieldwork began in Ocala National Forest (early 2001) and will occur in five other major bear populations across the state over a three year period. Mark-recapture modeling will be used on fur samples collected at barbed wire- enclosed bait sites. Individuals will be identified from genetic analyses of the hair samples, and the proportion of new to previously identified bears that visit the bait sites will be used to estimate the density of bears in each area. Regional bear distributions will be identified and, mapped using Geographic Information System maps and will be combined with estimated densities to calculate the total bear population. The study has been funded for three years and will provide important baseline information on the status of Florida's bear populations.

The number of bears in Florida has changed significantly over the past 500 years (Figure 1). Prior to the 1500s, bears inhabited the entire state, including some of the upper Keys in south Florida. However, the distribution of bears across the state was not uniform and varied markedly from place to place, predominantly due to food availability

and cover. Densities most likely were highest in forested wetland systems and in the oak/pine scrub areas along the central ridge of Florida. Densities were lowest in open water and prairie systems, sandhills and pine flatwoods. The total population size of bears at this time is not known, but was at least 11,000 - 12,000 individuals. Even though they relied on bears for food and other resources, Native American impacts on bears were minimal to low because they resided in low densities and tended to coexist with nature.

When Europeans settled Florida they came in great numbers and viewed nature as something to be conquered and tamed. They cleared and logged vast expanses of forest and actively attempted to eradicate large carnivores like panthers and bears. By the early 1900s, nearly all of Florida had been cut over at least once and bear populations had been severely reduced by hunting and trapping pressures. This one-two punch of habitat loss and increased mortality greatly impacted bear populations across the state, which probably totaled only several hundred individuals at this time and was restricted to small, remote, isolated areas. In response to this situation, regulations were put in place to limit mortality on bears and protect habitat. The result of these regulations and the natural regeneration of Florida's forests, most notable in recent years, has been an increasing bear population. Bears have expanded out of their small population centers and now inhabit areas of the state that 50 years ago did not support bears. Additionally, bear numbers and densities have increased as has the total amount of protected habitat.

Currently, even in the face of modern human development pressures, we have an expanding bear population that, as yet, has not filled all available habitat. However, the "population" is actually a mosaic of six somewhat discrete populations and several smaller, peripheral populations. These populations differ in size, density, demographics, and threats to existence, and they occur in areas with differing habitat characteristics and land ownership patterns. Consequently, each population faces its own unique circumstances, and, although most are represented by the situation described above, some face more dire circumstances. Additionally, and perhaps more importantly, all of these populations are or will be limited by Florida's burgeoning human population and associated development at some point. Herein lies the crux of the bear's future in Florida - will we as stewards of the land take the necessary precautions to ensure the long-term viability of bear populations across the state or we will continue along our current path of rampant development and habitat destruction that could lead to reduced bear populations?



WHAT ELSE CAN YOU DO?

As a facilitator, there are a number of activities you can initiate or collaborate on to further promote Florida black bear education and conservation. Specific areas in which you can have a significant impact include:

- a. Follow-up with workshop participants,
- b. Networking with other facilitators,
- c. Recruitment of other facilitators,
- d. Publicity and media coverage of workshops, and
- e. Establishing local education and/or conservation initiatives.

Follow-up

Follow-up interviews of former participants in other workshops sponsored by the Florida Fish and Wildlife Conservation Commission (FWC) indicate many participants feel a sense of isolation after completing environmental education workshops. Although they are motivated and want to implement the activities and strategies they learn about in workshops, participants often need encouragement, concrete suggestions and ideas, and logistical support in order to follow through. As a facilitator, you can serve as a valuable resource in all of these areas. In addition to providing workshop participants with your phone, mail, and e-mail contact information, keep a record of this same information for all of your workshop participants. Try to keep in touch with former workshop participants at least once every six months via a short newsletter or general e-mail message. Use these communications to update participants on current bear-related activities, such as the Florida Black Bear Festival, or share new information, such as current bear roadkill statistics, recent news articles about Florida black bears or legislative updates. After each workshop you conduct, notify your past workshop participants of newly trained educators in their local area and invite participants to contact you with any concerns or questions they may have. You may even want to organize a small reunion day for former workshop participants living in your area.

Networking

The recent evaluation of the FWC's Schoolyard Wildlife Program also found that very few facilitators conduct as many workshops as they would like. This study also determined that facilitators who network and offer workshops as a team offer more workshops than those who facilitate workshops on their own. If you do not have the time or opportunity to conduct as many black bear workshops as you would like, try contacting other facilitators in your local area to co-sponsor workshops. You could also set up an e-mail address book for facilitators in your area to facilitate sharing of ideas and concerns.

Recruitment

Like Project WILD, Project Learning Tree and other successful environmental education curriculum supplement programs, *The Florida Black Bear Curriculum Guide* is only distributed via FWC/ Defenders of Wildlife-sponsored training workshops. Therefore, the success or failure of the entire program is primarily dependent on the number and quality of trained program facilitators. Increasing the number of certified facilitators, especially in currently underserved areas of the state, like the Panhandle, is one of the only ways to ensure widespread dissemination of the *Guide*. Whenever you meet dynamic educators with an interest in the environment, strongly encourage them to consider becoming black bear facilitators. If possible, try to target teams of teachers from the same school or nearby schools to participate in the training together. You may want to begin by asking former participants of your Project WILD or Schoolyard Workshops to consider black bear training.

Publicity

In recent years, the print and television news media has been inundated with "bad" news about Florida black bears such as stories about black bear roadkill, illegal black bear killing or nuisance black bears in neighborhoods. To make people more aware of

the positive pro-active things that are being done, contact your local newspaper or television station and ask them to develop a short segment about the Florida black bear and things teachers and their students are doing on the bears' behalf. You could provide photographs from your training workshops as well as photos from follow-up visits with teachers actually implementing the activities in their classrooms.

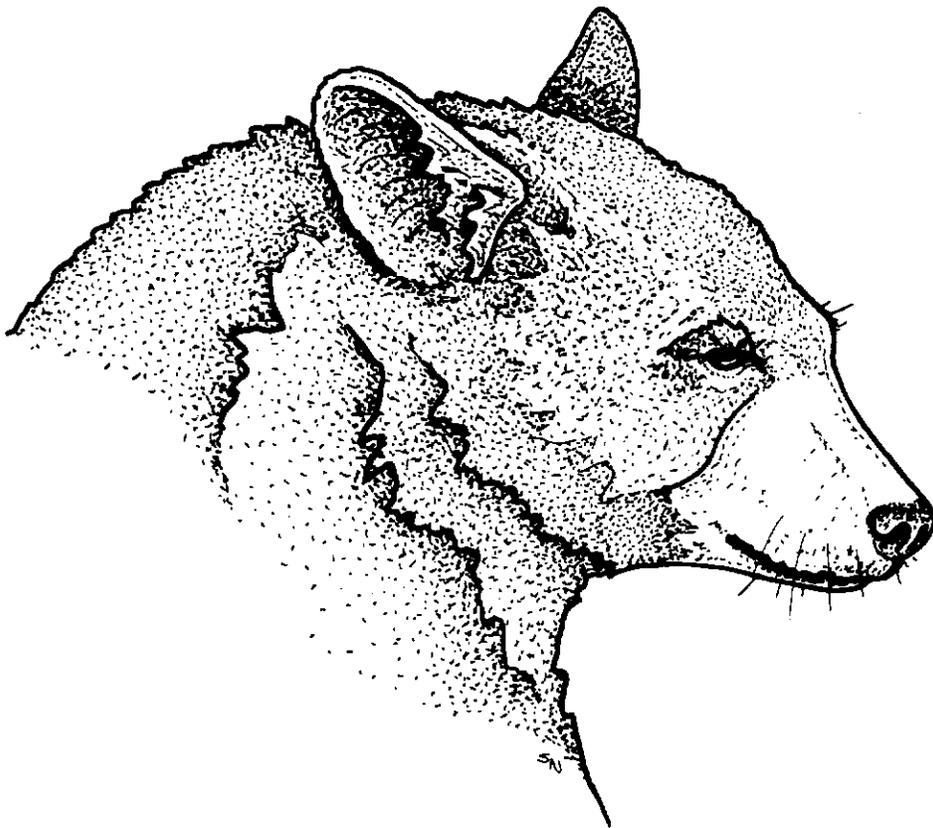
Establishing Initiatives

As a facilitator, one way to follow through with the "Awareness to Action" philosophy of environmental education is to establish a Florida black bear conservation or education initiative in your own local area. The individuals and organizations listed in the "Important Contacts" section of this manual can provide guidance and assistance with such initiatives. Examples of conservation and education initiatives you may want to organize and sponsor include:

1. A driver education presentation for the community or a high school driver's education class focusing on Florida black bears and road mortality;
2. A booth or exhibit about Florida black bears at a local community festival or fair;
3. A "Florida Black Bear" month at the local library featuring Florida black bear activities and reading circles for young children;
4. A habitat restoration or habitat management project at a local park or nature center;
5. A fund-raising campaign to support black bear-related initiatives of state or national conservation organizations.

As a black bear facilitator, teachers and students in your area will look to you as an expert and a resource and will often be more than willing to participate in an initiative you organize.

FWC's K-12 Programs Coordinator is always available to consult and assist with your efforts. Also, feel free to contact anyone on the following contact sheet for support or assistance in your efforts.



IMPORTANT CONTACTS

notes

In addition to the specific individuals listed below, page 162 of the *Curriculum Guide* contains a more expanded list of individuals, organizations and agencies that can provide information and other assistance with black bear–related follow-up and networking activities.

INDIVIDUAL CONTACTS

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Project WILD/K-12 Programs Coordinator
(850) 488-4679/Suncom 278-4679/Toll free (877) 450-WILD (9453)
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Judy Gillan

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Conservation Education Director
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Christine Small

Defenders of Wildlife
Habitat for Bears Campaign Coordinator
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Laurie Macdonald

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Florida Programs Coordinator
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Linda Cronin Jones

Associate Professor of Science and Environmental Education
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lcjones@coe.ufl.edu

notes

FLORIDA BLACK BEAR CURRICULUM GUIDE

KNOWLEDGE ASSESSMENT

Name _____

Circle one: Pre-test Post-test

Workshop Date _____ Facilitator(s): _____

PART 1. FLORIDA BLACK BEAR CONTENT KNOWLEDGE

TRUE-FALSE *(Circle the correct answer)*

1. True False Florida black bears eat mostly plant matter.
2. True False Florida black bears have attacked and killed people.
3. True False Both male and female Florida black bears help to rear their young.
4. True False Florida black bear cubs are born blind and helpless.
5. True False Female Florida black bears usually live longer than males.

FILL IN THE BLANK

6. What is the current state-designated status of the Florida black bear? _____
7. What is the estimated population of Florida black bears today? _____
8. What is the size of the area (in acres) needed to support a viable population of Florida black bears? _____
9. What are habitats providing less than ideal food, water, shelter and space requirements called? _____
10. What is the primary factor threatening the survival of the Florida black bear? _____
11. What is the combination of different habitats, plant communities or forest types that a wide-ranging species like the Florida black bear needs to survive called? _____
12. Three plant community types often used by Florida black bears are freshwater swamps, sand pine scrub and _____.
13. During what season are Florida black bear roadkills highest? _____
14. What are areas of land or water that connect isolated areas of wildlife habitat with each other called? _____
15. Name one area of the state where Florida black bears currently live. _____

SHORT ANSWER (*Write your answer in the spaces provided.*)

16. Why is the Florida black bear called an umbrella species?

17. What is the relationship between Florida's human population growth and Florida black bear populations?

18. Why are more male Florida black bears killed on roads than females?

19. Why is habitat fragmentation so detrimental to Florida black bears?

20. What is one major misconception your students may have about Florida black bears?

PART 2. KNOWLEDGE OF EDUCATIONAL PHILOSOPHIES/STRATEGIES

21. What are the two most common techniques used in direct instruction?

22. What are the two most common techniques used in facilitative instruction?

23. What are the three phases of the Learning Cycle?

24. Which lesson in the *Guide* should always be conducted first?

25. What are the four major categories of attitudes people can have toward wildlife?

FLORIDA BLACK BEAR CURRICULUM GUIDE KNOWLEDGE ASSESSMENT

Answer Key

PART 1. FLORIDA BLACK BEAR CONTENT KNOWLEDGE

TRUE-FALSE *(Circle the correct answer)*

1. **True**False Florida black bears eat mostly plant matter.
2. True **False** Florida black bears have attacked and killed people.
(not as of this printing, 2/03)
3. True **False** Both male and female Florida black bears help to rear their young.
4. **True**False Florida black bear cubs are born blind and helpless.
5. **True**False Female Florida black bears usually live longer than males.

FILL IN THE BLANK

6. What is the current state-designated status of the Florida black bear? *(threatened)*
7. What is the estimated population of Florida black bears today? *(1,500 – 3,000)*
8. What is the estimated size of the area (in acres) needed to support a viable population of Florida black bears? *(500,000 to 1 million acres)*
9. What are habitats providing less than ideal food, water, shelter, and space requirements called? *(marginal habitats)*
10. What is the primary factor threatening the survival of the Florida black bear? *(habitat loss and fragmentation due to development)*
11. What is the combination of different habitats, plant communities or forest types that a wide-ranging species like the Florida black bear needs to survive called? *(habitat mosaic)*
12. Three plant community types often used by Florida black bears are freshwater swamps, sand pine scrub, and *pine flatwoods*.
13. During what season are Florida black bear roadkills highest? *(Fall)*
14. What are areas of land or water that connect isolated areas of wildlife habitat with each other called? *(habitat corridors)*
15. Name one area of the state where Florida black bears currently live. *(Apalachicola National Forest, Big Cypress Preserve, Chassahowitzka, Eglin Air Force Base, Glades/Highlands, Ocala National Forest, Osceola National Forest, St. John's River)*

SHORT ANSWER *(Write your answer in the spaces provided.)*

16. Why is the Florida black bear called an umbrella species? *(If the Florida black bear and its habitat are protected many other kinds of plants and animal species will also be protected.)*
17. What is the relationship between Florida's human population growth and Florida black bear populations? *(Historically there was an inverse relationship. As Florida's human population grew, the population of Florida black bears decreased. In past 10-20 years the population is thought to be increasing.)*
18. Why are more male Florida black bears killed on roads than females? *(Male bears have a larger territory and home range and travel more than females.)*
19. Why is habitat fragmentation so detrimental to Florida black bears? *(Habitat fragmentation isolates populations of black bears which can lead to inbreeding and genetic defects. Isolated populations are also more vulnerable to local extinction due to a natural disturbance such as a widespread wildfire. Black bears living in fragmented habitats are also exposed to more risk to being killed on roads traversing their habitats.)*
20. What is one major misconception your students may have about Florida black bears? *(Answers will vary.)*

PART 2. KNOWLEDGE OF EDUCATIONAL PHILOSOPHIES/STRATEGIES

21. What are the two most common techniques used in direct instruction? *(lecture and note taking)*
22. What are the two most common techniques used in facilitative instruction? *(discussion and hands-on group work)*
23. What are the three phases of the Learning Cycle? *(Exploration, Concept Introduction, Concept Application)*
24. Which lesson in the *Guide* should always be conducted first? *(Lesson 1)*
25. What are the four major categories of attitudes people can have toward wildlife? *(human-centered, feeling-centered, life-centered, systems-centered)*

FLORIDA BLACK BEAR CURRICULUM ATTITUDE ASSESSMENT

Name _____ Circle one: Pre-test Post-test

Workshop Date _____ Facilitator(s): _____

INSTRUCTIONS: Please respond to these items honestly. There are no right or wrong answers.

PART 1. Please circle your preferred response for each item.

Strongly Agree Agree Unsure Disagree Strongly Disagree

1. Hunting of Florida black bears should be legal in counties with large populations of bears.
SA A U D SD
2. Nuisance bears should be trapped and moved to a new area.
SA A U D SD
3. I think it is a good idea to establish bear feeding stations in preserves and national forests during times of year when natural food sources are scarce.
SA A U D SD
4. If I lived in a rural area, I would feed Florida black bears that passed through my property.
SA A U D SD
5. Speed limits on highways passing through bear habitat should be reduced in known bear crossing areas.
SA A U D SD
6. I would be willing to pay extra taxes to help cover the costs of building highway underpasses for bears and other wildlife.
SA A U D SD
7. Apiculturists who depend on bee honey for their livelihoods should be allowed to poison bears that repeatedly raid their hives.
SA A U D SD
8. Since Florida black bears are a threatened species we do not need to worry about them as much as we worry about endangered species like the manatee and Florida panther.
SA A U D SD
9. I would be afraid of being attacked or killed if I came across a Florida black bear while hiking in the woods.
SA A U D SD
10. I think one of the best things we can do for Florida's wildlife in general is protect more Florida black bear habitat.
SA A U D SD

PART 2. Please circle your preferred attitude toward wildlife in general, and in the space below briefly explain the rationale for your view.

Human-centered Feeling-centered Life-centered
Systems-centered Unsure

FLORIDA BLACK BEAR CURRICULUM ATTITUDE ASSESSMENT ANSWER KEY

This instrument should be used for diagnostic purposes only. It can be used to document the changes in participants' attitudes as a result of the workshop. Some of these items do not have a clearly preferred view overall; however, from a systems-centered perspective, the responses circled here represent preferred scientifically-based attitudes. Unfortunately, all of these items are related to extremely complex management and conservation issues with multiple ethical, economic and legal implications. Facilitators need to make sure they do not try to impose their personal attitudes regarding these issues on workshop participants.

PART 1.

Strongly Agree Agree Unsure Disagree Strongly Disagree

1. Hunting of Florida black bears should be legal in counties with large populations of bears.

S A (A) U D SD

2. Nuisance bears should be trapped and moved to a new area.

S A A U D (SD)

3. I think it is a good idea to establish bear feeding stations in preserves and national forests during times of year when natural food sources are scarce.

S A A U D (SD)

4. If I lived in a rural area, I would feed Florida black bears that passed through my property.

S A A U D (SD)

5. Speed limits on highways passing through bear habitat should be reduced in known bear crossing areas.

S A A U (D) SD

6. I would be willing to pay extra taxes to help cover the costs of building highway underpasses for bears and other wildlife.

S A (A) U D SD

7. Apiculturists who depend on bee honey for their livelihoods should be allowed to poison bears that repeatedly raid their hives.

S A A U D (SD)

8. Since Florida black bears are a threatened species we do not need to worry about them as much as we worry about endangered species like the manatee and Florida panther.

S A (A) U D SD

9. I would be afraid of being attacked or killed if I came across a Florida black bear while hiking in the woods.

S A A U D (SD)

10. I think one of the best things we can do for Florida's wildlife in general is protect more Florida black bear habitat.

(SA) A U D SD

PART 2. Please circle your preferred attitude toward wildlife in general, and in the space below briefly explain the rationale for your view.

Human-centered Feeling-centered Life-centered
Systems-centered Unsure

FLORIDA BLACK BEAR TREK

Name _____ Date _____

PART 1. EXPLORE THE ENTIRE *GUIDE* TO ANSWER THESE QUESTIONS.

1. The *Florida Black Bear Curriculum Guide* is a joint project of what two groups?

2. What are the two kinds of instructional approaches used in the lessons?

3. What are the three phases of the learning cycle?

4. What four categories of Florida black bear behavior are addressed in the curriculum?
(HINT: "Conceptual Framework")

5. In addition to "Educating Others," what are two other categories of student action ideas?

6. Which lessons address the Conceptual Framework Topic "Habitats/plant communities used by Florida black bears?"

7. Which lessons can be completed in a social studies class?

8. Which lessons address this elementary school Sunshine State Standard in mathematics? "The student uses estimation in problem solving and computation."

9. Which lessons address this middle school Sunshine State Standard in science? "The student understands the competitive, interdependent, cyclic nature of living things in the environment."

10. Define the term "plantigrade."

11. What children's book about bears was written by Van Wormer?

12. From what company could you order a black bear skull or claw?

FLORIDA BLACK BEAR TREK

PART 2. REFER TO LESSON FOUR TO ANSWER THESE QUESTIONS.

13. What is the key question addressed in this lesson?

14. In what three subjects could this lesson be used?

15. What vocabulary terms are directly addressed in this lesson?

16. Which item is essential for each student?

17. During what months do most Florida black bears den?

18. What are the four stages of a Florida black bear's life?

19. What is one potential discussion question that can be addressed in this lesson?

20. How many suggested modifications for younger, ESE or ESOL students are provided?

FLORIDA BLACK BEAR TREK ANSWER KEY

notes

PART 1. EXPLORE THE ENTIRE *GUIDE* TO ANSWER THESE QUESTIONS.

1. The *Florida Black Bear Curriculum Guide* is a joint project of what two groups?
(*Florida Fish and Wildlife Conservation Commission and Defenders of Wildlife*)
2. What are the two kinds of instructional approaches used in the lessons?
(*direct and facilitative*)
3. What are the three phases of the learning cycle? (*exploration, concept introduction, concept application*)
4. What four categories of Florida black bear behavior are addressed in the curriculum?
(*feeding, reproductive, defensive, and maternal behavior*)
5. In addition to “Educating Others,” what are two other categories of student action ideas? (*Volunteering, Fund-Raising, Expressing Personal Opinions, Making Lifestyle Changes/Increasing Personal Awareness*)
6. Which lessons address the Conceptual Framework Topic “Habitats/plant communities used by Florida black bears?” (*Lessons 7 and 8*)
7. Which lessons can be completed in a social studies class? (*Lessons 2, 3, 7, 9, 10*)
8. Which lessons address this elementary school Sunshine State Standard in mathematics? “The student uses estimation in problem solving and computation.”
(*Lessons 5, 7, 9, 10*)
9. Which lessons address this middle school Sunshine State Standard in science? “The student understands the competitive, interdependent, cyclic nature of living things in the environment.” (*Lessons 2, 4, 5, 7, 8*)
10. Define the term “plantigrade.” (*An animal that walks on the flat soles of its feet, such as a bear, a human or a chimpanzee*)
11. What children’s book about bears was written by Van Wormer?
(*The Black Bear Book*)
12. From what company could you order a black bear skull or claw?
(*Skulls Unlimited International*)

PART 2. REFER TO LESSON FOUR TO ANSWER THESE QUESTIONS.

13. What is the key question addressed in this lesson?
(*What is the life of a Florida black bear like?*)
14. In what three subjects could this lesson be used?
(*Science, Language Arts, Mathematics*)
15. What vocabulary terms are directly addressed in this lesson?
(*sow, boar, cub, yearling*)
16. Which item is essential for each student?
(*one “It’s a Bear’s Life Field Notebook Sheet”*)
17. During what months do most Florida black bears den?
(*December, January or February*)
18. What are the four stages of a Florida black bear’s life?
(*Cub, yearling, young adult, mature adult*)
19. What is one potential discussion question that can be addressed in this lesson?
(*see pg. 48 in Guide*)
20. How many suggested modifications for younger, ESE or ESOL students are provided? (*two*)

BEAR BIOLOGIST TRIVIAL PURSUIT

INSTRUCTIONS FOR FACILITATORS:

As a result of the workshop, certain basic concepts regarding Florida black bears and related conservation issues should be mastered by all participants. Prior to administering a formal post-test to assess the content knowledge of each individual participant, a modified version of Trivial Pursuit can be played as a team-based review game. Before playing the review game, create a set of question cards containing specific content areas addressed in the workshop and place all of the cards in a bowl or box. Include at least one card for each participant in the workshop. Divide the group of participants in half and have each half line up in a straight row. Randomly draw cards one at a time from the bowl and have the first person in each team's row take turns answering a trivial pursuit question. If they answer the item correctly, they move to the back of their line and their team **EARN**s one point. If they do not answer the item correctly, they move to the back of their line but their team **LOSE**s one point. The question should then be referred to the first person in line on the opposing team and the same rules apply. The game can be played until all questions have been correctly answered.

BEAR BIOLOGIST TRIVIAL PURSUIT CARDS

What is the scientific name of the Florida black bear? (Lesson 1 — *Ursus americanus floridanus*)

When was the Florida black bear first described and what was it called? (Lesson 1-1896, The Everglades Bear)

Before European settlement, approximately how many black bears roamed the state? (Lessons 1, 6, 9 and 10 — at least 12,000)

What percent of the Florida black bear's diet consists of plant matter? (Lessons 1,5 — 80%)

On what continent did the first bears appear and how many years ago did they appear? (Lessons 1,2 — Europe, 4-5 million years ago)

Distinguish between the terms plantigrade and digitigrade. Which term applies to Florida black bears? (Lesson 1— walking on soles of the feet versus walking on toes. Florida black bears are plantigrade.)

Name one way Florida black bear skulls and Florida panther skulls are different. (Lesson 1— multiple answers)

Name one way Florida black bear feet and Florida panther feet are different. (Lesson 1— multiple answers)

How many cases of Florida black bears attacking humans have been documented? (Lesson 1, 3 — none)

What was the evolutionary ancestor of the bear called? (Lesson 2— the bear dog)

How many species of bears are there in the world today? (Lesson 2— eight species)

Name one continent where no bears are found. (Lesson 2— Africa, Antarctica, Australia)

Which of these is not a true bear, the panda bear or the koala bear? (Lesson 2— the koala bear)

Name the three species of bears found in North America. (Lesson 2— black bear, brown bear, polar bear)

True or False: All species of bears are omnivorous. (Lesson 2— True)

What is the most endangered species of bear in the world? (Lesson 2— the giant panda)

Define the term subspecies. (Lesson 2— A geographically isolated sub-group of a species that has developed unique, distinguishing traits)

What species are grizzly bears and Kodiak bears subspecies of? (Lesson 2— the brown bear)

What is the current state-designated status of the Florida black bear: endangered, threatened, rare or common? (Lessons 1, 2 — threatened, except in Columbia and Baker counties and the Apalachicola national Forest)

Define the term “attitude.” (Lesson 3 — a positive or negative feeling about something)

Explain the “human-centered” perspective regarding wildlife. (Lesson 3 — Wildlife is only important when it benefits humans. The needs of people are more important than the needs of wildlife.)

Explain the “feeling-centered” perspective regarding wildlife. (Lesson 3 — Wildlife species that can feel pain or have emotions are more important than those who don’t. Animals that are more human-like are more important.)

Explain the “life-centered” perspective regarding wildlife. (Lesson 3 — All living things, both advanced and less advanced, have a right to life and humans should be the caretakers of all life forms.)

Explain the “systems-centered” perspective regarding wildlife. (Lesson 3 — The entire ecological system is more important than individual organisms in that system.)

Scientifically, which perspective: human-centered, feeling-centered, life-centered, or systems-centered is preferred by ecologists? (Lesson 3 — systems-centered)

What are adult female black bears called? (Lesson 4 — sows)

What are adult male black bears called? (Lesson 4 — boars)

True or False: Male black bears have been known to kill and even eat young black bear cubs and yearlings. (Lesson 4 — True)

During what season do most Florida black bears den? (Lessons 4, 7 — winter)

What is the average size of a Florida black bear litter? (Lesson 4 — two to three cubs)

True or False: Florida black bear cubs are born blind and helpless. (Lesson 4 — True)

How long do Florida black bear cubs nurse? (Lesson 4 — nine to ten months)

How old are young black bears when they are run off by their mothers? (Lesson 4 — 18 months old)

How old are female black bears when they have their first litter of cubs? (Lesson 4 — three to four years old)

How old are male Florida black bears when they first mate? (Lesson 4 — four to six years old)

True or False: Female Florida black bears usually live longer than male Florida black bears (Lessons 4,6 — True)

True or False: Female Florida black bears can live up to 45 years. (Lesson 4 — False — 30 years)

How many acres do scientists estimate are needed to support a viable population of Florida black bears? (Lessons 5,10 — 500,000 to 1 million acres)

What percent of a Florida black bear's diet consists of animals other than insects? (Lesson 5 — 5%)

Define the term "optimal habitat." (Lesson 5 — A habitat with enough food, water, shelter and space to support a healthy population of Florida black bears.)

Define the term "marginal habitat." (Lesson 5 — A habitat providing minimal or less than ideal food, water, shelter and space requirements.)

Define the term "carrying capacity." (Lesson 5 — The largest population of organisms of a given species that an area of habitat can support on a year-round basis.)

True or False: One way to help Florida black bears living in marginal habitats is to feed them. (Lesson 5 — False)

Define the term "population." (Lesson 6 — A group of interbreeding organisms living in the same area of habitat.)

What four factors influence the population of organisms in a natural system? (Lesson 6 — birth rate, death rate, immigration and emigration)

What is the term for the factors that limit the sizes of populations of organisms in a habitat? (Lessons 5, 6 — limiting factors)

Name one example of a natural limiting factor potentially affecting Florida black bears. (Lesson 6 — drowning, den cave-ins, hypothermia, predation, starvation, falling from trees, infections, aggressive encounters with other bears, diseases, parasites)

What are the three main human activities causing Florida black bear mortality? (Lesson 6 — roadkills, poisoning, shooting)

What is the primary factor threatening the survival of the black bear in Florida? (Lessons 6,8 — Habitat loss due to development).

True or False: Approximately 25% of all Florida black bear cubs born do not survive their first year. (Lesson 6 — True according to lesson 6, however recent data indicates this is higher at 35-40%)

Over the past 50 years, how many million acres of forested land has been cleared in Florida? (Lessons 6, 10 — eight million acres)

Of every 100 Florida black bear cubs born, what fraction live a normal life span? (Lesson 6 — one third)

Define the term "habitat mosaic." (Lesson 7 — The combination of different habitats, plant communities or forest types that a wide-ranging species like the Florida black bear needs to survive.)

What is the area of habitat regularly used by an animal during a year called? (Lesson 7 — home range)

True or False: The home ranges of male Florida black bears are 4-10 times larger than those of female black bears. (Lesson 7 — True)

True or False: Female Florida black bears are generally more aggressive than males. (Lesson 7— False)

During what season do Florida black bears travel the farthest? (Lesson 7 — Fall)

During what season do Florida black bears have their cubs? (Lesson 7 — Winter)

What plant community is sometimes referred to as “the desert of Florida?” (Lesson 8 — sand pine scrub)

What is the most common plant community found in Florida? (Lesson 8 — pine flatwoods)

What kind of plant community often contains cypress trees? (Lesson 8 — freshwater swamp)

Why is the Florida black bear called an “umbrella species?” (Lesson 8 — Because so many different kinds of plants and animals will be protected if the Florida black bear’s habitat is protected)

Define the term “indicator species.” (Lesson 8 — A species whose population size and population health are used to gauge the overall health and quality of an ecosystem)

Why do Florida black bears need access to several different plant communities in order to survive? (Lesson 8 — They depend on many different kinds of food for survival and different kinds of food are found in different plant communities throughout the year)

Name one mammal that lives in the same habitat as the Florida black bear. (Lesson 8 — Florida mouse, southeastern pocket gopher, flying squirrel, gray fox, Sherman’s fox squirrel, white-tailed deer, Florida panther, river otter)

Name one reptile that lives in the same habitat as the Florida black bear. (Lesson 8 — gopher tortoise, Florida pine snake, sand skink, Florida box turtle, eastern indigo snake, common snapping turtle, American alligator)

Name one amphibian that lives in the same habitat as the Florida black bear. (Lesson 8 — gopher frog, flatwoods salamander, oak toad, bird-voiced tree frog, two-toed amphiuma)

Name one bird that lives in the same habitat as the Florida black bear. (Lesson 8 — Florida scrub jay, burrowing owl, red-cockaded woodpecker, southern bald eagle, white ibis, limpkin, swallow-tailed kite)

During what season are Florida black bear roadkills highest? (Lesson 9 — Fall)

How has the number of Florida black bear roadkills changed over the past 20 years? (Lesson 9 — it has increased)

What is the apparent relationship between the human population in Florida and the number of Florida black bear roadkills? (Lesson 9 — As human population increases, Florida black bear roadkills increase)

True False: More female Florida black bears are killed on roads than male black bears. (Lesson 9 — False)

Name any one strategy for reducing the number of Florida black bear roadkills. (Lesson 9 — multiple answers)

What is the fastest developing state in the country? (Lesson 10 — Florida)

Define the term “habitat fragmentation.”

(Lesson 10 — Breaking larger areas of habitat into smaller pieces)

What is a habitat corridor? (Lesson 10 — An area of land or water that connects isolated areas of wildlife habitat with each other)

Name one of the eight remaining Florida black bear habitat areas in Florida.

(Lesson 10 — Apalachicola National Forest, Big Cypress, Chassahowitzka, Eglin Air Force Base, Glades/Highlands Counties, Ocala National Forest, Osceola National Forest, St. John’s River)

True or False: Before European settlement, Florida black bears ranged throughout the entire state, even the Florida keys. (Lesson 10 — True)



PART 3. WORKSHOP COMPONENTS (Please circle your responses.):

- | | | | |
|---|------------|----------|------------|
| 17. Amount of time spent on hands-on activities: | Just Right | Too Much | Too Little |
| 18. Amount of time allowed for interaction with other participants: | Just Right | Too Much | Too Little |
| 19. Amount of time spent lecturing/presenting information: | Just Right | Too Much | Too Little |
| 20. Amount of time allowed for questions/discussion: | Just Right | Too Much | Too Little |
| 21. Amount of time allotted for breaks: | Just Right | Too Much | Too Little |

PART 4. WORKSHOP FACILITATOR(S) (Please circle your responses.):

- | | | | | |
|--|-----------|------|------|------|
| 22. Preparedness: | Excellent | Good | Fair | Poor |
| 23. Presentation skills: | Excellent | Good | Fair | Poor |
| 24. Knowledge about black bears: | Excellent | Good | Fair | Poor |
| 25. Knowledge about effective teaching strategies: | Excellent | Good | Fair | Poor |
| 26. Ability to answer questions/address concerns: | Excellent | Good | Fair | Poor |
| 27. Overall rating of workshop facilitator(s): | Excellent | Good | Fair | Poor |

PART 5. GENERAL QUESTIONS (Please answer these questions in the spaces provided.)

28. How did you find out about this workshop? (Circle all that apply):

Flyer/Poster Word of mouth Notice in newsletter Announcement in a class or meeting

Other _____

29. Why did you attend this workshop? (Circle all that apply):

To receive inservice credit As part of a college course Personal interest in the topic

It was required Other _____

30. Did this workshop adequately prepare you to use the *Florida Black Bear Curriculum Guide* as a teaching tool? Yes No If not, please explain: _____

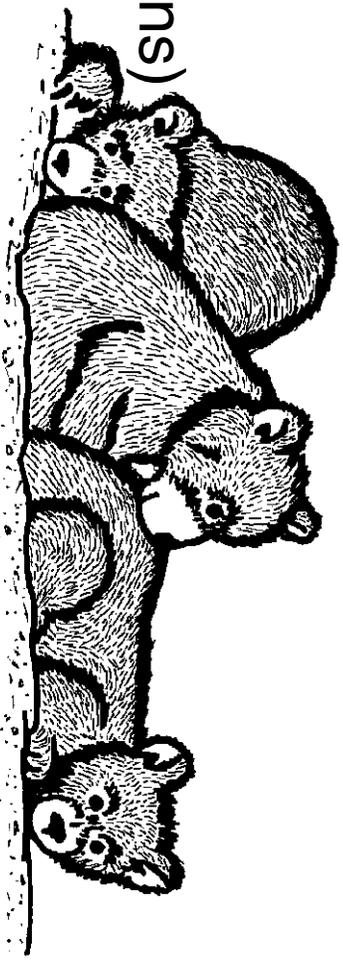
31. Are there any ways in which the workshop could be improved? Yes No If yes, please explain:

WHAT ARE THE GOALS OF THE CURRICULUM GUIDE?

A BALANCED CURRICULUM MOVES STUDENTS
FROM AWARENESS TO ACTION

FOUR MAJOR CATEGORIES OF LEARNING OUTCOMES:

- **CONTENT KNOWLEDGE** (Facts, Concepts, Generalizations)
- **ATTITUDES/VALUES/ETHICS**
- **SKILLS** (Creative, Critical, Problem Solving)
- **BEHAVIOR** (Individual
& Group Actions)



WHY DOES THIS CURRICULUM GUIDE FOCUS ON THE FLORIDA BLACK BEAR?

- Bears are charismatic and fascinating to children.
- The black bear is the largest land mammal in Florida.
- The black bear is a threatened species in Florida.
- Threatened means there is still time.
- The black bear can be used to introduce many significant ecological concepts.

MAJOR ECOLOGICAL CONCEPTS ADDRESSED:

- LIMITING FACTORS
- CARRYING CAPACITY
- OPTIMAL AND MARGINAL HABITAT
- HABITAT FRAGMENTATION AND CORRIDORS
- HABITAT MOSAICS
- UMBRELLA SPECIES
- INDICATOR SPECIES



WHAT GRADE LEVELS DOES THIS CURRICULUM GUIDE TARGET?

- GRADES 3-6

WHY?

- Childhood years are crucial to knowledge and attitude development.
- A solid knowledge base + positive attitudes = responsible behavior.
- Most children have limited or inaccurate knowledge of bears.
- Misconceptions are easier to correct in elementary school.
- Most environmental attitudes are fixed by age 12
- Positive environmental attitudes can be learned in school.

IS THIS A SCIENCE CURRICULUM GUIDE?

YES AND NO

- Effective environmental education is interdisciplinary.
- All lessons are based on recent, accurate, scientific research.
- All major subject areas are addressed (math, language arts, social studies, the arts, science).
- All lessons are correlated to elementary and middle school sunshine state standards for each subject.
- All lessons include assessment items similar to those contained in statewide FCAT and Florida Writes! assessments.

WHAT CRITERIA WERE USED TO DEVELOP THE LESSONS?

- OBJECTIVE 1: Lessons work in real-world classrooms and were pilot tested and field tested throughout the state.
- OBJECTIVE 2: Lessons are easy to plan, implement and assess.
- OBJECTIVE 3: Lessons address important ecological concepts and environmental issues.
- OBJECTIVE 4: Lessons are interesting and relevant to students.
- OBJECTIVE 5: Lessons include a mix of whole-class, small group and individual activities.
- OBJECTIVE 6: Lessons are appropriate for diverse student populations.
- OBJECTIVE 7: Lessons directly address knowledge and skills taught in all core subjects. All lessons are correlated to the Sunshine State Standards.

HOW WAS THIS CURRICULUM GUIDE DEVELOPED?

- Two-year process
- Collaborative effort of Florida Fish and Wildlife Conservation Commission and Defenders of Wildlife
- Review committee: Classroom educators, agency environmental educators and scientists
- Statewide pilot and field testing
- Draft lessons each pilot tested in three or more different classrooms
- Entire curriculum guide field tested in six different classrooms
- Significant increases in student content knowledge and attitudes were documented

WHAT KINDS OF INSTRUCTIONAL APPROACHES ARE USED?

- TWO PERSPECTIVES: DIRECTOR AND FACILITATOR

DIRECTORS:

- GOAL - Convey information
- TECHNIQUES - Lecture/note-taking
- LEARNERS - Passive
- LEVEL OF LEARNING - Recall and memorization
- RETENTION - Short-term

FACILITATORS:

- GOAL - Help students discover information
- TECHNIQUES - Discussion and hands-on group work
- LEARNERS - Active
- LEVEL OF LEARNING - Complex and higher order
- RETENTION - Long-term

WHAT IS THE LEARNING CYCLE?

- BASED ON “CONSTRUCTIVIST” LEARNING THEORY:

LEARNERS CONSTRUCT THEIR OWN KNOWLEDGE THROUGH DIRECT EXPERIENCE. THEY DO NOT MERELY ABSORB KNOWLEDGE FROM SOME OUTSIDE SOURCE.

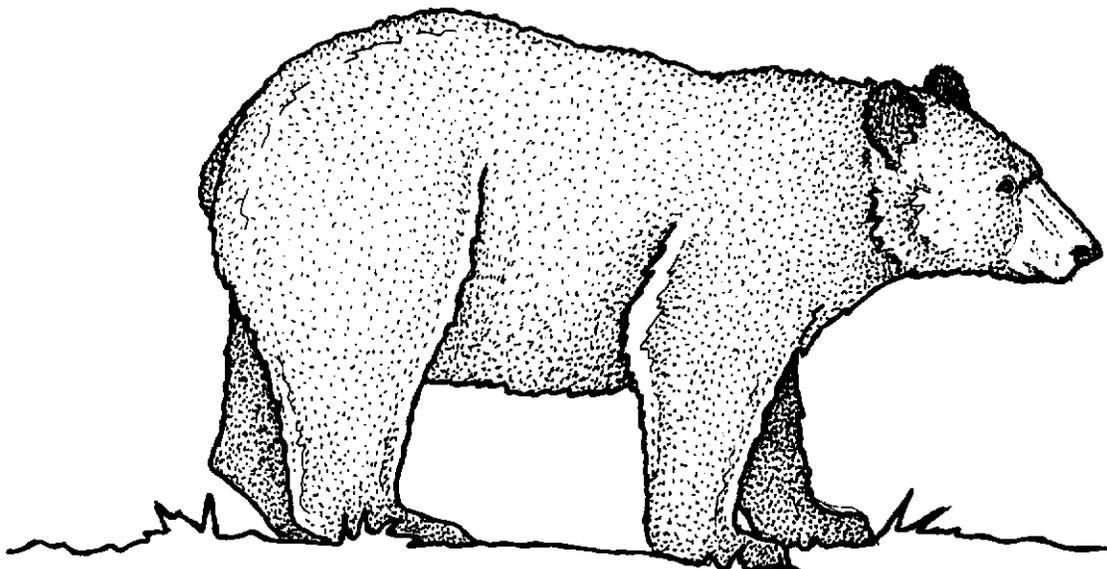
3 PHASES OF THE LEARNING CYCLE

- EXPLORATION
- CONCEPT INTRODUCTION
- CONCEPT APPLICATION



DO THE LESSONS HAVE TO BE COMPLETED IN ORDER?

- Designed to supplement instruction
- Can adapt lessons to interests, needs and ability levels of students
- Lessons progress from concrete to abstract, simple to complex
- Lessons stand alone
- Lesson One should be conducted first to provide a conceptual framework



HOW CAN THE GUIDE BE USEFUL TO ME?

- LESSONS ARE “TEACHER-FRIENDLY” AND EASY TO USE
- ALL LESSONS HAVE BEEN FIELD TESTED IN REAL CLASSROOMS
- THOROUGH BACKGROUND INFORMATION IS PROVIDED
- LESSONS FOCUS ON AN ANIMAL OF GREAT INTEREST TO CHILDREN
- LESSONS ARE INTERDISCIPLINARY
- LESSONS ADDRESS SUNSHINE STATE STANDARDS FOR SEVERAL SUBJECTS
- NO EXPENSIVE EQUIPMENT OR MATERIALS ARE REQUIRED
- TRANSPARENCY MASTERS, STUDENT WORKSHEETS AND ACTIVITY SHEETS ARE PROVIDED
- TRADITIONAL AND ALTERNATIVE ASSESSMENT IDEAS ARE PROVIDED
- MANY LESSONS CONTAIN GAME-LIKE FEATURES AND ARE FUN FOR CHILDREN

HOW IS THE FLORIDA BLACK BEAR CURRICULUM GUIDE ORGANIZED?

SECTION ONE

- INTRODUCTION
- CONCEPTUAL FRAMEWORK
- LESSON SUMMARIES

SECTION TWO

- COMPLETE LESSON PLANS
- VISUAL AIDS AND STUDENT MATERIALS FOR EACH LESSON
- COLOR “BEARS OF THE WORLD” POSTER

SECTION THREE

- ACTION/COMMITMENT IDEAS
- CROSS-REFERENCES
- GLOSSARY
- ASSESSMENTS
- RESOURCES AND REFERENCES

HOW ARE THE LESSONS ORGANIZED?

- Key Questions(s)
- Conceptual Framework Topics
- Subjects
- Time Estimates
- Key Vocabulary
- Objectives
- Essential Materials
- Supplemental Materials
- Background
- Advance Preparation
- Procedure and Discussion Questions
- Modifications: Younger/ESE/ESOL
- Assessment Suggestions
- Art Extensions
- Sunshine State Standards

FACT OR FICTION? INSTRUCTIONS

INSTRUCTIONS FOR FACILITATORS:

Give each workshop participant an index card with “FACT” written on one side and “FICTION” written on the other. Before implementing any of the lessons in the *Curriculum Guide*, display the “Fact or Fiction” overhead transparency and ask participants to hold up the “Fact” or “Fiction” side of their card in response to each statement. Do not provide participants with correct answers for any items but explain that they should be able to correctly classify each statement as Fact or Fiction by the end of the workshop. These statements directly address specific topics covered in the *Curriculum Guide*. The Fact or Fiction game is a quick and enjoyable way to diagnose the entry-level knowledge and misconceptions of workshop participants. It also piques participant interest and provides them with an advance organizer of the topics to be covered in the workshop.



FACT OR FICTION?

1. THERE ARE MORE THAN 10,000 BLACK BEARS IN FLORIDA TODAY
2. FLORIDA BLACK BEARS ARE DESCENDED FROM CANINE (DOG) RELATIVES
3. FLORIDA BLACK BEARS ONCE LIVED IN EVERY COUNTY IN FLORIDA
4. FLORIDA BLACK BEARS HAVE ATTACKED AND KILLED PEOPLE
5. FLORIDA BLACK BEARS EAT MOSTLY MEAT
6. FLORIDA BLACK BEARS CAN WEIGH UP TO 1,000 POUNDS
7. THE FLORIDA BLACK BEAR IS ENDANGERED
8. FLORIDA BLACK BEARS EAT HONEY
9. FLORIDA BLACK BEARS ARE SOCIAL AND LIVE IN COOPERATIVE GROUPS
10. BOTH MALE AND FEMALE FLORIDA BLACK BEARS HELP RAISE THE CUBS
11. FEMALE FLORIDA BLACK BEARS USUALLY LIVE LONGER THAN MALES
12. THE AVERAGE HOME RANGE FOR AN ADULT MALE FLORIDA BLACK BEAR IS OVER 50 SQUARE MILES
13. MORE THAN ONE-FOURTH OF ALL FLORIDA BLACK BEAR CUBS DIE BEFORE THEY ARE ONE YEAR OLD
14. EACH YEAR, ABOUT 5% OF FLORIDA'S BLACK BEARS ARE KILLED ON ROADS
15. FLORIDA BLACK BEAR ROADKILLS ARE HIGHEST IN THE SUMMER

FACT OR FICTION? ANSWER KEY

1. THERE ARE MORE THAN 10,000 BLACK BEARS IN FLORIDA TODAY **(FICTION)**
2. FLORIDA BLACK BEARS ARE DESCENDED FROM CANINE (DOG) RELATIVES **(FACT)**
3. FLORIDA BLACK BEARS ONCE LIVED IN EVERY COUNTY IN FLORIDA **(FACT)**
4. FLORIDA BLACK BEARS HAVE ATTACKED AND KILLED PEOPLE **(FICTION)**
5. FLORIDA BLACK BEARS EAT MOSTLY MEAT **(FICTION)**
6. FLORIDA BLACK BEARS CAN WEIGH UP TO 1000 POUNDS **(FICTION)**
7. THE FLORIDA BLACK BEAR IS ENDANGERED **(FICTION)**
8. FLORIDA BLACK BEARS EAT HONEY **(FACT)**
9. FLORIDA BLACK BEARS ARE SOCIAL AND LIVE IN COOPERATIVE GROUPS **(FICTION)**
10. BOTH MALE AND FEMALE FLORIDA BLACK BEARS HELP RAISE THE CUBS **(FICTION)**
11. FEMALE FLORIDA BLACK BEARS USUALLY LIVE LONGER THAN MALES **(FACT)**
12. THE AVERAGE HOME RANGE FOR AN ADULT MALE FLORIDA BLACK BEAR IS OVER 50 SQUARE MILES **(FACT)**
13. MORE THAN ONE-FOURTH OF ALL FLORIDA BLACK BEAR CUBS DIE BEFORE THEY ARE ONE YEAR OLD **(FACT)**
14. EACH YEAR, ABOUT 5% OF FLORIDA'S BLACK BEARS ARE KILLED ON ROADS **(FACT)**
15. FLORIDA BLACK BEAR ROADKILLS ARE HIGHEST IN THE SUMMER **(FICTION)**

HOW DO KIDS FEEL ABOUT FLORIDA BLACK BEARS?

BACKGROUND ON COMMENTS:

These are verbatim excerpts of comments collected from third through sixth grade students during the pilot and field testing of Lesson 3 - "Bear Dilemmas." Students learned about the four major categories of attitudes toward bears and then wrote a few sentences explaining which category they thought they fit into. These short paragraphs were written both before and after completing the lesson. Interestingly, although many students were human-centered before completing the lesson, few students thought of themselves as human-centered after completing the lesson. The two most common categories of attitudes expressed both before and after completing the lesson were life-centered and feeling-centered. More female students were feeling-centered while more male students were life-centered. As a result of completing the lesson, no third grade students expressed a systems-centered focus, but approximately 25% of the fourth through sixth graders included a systems-centered focus in their paragraphs.

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HOW DO KIDS FEEL ABOUT FLORIDA BLACK BEARS?

HUMAN-CENTERED

“We need room to build our homes. I think we should try to put the bears in nature preserves but we also need some room.”

“I think that habitats should only be cleared out for stuff we can’t live without except for malls and toy stores.”

“Bears have rights but so do we. People should have the right to shoot bears if they are bothering them.”

“I like new houses, malls, stores and all of that other stuff more than I like the woods.”

“Sometimes things have to die for progress. If a habitat has to be destroyed for a park, then just do it.”

“I really do not care for black bears-they seem mean. Plus I have never seen one except on t.v. People like homeless people are more important than black bears. We need to take care of them first.”

FEELING-CENTERED

“I would rather save a bear than a bug. Right away when I see a bug I kill it and I don't feel bad about it.”

“I care a lot about bears because they look sad sometimes. They have feelings too.”

“If I was a bear I wouldn't want to be shot, taken out of my habitat or killed for my body parts. I think it makes bears feel very scared when people try to hurt them.”

“I like rabbits and bears because they are cute and sometimes cuddly. I like dogs too because they are friendly. I don't like bugs or insects because they are ugly and slimy.”

“Bears are cool. Reptiles-I hate them. Sorry but that is the way I am.”

“I love to help animals live longer like turtles, ferrets, squirrels, birds and other wild animals, even foxes. Most of my best friends are animals. They are so cute.”

LIFE-CENTERED

“I love all types of animals, not just certain kinds that show their feelings. Also, I like plants but I don’t like Spanish moss.”

“I don’t like any animal to be hurt, whether it’s a worm or a bear.”

“I think all living things have a right to live like worms, bugs, bears, frogs and even ants. We shouldn’t destroy habitat if there’s even one animal living in it.”

“Everything that Mother Nature put down here on earth has a purpose. Even reptiles (although I really dislike them) have a purpose here. I think that every animal has a place and a purpose.”

“Everything is important to me. Animals are important because they give us food to eat and without animals we wouldn’t be alive. Trees give us oxygen so we can breathe.”

“I think that all creatures should be treated equally and fairly. The black bear is just as important to me as people are, therefore they should be treated equally. They have just as much right to this land as we do, if not more. We should share the land with bears and all other animals and plants.”

SYSTEM-CENTERED

“If you take away the forests where the black bear’s food is, it’s like taking away our food stores.”

“If something happens to wipe out the bears, it will affect me too in some way.”

“If we don’t have black bears we won’t have many other animals. If we didn’t have all these other animals it wouldn’t be a complete world. Our whole life could fall apart if animals like black bears become extinct.”

“I think we need to save some bear habitat and leave them alone. I know how life is and I know how hard it is to find food because I have a rabbit and I have to feed it every day. But a bear is not a pet. If it can’t find food I can’t feed it even if it might die.”

“I think we will only be able to save the black bear and other animals by saving the habitat first. I also think we should try to pick up trash and clean up the habitat.”

“There has to be a way to make it so that the black bears get what they need but we do to. This is because they are just as important as we are if not more important because there are millions of us but only hundreds of them.”

WHAT DO KIDS WANT TO DO TO HELP FLORIDA BLACK BEARS?

BACKGROUND ON STATEMENTS:

At the conclusion of the field test of the entire 10-lesson curriculum, students were asked to complete Action Commitment Forms and identify at least two things they would do to help the Florida Black Bear. These statements are verbatim excerpts from the Action Commitment Forms and represent examples of the five major categories of actions students can take on behalf of the Florida black bear.

These responses have not been coached or edited and represent the child's opinion regardless of whether we agree (or not) with it scientifically.



WHAT DO KIDS WANT TO DO TO HELP FLORIDA BLACK BEARS?

EDUCATING OTHERS

“When I grow up I will help them by making a business that protects bears. But till then I’m going to tell my parents to watch all of the signs about bears on the side of the road. I love bears!” – Jordan

“I can help the Florida black bear by asking my mother or whoever is driving to please slow down at bear crossings or any animal crossing. I can also help the bear by making newer bigger and better signs telling people to slow down on the roads.” – Ashley

“I want to get hunters to know bears are an important part of the world and I want to tell builders to stop destroying bear habitat.” – Johnny

“I want to put posters up all over my neighborhood so people can see how important Florida black bears are. I also want to have a program for people who want to stop others that hunt and kill black bears.” – Daibelis

“I will try to encourage grown ups that we already have enough land for people. Also I will try to get the government to move some of the roads away from where bears live.”
– Marisa

VOLUNTEERING

“I will pick up trash around their habitats and not encourage building and clearing of the woods more than we have to in their habitats. With a large, clean habitat it will be easier for them to survive.” – Alexis

“I would like to plant more trees and help build a hole under the road so bears do not get run over by cars.” – Stacy

“I want to be a vet and take care of Florida black bears for free if they are sick or get hit by a car.” – Jafiyath

FUND-RAISING

“I will help them by donating money to national parks and reserves that protect the places where bears live.” – Nicholas

“I am going to save up my money and give it to people who are trying to save the Florida black bear.” – Roselda

EXPRESSING PERSONAL OPINIONS

“I will try to reach out to people and explain why bears are important...not only to us, but to the other animals. I will try to go to my city hall and tell them to leave bear habitats alone. I will try until they say yes for this is the best I can do.” – Moana

“I will send a note to the governor and tell him to save bear habitat. And I will tell him to put speed bumps on roads in bear territory.” - Sarah

“What I will do to save the Florida black bear is fight to make a reserve for them and fight to make hunting laws...like no hunting bears or else you get a big fine.” – Kenneth

MAKING LIFESTYLE CHANGES/INCREASING PERSONAL AWARENESS

“I will never feed a bear and I will be aware of them when driving on the highway. A final thing I will do is tell my friends about bears.” – Bethany

“I would like to become a bear scientist and invent something to let the bears get to the other side of the road without crossing the road and getting killed.” – Kelly

“I will learn more about Florida black bears and try to write a law to stop people from shooting and poisoning them.”
– Heather

