

# NATURE UNFOLDS

TEACHER GUIDE  
BY SHERRI GRIFFIN



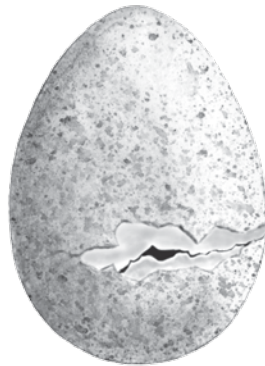
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DISCOVER  
**nature**  
SCHOOLS



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BY SHERRI GRIFFIN



Missouri Department of Conservation

## ABOUT THE AUTHOR

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# ACKNOWLEDGMENTS

*See How the Turkey Grows* is an extension of a project started in 1983 when my husband, John, joined the Missouri Department of Conservation as a new conservation agent. At the time, the original *Conservation Seeds* curriculum was written, I was a young, inexperienced teacher working on my Ph D. John was the connection who believed I could offer the Department insight into young children and how they grow, think and develop. Since then, I have presented numerous workshops and classes about sharing nature and conservation with children. Over the years, my thinking has changed as I learned along with the children. The path that I started so long ago has included many mentors, friends and inspirations along the way.

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Lastly, I want to thank my husband, John, for always supporting and assisting with my conservation related projects. I hope his stories serve to inspire learners for many years to come.



# PURPOSE

“The conservation conscience must begin with the young, and there should be opportunity for its blooming” (Swift, 1967)

Conservation education comprises all activities and experiences which result in learning about our dependence upon and use or abuse of natural resources for our needs and wants. Activities and experiences should emphasize feelings rather than knowledge for the young child. Rachael Carson called it the “sense of wonder” and authored a book so-titled for parents and teachers of young children. Her immortal message encouraged us to make discovery fun and to stimulate children’s natural sense of wonder. Later, when children are ready, they will assimilate the facts that correspond to personal feelings.

Nature study is the process of learning about nature, the key often used to generate interest in conservation. Children are intent on discovering the properties of nature. Too often we neglect to see their interest, spoken or silent—that “sense of wonder” that should be cultivated. Teaching any subject demands awareness of children’s interests and explorations, picking up the cues, and guiding the children’s discovery of reality. This is also true of conservation education.

Conservation education is more than nature study. It involves our use of all natural resources: air, water, minerals, land and all life forms, including people. The term “conservation” is of relatively recent origin, but references to conservation ideas and practices are not. The classic textbook definition of conservation is “the wise use of natural resources.” Another definition that has much merit was stated by the renowned conservation philosopher Aldo Leopold who wrote, “Conservation is a state of harmony between men and the land.” It is important to note, that in order to determine best use of natural resources, people have to have a basic understanding of nature and the intricacies of how ecosystems operate. Nature study is tied to understanding and practicing conservation.

Regardless of the definition used, it is important to realize that conservation is not a subject to be relegated to a certain hour of the school day but rather a philosophy of living that reflects a pattern of human behavior with respect to our life-sustaining environment.

When I first began teaching, I thought conservation meant saving the natural resource. Like many people, I assumed that to conserve a natural resource meant not using it. However, after studying and learning about conservation, I now understand that there

are three levels of conservation effort: preservation, restoration and management (Missouri Department of Conservation, 1990)

## PRESERVATION

Preservation means saving with little or no use of a resource. “There are certain resources—true wilderness, endangered species of plants and animals, small tracts of unique ecosystems, historically important buildings—in which preservation is the only possible method of conservation” (Missouri Department of Conservation, 1990, p. 2)

## RESTORATION

Restoration is the second level of conservation. Of equal importance, restoration implies a long-term effort to reestablish the original quality which once existed in the resource being restored. This level of conservation may address the return of worn-out farmland to productivity, the restocking of a wildlife species to an area from which it had been depleted, the replanting of denuded forest land, the grading and seeding of barren strip-mined areas or the reflooding of a drained waterfowl marsh.

## MANAGEMENT

Management is the third level of conservation. It is on the management level that people must make the decisions and implement practices. People often don’t realize that the decisions they make about their backyards is a land management decision that impacts whole ecosystems. For example, I live on a gravel county road in a very small, rural community. Most of my neighbors live on five or more acres of land. Some have chosen to clear their acreage and plant and mow grass; some harvest hay, plant gardens or use the land for livestock; some plant warm season grasses and manage controlled burns on a regular basis, and still others let the land proceed as it would naturally. Each of these individuals, whether consciously or not, is making a decision about how to manage the natural resource and thus impacting the wildlife sharing the habitat.

While much of this seems beyond the understanding of young children, the attitudes they develop about the earth’s natural resources begin at a very early age. Conservation is a philosophy of daily living that reflects

a pattern of people's behavior with respect to our life-sustaining environment This philosophy extends to everyday decisions made on a daily basis in the classroom

One such example in my classroom concerned one of the literacy experiences that children especially enjoy—character suitcases The particular suitcase in question was based on the book *Nicky the Nature Detective* Inside the suitcase was the book, a Nicky doll, binoculars, a compass, insect box, hand lens, blank book and colored pencils Children sign up to take these suitcases home on a rotating basis One child had taken Nicky home and kept forgetting to bring her back After several weeks, the family wrote me a note saying they could no longer find all of the parts A classroom discussion followed about how to handle the suitcase issue I was amazed to find that all three levels of conservation were involved in this discussion One child thought the suitcases shouldn't go home with anyone anymore; they should remain at school for children to use (preservation) Another thought the family should have to buy all new materials for the suitcase (restoration) Still another child thought the family should not get any more suitcases until they returned the lost materials (management) Although this discussion wasn't about natural resources or a topic considered relevant to conservation, it was about allocation of resources and was very conservation minded The way problems are handled in the classroom provides children with strategies for how

they handle problems in everyday life Conservation ethic is taught whether teachers intend it or not

As teachers, we have the power to influence that philosophy whether we want it or not Only knowledgeable, well informed people can make decisions about best practices As early childhood professionals, our responsibilities lie with helping children develop attitudes and gather information about the interdependence of natural resources and people Conservation ethic decisions will belong to them in the future

As a teacher, I have grown and matured in my handling of conservation issues and concepts throughout the years When I first began thinking about conservation in my classroom, I considered it just another topic or study that we would engage in on an occasional basis However, as time has gone by and I have read, studied, and lived the topic, I have come to realize that conservation ethic is addressed in life on a daily basis It is not something that I decide to teach or not to teach Conservation ethic is evident in every decision made by me, the children, and our classroom community My ultimate goal for the children is not that they grow up to be preservationists or hunters but rather that they consider all sides and make decisions about conservation issues based upon a real understanding of ecosystems and how they work Only then will they be able to handle the "wise use" of our world's natural resources





# DISCOVER NATURE SCHOOLS

“What’s the relationship between School and Mother Nature? Are they getting divorced or are they committed to working on a long-term relationship?” (David Sobel, 2008)

*Discover Nature Schools* (DNS) is designed as a commitment to a deep and sustained relationship between Missouri schools and the out of doors. The Missouri Department of Conservation has long provided teachers in the state with materials to aid in teaching learners of all ages about nature and conservation. In recent years with the pressures of high stakes testing and No Child Left Behind, it has become increasingly more challenging for teachers to devote time, energy and resources to taking children outside. Yet research indicates (Louv, 2005; World Forum, 2008) the importance and absolute necessity of sharing nature and the out of doors with all children on a routine basis.

*Nature Unfolds* is the primary grade level unit of DNS. Activities in this teacher guide address Missouri Department of Elementary and Secondary Education (DESE) Grade Level Expectations (GLEs). First grade Living Organisms, Ecology and Earth Systems GLEs are targeted, but there are also GLEs addressed from kindergarten and second grade. The activities in the teacher guide, along with the picture book, are designed to last throughout the school year, encouraging teachers to experience the environment *with* the children rather than merely discussing or pointing out vague ideas.



## UNIT OVERVIEW

The children’s picture book, *See How the Turkey Grows*, is written with the young learner in mind. Rather than a textbook presenting facts, this realistic fiction picture book is designed for discoveries and connections to be made by children as their understanding of concepts unfolds. The intent is to revisit this text numerous times throughout the school year while exploring activities in the teacher guide. Classroom copies of the picture book are provided so each child has the opportunity to see, experience and live the many aspects of nature addressed in the text and illustrations. It is presented in such a way to inspire the young learner’s “sense of wonder” while capitalizing on the concepts of nature, conservation and science that the GLEs dictate children know.

The companion teacher guide is intended to offer experiences that will escort children toward greater understanding of the academic content of the GLEs throughout the school year. This guide is presented in a seasonal format, with each season building upon concepts introduced and expanded upon in the previous season. It begins with summer and continues throughout the school year into late spring. Although the GLEs offer the framework around which the teacher guide is organized, the learning experiences presented are designed with the young learner in mind, capitalizing on the child’s interests and experiences while carefully considering developmentally appropriate practice (Bredenkamp & Copple, 2009). Rather than rote learning of academic skills, the activities deliberately offer opportunities for active, experiential learning in a meaningful context. Supporting technology references are intentionally not included. Children this age need to be connected to actual experiences in a familiar environment (Sobel, 2008). (Keep in mind that rain gauges, thermometers and rulers are examples of technology and that by using tools such as string or ribbon to measure the wind, children are engaged in using and creating technology as well as engaged in elements of engineering.) This approach will assist the young learner in not only acquiring the academic facts identified in the GLEs but also the ability to apply the information to problems and real situations. This is also the reason the learners are referred to as children rather than students throughout the materials. They are individuals and children before they are students in our classrooms. It is imperative that we keep this foremost in our thinking if we want to successfully offer meaningful learning experiences that truly leave no child behind.

# LEARNING EXPERIENCE COMPONENTS

**Name of Learning Experience**—The title concisely describes the activity providing clues as to what the learning experience entails. A quick glance identifies the key concepts or topic addressed in the activity.


**Objectives**—These are specific, observable actions that learners will engage in during the learning experience.

**Grade Level Expectations**—This section includes the specific Missouri Science GLEs that the learning experience addresses. If the entire intent of the GLE is not addressed, the portions not included are struck through. Although the Science GLEs are the only ones identified in this guide, keep in mind that curriculum frequently overlaps, and GLEs from other content areas could be addressed with the same activities. The following words reflect meaningful substitutions included in this unit:

- *Fox* is substituted for *dog*
- *Turkey* is substituted for *chicken*
- *Trees* are sometimes substituted for *plants*

**Materials**—Each learning activity includes a comprehensive list of materials needed to complete the experience. They are written in a list format for check off as materials are gathered. Some of the learning experiences require the use of natural materials such as feathers. Any materials of this nature should be legally obtained—either purchased from a reputable source or taken from game birds legally harvested during season. Hunters generally are very willing to share the turkey, duck and other game bird feathers for educational purposes. Feathers, nests, eggs, etc. found by the teacher or children during outdoor experiences should be observed but then left where they were found.

**Teacher Preparation**—Included in this section are activities that teachers need to do prior to sharing the learning experience with the children. It is also written as a checklist for teachers to quickly ascertain if they are adequately prepared to present the learning event.

-  This icon indicates book(s) from the Children's Literature section especially relevant to an activity and found by season/activity in the annotated "Children's Literature Recommended in Activities" section which begins on page 199.

**Procedure**—The numbered step-by-step procedures are specific and designed for both the novice as well as experienced teacher. This includes how to introduce the experience, background information for the teacher, step-by-step instructions for conducting the experience and a conclusion to the learning event.

**Questions For Discussion**—Each learning event includes several open-ended questions that encourage children to make deeper connections and explore beyond the activity itself, often integrating concepts across the curriculum.

**Assessment**—The assessment rubric is a detailed plan to evaluate how each child met each of the objectives and GLEs identified. Included here are specific, observable behaviors or artifact details that indicate how successfully the objectives and standards have been dealt with. They are designed to assess individual understanding as well as judge the success of the experience itself. These rubrics are intended to assist the teacher in evaluating teaching and individual learning.

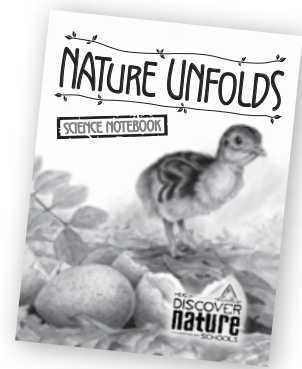
**Learning Center Activities**—This section includes supplemental learning experiences that address various subject areas and support or expand upon learning in the main experience. While these experiences are not essential to understanding, they will support the growth and application of the knowledge gained during the main learning experience.

**Science Notebook Pages**—These are specifically tailored to each learning experience. These pages should be copied and used during the activity. They might be placed on a clipboard (to be added to a science folder or notebook later) or put into a specific science notebook (folder) before the activity is presented. As you consider how to use these notebook pages, it is important to consider your own teaching style as well as the children within your classroom. Would these notebook pages be best organized in individual folders around a particular topic (for example weather) or should they be placed in a folder for the appropriate season? Whichever organization you select, the science notebook pages should be used as a teaching as well as an assessment tool. They also serve as documentation of the children’s learning and growth throughout the year.

**Student Science Notebooks**—Science notebook pages included in this teacher guide and discussed above have been compiled into individual student science notebooks. In addition to the science notebook pages from the teacher guide, several generic notebook pages have been included in these student science notebooks to allow students to record information, make notes and sketch during other outdoor explorations.

These student science notebooks are offered as an option to printing science notebook pages from the teacher guide and distributing them to students.

Student science notebooks may be requested when ordering student books. (*See How the Turkey Grows*)



# SHARING LEARNING EVENTS WITH CHILDREN

“The best teachers are the ones who can remember what it was like to be a child” (Piaget?)

Teacher attitude and approach are as important as the activities themselves in sharing the learning experiences presented in the *Nature Unfolds* teacher guide. In his book *Childhood and Nature: Design Principles for Educators*, David Sobel (2008) identifies seven childhood “play motifs” (p. 20). He uses these play motifs to construct design principles for helping children build relationships with nature.

These principles along with knowledge of developmentally appropriate practice for six- to eight-year olds were used to structure the experiences presented in this guide. They are presented here because not only is it important for teachers to share these experiences with children in their classrooms, but also the attitude and tone in which the activities are presented will also influence the success of the learning experience for both the learner and the teacher. Recognizing and using these design principles will help you shape the experiences to your group of children. They also give you permission to explore the unknown and experience the joy of learning along with your children while keeping in mind the outcomes dictated by the GLEs.

## ADVENTURE

The first principle Sobel identifies is **Adventure** (2008, p. 21). Adventure involves risk taking and exploration of the unknown—of surprises. I routinely visit a creek with the children and families in the local preschool where I teach. I find that the children are much more responsive when we go adventuring to the creek than when I call it a hike or walk, especially when the weather is wet and/or cold. Often the water is too high for wading, so our explorations are along a trail next to the creek. There are a number of large trees that have fallen in recent years. These “jungle gym trees” have the feel of the jungle, with grapevines hanging all around and the creek flowing by in front of them. They provide many opportunities for risk taking and adventure. The children challenge their physical prowess as they climb and balance on these large trees. Also provided here is the perfect backdrop for sitting and sketching our finds. Often we don’t walk back along the trail but

instead scale the mountain back to our picnic area. It is really a very steep hill, but scaling a mountain sounds and feels so much more adventuresome than walking back. These are really sidelines to my main purpose of exploring nature along the creek, but taking a moment to remember to make this hike more playful piques everyone’s interest including my own! Remember to set the stage for adventure as you explore the experiences with the children. Adopting a mere change in the language and tone of voice used to introduce an experience to the children can make the learning fun as well as purposeful.

## FANTASY AND IMAGINATION

**Fantasy and Imagination** is Sobel’s second principle (2008, p. 24). This principle involves engaging the child’s imagination and encouraging him or her to “live the challenge” rather than merely hearing a lecture about it. Last winter when my first grade niece and her fourth and fifth grade brothers were staying with me, we adventured in the woods and snow on a daily basis. One of their most memorable experiences was “getting lost” in the woods. We were hiking in an area of the woods they had not visited before. I pointed out the direction to the house and then walked out to the road and left them to find their way home. Their sense of adventure was piqued, and they became explorers forging new territory. They talked about and asked that this experience be repeated for months afterward. It was also the fodder for stories, writings and map making when we returned to the house and also when they returned to school following the holiday break. Use the experiences in this guide to create worlds for the children to imagine and explore while also accomplishing the tasks designated in the GLEs. The GLEs are there to guide our teaching and ensure a certain level of knowledge—not to make learning drudgery. Engage your imagination as well as that of the children’s and everyone will remember the material you want them to learn.



## ANIMAL ALLIES

Sobel's third principle is *Animal Allies* (2008, p 29) "Animals play a significant role in the evolutions of children's care about the natural world and in their own emotional development" (Sobel, 2008, p 29) The best way to understand something is to become that thing—to live, breathe and play as the animal or plant Within the activities presented in this guide, you will find activities that assist you in helping children to experience animal allies Being that young turkey emerging from the egg, following momma turkey through the weeds and hiding from predators capitalizes on the young child's learning about the turkey The young child will be much more inclined to remember the life cycle of the turkey for the standardized test through this type of experience rather than just reading about it Furthermore, after experiencing this, the idea of habitat becomes real for them Only after many of these types of experiences can children really grasp the plant or animal's role in the ecosystem We can't ask children to save the world until they really know it!

## MAPS AND PATHS

Principle four is *Maps and Paths* Sobel describes this principle as "finding shortcuts, figuring out what's around the next bend, following a map to a secret event Children have an inborn desire to explore local geographies Developing a local sense of place leads organically to a bioregional sense of place and hopefully to biospheric consciousness" (2008, p 34) Throughout my many years of teaching young children, I have found that they naturally find maps intriguing Maps are something we use throughout our lives to help us figure out where we are both literally and figuratively Mapmaking helps children develop a "sense of place" (Sobel, 1998) Recently, one of my kindergarteners in Alumni School brought two snakes and a turtle to share In preparation for sharing his finds, he created a map of his house and yard showing exactly where he found each The map helped the rest of the group consider why these animals were in these particular locations There was much discussion about what the animals needed to survive and what was in the area His map helped the rest of the group really understand and consider his home and how he shares it with the animals There are several activities in this teacher guide that suggest mapping with children The maps the children create will challenge them to consider their space in new ways and allow adults to see what is important to them and how they view

their immediate environment It will push them to symbolize the internal maps they have of their familiar spaces Sobel calls maps "a tool for hitching children's live to their places" (1998, p 9)

## SPECIAL PLACES

*Special Places* is Sobel's fifth principle (2008, p 38) Children have an innate desire to find and create special places For the youngest children, this might be building a house from the couch cushions in the living room while older children move farther afield In *Bridge to Terabithia* (Paterson, 1987) Jess and Leslie create an entire kingdom in the woods near their houses where they retreat to play, be alone and come to grips with the many puzzling aspects of the adult world Children create these special places with or without adult assistance As teachers, why not capitalize on this and work with the children to create special places on the school yard? Sobel (2008) describes several New England teachers who create classroom special places on their play yards and allow children to create their own places within that framework They visit these special places recurrently throughout the school year for quiet work such as reading, writing and reflecting These teachers report that the children often identify this as what they liked best in the curriculum "Through recognizing children's deep impulses and building on them, the curriculum can be enhanced" (Sobel, 2008, p 41) Many of the learning events in this teacher guide require being outside to complete them Children will find their special places on your play yard, but if you make a conscious effort to address and use these as part of the curriculum, the learning experiences will provide even stronger connections for both you and the children

## SMALL WORLDS

Sobel's fifth principle is *Small Worlds* (2008, p 45) Children love to create and play in miniature worlds Playing in these worlds allows players to see and understand the larger picture "It's like the one-page organizational chart for the organization, the site map for the website, the logic model that describes the underlying assumptions for a project" (Sobel, 2008, p 46) The trail we use to access the creek is the old wagon crossing for the creek It is still marked on the deed to the property The path is wide with a rocky ledge along one side Along this ledge are many rocky nooks and crannies They cry out to be homes to magical creatures One of these nooks was

designated by the children as a leprechaun house many years ago. It is a routine stop on our treks down to the creek. Over the years, the leprechaun sometimes leaves notes and treasure for the children to find. Inside the house, he stores his gold (a small pile of fool's gold) and his hat. The hat routinely is moved around by the leprechaun or some of his "friends"—the raccoons or birds in the area. Several years ago the hat completely disappeared. The children speculated that the leprechaun must have taken it back to Ireland. It was a great surprise (to the children but especially to the grown-ups) when the hat reappeared on an exploration several years later. The exploration of this rocky area has led the children to believe that all of the nooks and crannies are homes to leprechauns and fairies. They explore this miniature world looking for signs of residence as well as discovering much about the local flora and fauna. Mosses are left intact as fairy beds and pillows, and shells are added for fairy bathtubs. This magical place inspires respect and consideration for the place by not disturbing the inhabitants, always returning the rocks to where they were found and leaving nothing behind that isn't already part of the environment.

## HUNTING AND GATHERING

The seventh and final principle identified by Sobel is *Hunting and Gathering* (2008, p. 50). He describes hunting and gathering as an innate characteristic of being human. It is part of our survival instincts. He suggests that teachers follow these instinctual predispositions and use them as a structure for learning experiences that will foster a positive relationship between children and the natural world. Children routinely make collections of artifacts they find—rocks, shells, sticks, flowers. Using this instinct to hunt and gather provides a basis for several of the experiences suggested in this teacher guide. These collections provide opportunities for the young child to sort, classify and create connections, which is the way individuals learn.

In addition, Sobel addresses the idea of hunting and gathering figuratively—"the quest, the search for the elusive" (2008, p. 55). During our routine visits to the creek, hunting for creek treasures is a primary focus of our event. No one knows



(including me) what we will find along the way. The lure of the unexpected and the treasure we find if we look closely drives us to study the details of our environment. Transforming learning experiences into treasure hunts entices even the most reluctant learner to engage.

One drizzly, wet trip to the creek, we stumbled upon a newborn fawn in the grass right next to the trail. It took sharp eyes to spot it in the tall grass and much restraint to watch from afar. However, not many of those children will forget the treasure we came upon that day. When we returned to the classroom, research about the fawn revealed that it had not be abandoned like the children thought but that the mother purposely stays away so her scent doesn't attract predators to the baby. We also discovered that the fawn weighed about the same or less than the children's pet cats. The research we did as follow up taught all of us more about the deer with whom we share a habitat as well as how to research to find answers to our questions. Sobel states, "Treasure hunts with elementary students provide a concrete illustration of the process of doing research and probing into the hidden recesses of a subject that happens in secondary school and in professional lives" (2008, p. 55).

An underlying concept that Sobel ties to all of these principles is to assist children in learning about their own immediate environment before exposing them to the problems of the world. Developmentally, the young child isn't ready to process abstract thinking about places they know little about. It is difficult enough for adults to consider habitats they have never experienced, but for the young child it is nearly impossible to consider. Sobel promotes helping children love and feel comfortable in their own immediate natural environments. If we foster this at a young age, knowledge and the ability to make "wise use" decisions will come later. "If we prematurely ask children to deal with problems beyond their understanding and control, prematurely recruit them to solve the mammoth problems of an adult world, then I think we cut them off from the possible sources of their strength" (Sobel, 1996, p. 5). The experiences offered in *Nature Unfolds* encourage local learning while addressing science GLEs. They are meant to provide a framework for understanding and growth as well as a foundation for later responsible and ethical decision making.

# TAKING ACTIVITIES OUTSIDE

"If a child is to keep alive his inborn sense of wonder he needs the companionship of at least one adult who can share it, rediscovering with him the joy, excitement and mystery of the world we live in" (Carson, 1956)

Most learning experiences in *Nature Unfolds* are designed to be implemented outside in the school yard. Familiarize yourself with the outdoor area, making note of dangerous places to be avoided. Each time you plan to take children outside, look at the area with the objectives of the learning experience in mind. Try to anticipate what the children will find and what dangers they might encounter. Preparedness will assist you in guiding the children toward discoveries you want them to make and facilitate their learning.

## APPROPRIATE ATTIRE

Make sure children are appropriately attired for the type of exploration in which you plan to engage. Consider and anticipate the weather. Socks, comfortable shoes and long pants will help to avoid problems during the outing. During the winter, keep extra gloves and hats on hand for those children who come to school unprepared. Of course, weather extremes should be avoided, but much can be learned through observations following or during a light rain or snow storm. The day we discovered the newborn fawn was a wet, dreary day. We nearly cancelled this visit to the creek, but since the weather forecast did not include thunderstorms, we followed the routine. Think of the magical learning experience we would have missed if we would not have gone to the creek that day!

## APPROPRIATE TOOLS

Take along the appropriate tools for the learning experience. Gathering materials for the experience prior to preparing the children will help make the most of the outside time. Even when just going outside the school, grabbing a first aid kit with basic supplies can save a trip inside before the group has completed the current learning experience.

As Rachel Carson (1956) so wisely advised us, young children have an *inborn sense of wonder*. Playing to that strength rather than concentrating

on knowledge acquisition is important. As adults, we have often lost that sense of wonder or are afraid of exploring or studying something we know little about. **Don't be afraid to explore unfamiliar phenomena.** It's important that adults have opportunities to keep that *inborn sense of wonder* alive. Some of the most interesting and successful studies I have had with children were when I was able to learn along with them. I will never forget our discovery of the small crayfish under the mother's tail; or that ticks have eight legs and are arachnids rather than insects; or the egg sack being dragged behind a wolf spider would soon hatch hundreds of small spiders that she would carry on her back. These were all discoveries we made together, and I'm certain my delight and wonder was evident to the children as theirs was to me!

## EXPLORATIONS

Encourage children to be observant. Many of the learning experiences offered encourage children to explore with all of their senses. Model observing, sketching and recording data about phenomena as you move through the area with the children. If you don't consider yourself an artist and scientist, the children won't think that of themselves either. Ask direct questions that will help children focus and challenge them to think. Bring the observation to the child's developmental level. For example, make comments regarding color, size, shape, texture or smell rather than providing factual information.

## TEACHABLE MOMENTS

Take advantage of teachable moments. These are times when a child or a group of children have expressed an interest in something or when a phenomenon unexpectedly presents itself. Seize the opportunity and expand upon the expressed interest—it may not be there when you are ready to do a unit on it. A study that I initiate won't be nearly as successful or as valuable as what occurs by taking advantage of the *teachable* and *learnable* moment. All individuals learn best when they are interested in the topic being explored. Following the children's lead promotes learning experiences where everyone is actively involved in the learning, including the teacher.

## COLLECTIONS

Encourage children to look with their eyes rather than disturbing areas and collecting specimens. After they have been examined, remember to return leaf litter and rotting logs to where they were found.

However, collecting artifacts and taking them back to the classroom is a wonderful way to extend the outdoor experience. Many of the learning experiences included in the teacher guide suggest collecting specific artifacts for sharing back in the classroom. The following guidelines should be addressed when promoting collection as part of the learning experience.

- 1 Discuss safe and specific items to collect. Often children are very zealous in their collection process. They neglect to consider safety. Be sure to discuss what the children are collecting and how to make sure it is something safe before beginning the activity.
- 2 Respect the area and all area regulations. If you are exploring a locale beyond your school yard, read and follow the rules of the area. Caution the children about only taking what they need for your specific purpose. The rest should be left behind for other users of the habitat to enjoy. Discuss “wise use” of the natural resource and the impact the children might have on the area. For example, when children collect seeds or nuts, collecting all of the acorns they can find might deprive the local wildlife of a food source or when collecting flowers, picking everything in sight ruins the beauty for the next visitors.
- 3 Consider alternative methods of collection. Collecting artifacts doesn’t always mean physically removing the item. Photographs and sketches are obvious possibilities, but audio recordings of sounds can also be a valuable reminder of the experience for children. Listening to these tapes back in the classroom often allows children (and teachers) to notice details missed while in the area.
- 4 Live plant and animal specimens should not be collected. Creatures encountered during an outdoor learning event should be observed in the natural habitat, then released immediately.

Tadpoles should be observed in a natural habitat rather than taken back to the classroom to be studied. Plants and animals held in captivity can be exposed to harmful diseases, viruses and fungi that might be transferred to wild native species. As an alternative, consider building animal habitat (for example a small pond) in your play yard that will attract the animals (frogs) or foster the plants you want to share with the children.

- 5 DO NOT release purchased tadpoles, insects or plants into the wild. Many of these purchased species are not native to Missouri and can create difficulties for native species, disrupting local ecosystems. The *Missouri Wildlife Code* even specifically prohibits some species that can be purchased out of state. Several invasive species around the country have been traced back to school project releases. If you purchase plants or animals to observe and study in the classroom—even those native to Missouri—dispose of them in a humane manner (humane euthanasia for animals or in a plastic bag deposited in the trash for plants).
- 6 Feathers are wonderful artifacts to study and use in the classroom. All feathers found outdoors may be examined and left where they were found. However, laws regulate the possession of feathers from certain birds. The Migratory Bird Treaty Act (MBTA) of 1918 establishes a prohibition on the possession, purchase, sale, transport, etc., of any migratory bird and includes prohibition on any bird part, nest or egg of any such bird. To legally possess feathers of birds protected by MBTA, contact a conservation agent of the Missouri Department of Conservation for assistance with obtaining the federal educational use permit which must remain with the specimen. Feathers and other parts (except meat) from legally-obtained game birds may be legally possessed without permit. Other bird species, including house sparrow, European starling, and rock pigeon, are not protected under MBTA or state law and feathers from these birds may be legally possessed without permit. Also, feathers from farm-raised birds may be legally possessed as well as those purchased from classroom supply or hobby retail sources.



7 Poison ivy is common throughout the state. Learn to recognize it. I keep a set of leaves laminated to help the children and me remember exactly what this plant looks like.



The foliage always turns a brilliant red in the fall, enticing young hands to pick it during collection trips. Find the plant at the beginning of the experience and show it to the children. Repeat the identification often. We have a resident patch on the path down to the creek that we visit on each trip to the area. I teach my children the following song to the tune of *Yankee Doodle*, and we sing it periodically throughout our outdoor adventures:

Poison ivy has three leaves  
White berries grow upon it  
It is food for birds and deer, but  
    people should not get near  
Poison ivy leaves of three  
Poison ivy let it be  
Bush or vine do not touch it  
Unless you want to itch, itch, itch!

The song helps children remember what to look for but also encourages them to see the purpose poison ivy serves in nature.

Always leave the area cleaner than you found it. Take along a trash bag to pick up trash even when this isn't your goal for the outdoor learning experience. You are modeling responsibility and caring for the environment.

Wondering about nature and conservation with the children over the years has taught me a great deal about teaching and learning. I am a teacher because I love learning. The children are my guides and teachers. Listen, learn, play and live with the children, and they will guide you to places you never dreamed. Ultimately, I would change Rachel Carson's quote to say "If a [grown-up] is to keep alive [his/her] inborn sense of wonder... [he/she] needs the companionship of at least one [child] who can share it, [discovering] with [him/her] the joy, excitement, and mystery of the world we live in."



# REFERENCES

- Carson, Rachel 1956 *The Sense of Wonder* New York: Harper & Row
- Copple, Carol and Sue Bredekamp (Editors) 2009 *Developmentally Appropriate Practice in Early Childhood Programs Serving Children From Birth Through Age 8; Third Edition* Washington, D C : NAEYC Books
- Leopold, Aldo 1949 *A Sand County Almanac: And Sketches Here and There* New York: Oxford University Press, Inc
- Louv, Richard 2005 *Last Child in the Woods: Saving Our Children From Nature-Deficit Disorder* Chapel Hill, NC: Algonquin Books of Chapel Hill
- Paterson, Katherine 1987 *Bridge to Terabithia* New York: HarperCollins Publishers
- Sobel, David 2008 *Childhood and Nature: Design Principles for Educators* Portland, ME: Stenhouse Publishers
- Sobel, David 1998 *Mapmaking With Children: Sense of Place Education for the Elementary Years* Portsmouth, NH: Heinemann
- Sobel, David 1996 *Beyond Ecophobia: Reclaiming the Heart in Nature Education* Great Barrington, MA: The Orion Society
- Swift, Ernest 1967 *The Conservation Saga* Washington, D C : National Wildlife Federation
- World Forum-Nature Action Collaborative (NACC) 2008 *Re-Connecting the World's Children to Nature: Call to Action* Paper presented at the Working Forum on Nature Education: New Tools for Connecting the World's Children with Nature, an international event held at Arbor Day Farm, Nebraska City, Nebraska, USA, July 2008



SUMMER



# GROWING FLOWERS FROM SEEDS

## CHILDREN PARTICIPATING IN THIS LEARNING EXPERIENCE WILL

- Brainstorm things children need to grow, develop and learn in school
- Brainstorm things plants need to survive
- Investigate results of altering growth conditions
- Observe their own flowers grow and develop throughout the school year

## GOALS ADDRESSED

LO 1 A 1 b Identify the basic needs of most plants (i.e., air, water, light)


ME 2 C 1 a Identify light from the sun as a basic need of most plants

LO 1 A 1 c Predict and investigate the growth of plants when growing conditions are altered (e.g., dark vs. light, water vs. no water)

## MATERIALS

- Small paper cups or containers for individual plants
- Soil
- Flower seeds (dwarf marigold, zinnia, nasturtium, petunia or other quick-growing flower seeds)
- Chart paper
- Marker
- Science notebook pages
- Pencils

## TEACHER PREPARATION

- Choose one of the types of flower seeds suggested above
  - Plan for one cup/plant per child
  - Plant at least 6 extra plants to use in experiments
  - Mark individual plants with children's names after children have prepared them
  - Determine if the plants will be taken home with children or kept in the classroom. If sending home, prepare note for families with purpose of plant activity and directions for care. Possibly even include a notebook to chart weekly progress of plant growth
  - Gather other supplies
  - Make copies of science notebook pages (one per child)
-  See "Children's Literature Recommended in Activities" beginning on page 199

## PROCEDURE

- 1 Gather children on the first day of school and talk about what the children will need in their classroom to help them develop throughout this school year. Make a list on the chart paper.
- 2 Provide each child with one paper cup, at least 3–4 seeds and enough soil to fill the cup.
- 3 Explain that just as the children will grow and develop over the school year, so will the flowers. Ask children to brainstorm what they think the flowers need to grow. Record their ideas on a second piece of chart paper. If necessary, provide prompts to include water, soil, and sun.
- 4 Have children prepare their plants by placing the soil in the cup, placing the seeds in the soil and adding water. (Prepare the six extra experimental plants.)
- 5 Explain that some of the plants will be experimental plants and will stay in the classroom the whole school year. Together they will investigate what happens when the experimental plants don't have some of the things on their list. Mark 3 experimental cups "water" and 3 "no water."

- 6 Place 1 “water” plant and 1 “no water” plant in a dark closet; 1 “water” plant and 1 “no water” plant in a windowless room that has a light always on; and 1 “water” plant and 1 “no water” plant in a sunny window If the children listed things other than air, water and light, brainstorm where else they want to experiment with placing the extra plants, and label these accordingly
- 7 Explain that one of the plants in each location will be watered with a certain amount of water on a routine basis (those labeled “water”) and the other (labeled “no water”) won’t receive any water Make sure there is a watering container that is always used with the same amount of water for each watered plant
- 8 If keeping individual plants in the classroom, talk with children about caring for these and set up some type of routine care If sending home, discuss routine care
- 9 Assign responsibilities for caring for experimental plants on a routine basis Include science notebook pages as a center for children to chart plant growth progress
- 10 Discuss the growth progress of all plants throughout the school year (if possible) Plants should reach flowering stage and possibly produce seeds before the end of the school year
- 11 Compare results from various experimental conditions and talk about why some of the plants are faring better than others Take photographs to document the project and assist the children in remembering what the plants looked like at the beginning of the school year

## QUESTIONS FOR DISCUSSION

- What do children need to help them grow and learn over the school year?
- What do flower seeds need to grow and develop into flowers?
- Does it matter what kind of light plants get?
- Discuss why some of the children’s plants grow more or less than others

## ASSESSMENT

<b>Discussion</b>	Participated during initial discussion and contributed something children need to grow and develop in school	Participated during initial discussion but did not contribute something children need to grow and develop in school	Did not participate in discussion but listened attentively
	Named at least 1 thing plants need to survive	Repeated someone else’s idea of what plants need to survive	Did not participate in discussion but listened attentively
<b>Science Notebook</b>	Over time, entries accurately represented experimental results as developmentally appropriate	Over time, entries mostly accurately represented experimental results as developmentally appropriate	Entries did not reflect experimental results

## LEARNING CENTER ACTIVITIES

**SCIENCE**—Put out flower seeds and hand lenses so children can examine the seeds

**SCIENCE**—Make a display of several different kinds of flower seeds and the seed packets Ask children to chart the differences between the different types of seeds

**NUTRITION**—Serve sunflower seeds for snack

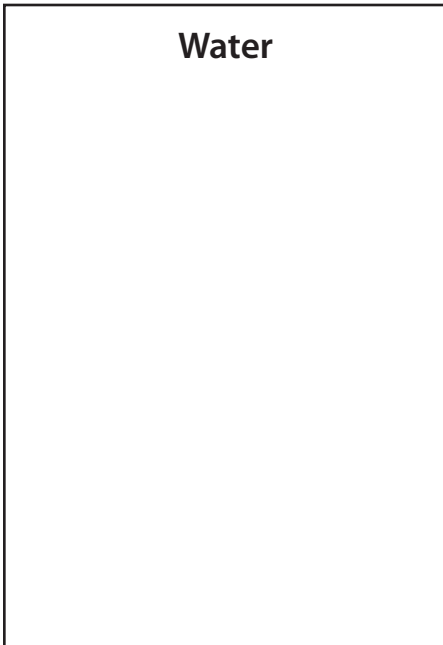
# GROWING FLOWERS FROM SEEDS

Date \_\_\_\_\_

Draw the plants under each experimental condition:

**Dark Room**

Water



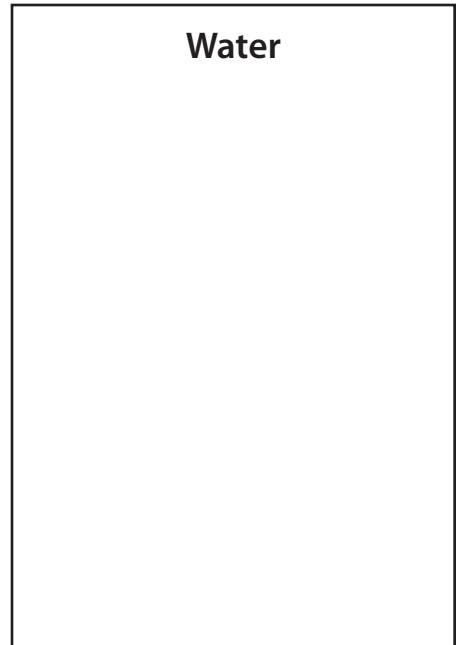
**Sunny Room**

Water

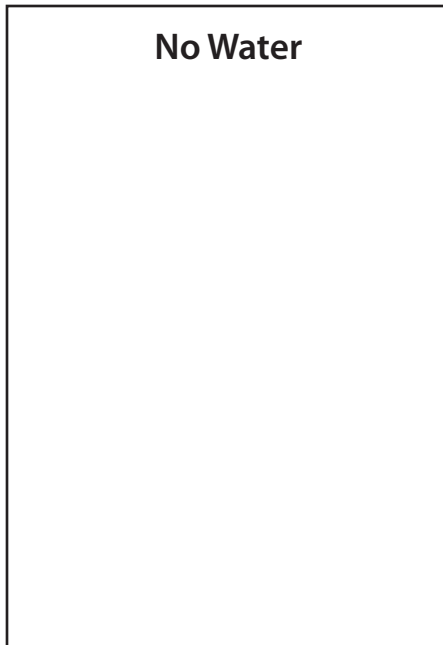


**Room with Light**

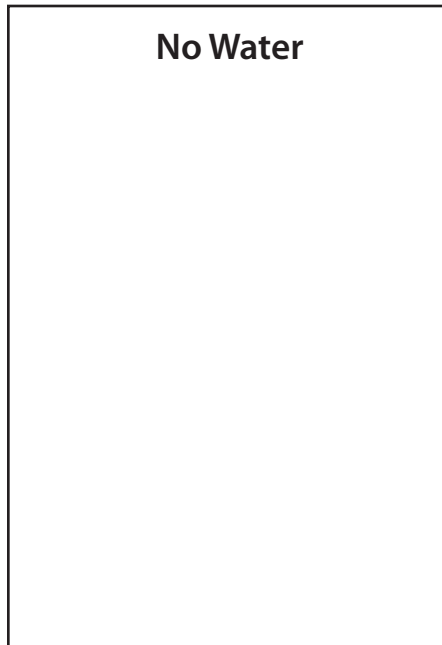
Water



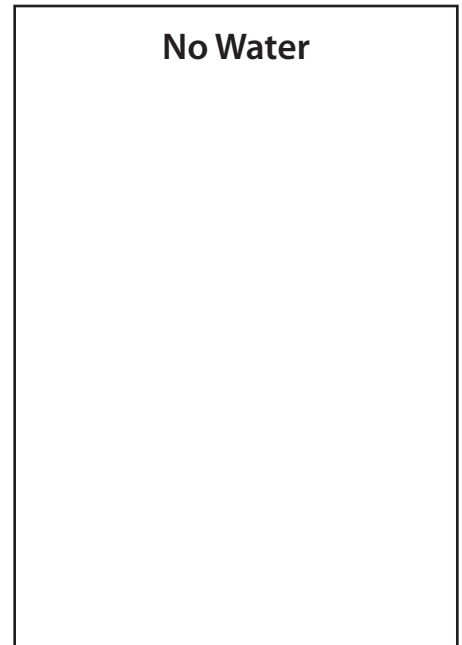
**No Water**



**No Water**



**No Water**





# SEE HOW THE TURKEY GROWS

## CHILDREN PARTICIPATING IN THIS LEARNING EXPERIENCE WILL

- Listen to a story about the life cycle of a turkey
- Explore how young turkeys are different than and the same as their parents
- Talk about the life cycle of the turkey
- Act out the life cycle of a turkey


## GOALS ADDRESSED

- LO 1 B 2 a Identify and sequence life cycles (birth, growth, and development, reproduction and death) of animals (i.e., butterfly, frog, chicken, snake, dog)
- LO 1 B 2 b Record observations on the life cycle of different animals (e.g., butterfly, dog, frog, chicken, snake)
- LO 3 D K a Identify that living things have offspring based on the organisms' physical similarities and differences
- LO 3 D 2 a Identify and relate the similarities and differences among animal parents and their offspring or multiple offspring

## MATERIALS

- Children's copies of *See How The Turkey Grows*
- Chart paper
- Marker

## TEACHER PREPARATION

- Become familiar with story
  - Examine pictures in story for details
  - Divide one piece of chart paper into 2 sections labeled "egg" and "poult" or "juvenile turkey" Divide each of these sections in half and label one side "alike" and one side "different"
-  See "Children's Literature Recommended in Activities" beginning on page 199

## PROCEDURE

- 1 Before reading the story, talk with the children about life cycles. A life cycle is a series of changes that every living thing goes through. For animals, it begins the minute a baby begins growing in an egg and continues until death. Not every creature has the same life cycle, but all follow a predictable pattern.
- 2 Explain that the story they are going to read together is about the turkey life cycle. Read through the story together pausing to examine the pictures and share ideas about what the children think is going to happen.
- 3 Once the story is finished, go through the story again with the children talking about each stage that the turkeys went through.
- 4 On the labeled piece of chart paper, introduce children to the terms describing the stages they just identified—egg, poult or juvenile. Some children may know that the female adult is called a hen, a 1-year-old juvenile male is a jake and an adult male is a gobbler or tom. Have children use their book to examine the turkeys at each stage noting how they are similar to the mother and different. Write down all of the children's ideas, making sure to point out things that they miss. For example, the adult turkeys eat the same food as the poults.

- 5 Talk about what happened to all of the turkeys in the story. Discuss reasons why turkeys lay so many eggs and what would have happened to the remaining turkeys as well as the snake and fox if the young turkeys had not been eaten.
- 6 Discuss the similarities between the way turkeys grow and develop and other birds.
- 7 After discussing the stages that turkeys go through, review the life cycle one more time by acting it out. Remember the more enthusiastic the teacher is in acting out the life cycle of the turkey, the more real it will be to the children. They will learn about the life cycle in their actions!
  - Ask the children to first be the eggs. Tell them to curl up in the nest (rug or meeting area) into a tight ball as small as they can get. The nest is dry, and they are snug and warm in their eggs. Their mother is sitting on them keeping them warm and safe and dry. But they are growing inside their eggs. It is late spring and getting very crowded inside that egg so they must get out! They start peeping even before they are out of the egg. They want mother hen to get to know them even before they are out of the shell. They use their sharp little egg tooth to peck their way out. It takes a long time to crack out of their shells.
  - When they get out, they are wet; and it is very noisy with all of the peeping going on around them. It's dark but dry under mother hen. Now they are poults. It takes a little while to dry; but once they are dry, they are HUNGRY! In fact they want to eat and eat and eat. Now they are brown, fuzzy balls. As soon as all of the eggs have hatched and the poults are dry, mother hen takes them out to find food. But the little poults stay close to mom. They peck the ground looking for tasty seeds, scrumptious berries, delectable snails and juicy bugs. Mother hen keeps all of the fuzzy brown poults near her while they are so vulnerable. Whenever a predator is flying over or nearby, she calls low, guttural *Kelp! Kelp! Kelp!* The poults know to quickly duck under mother hen when they hear this sound. They are wary young poults, always listening for mother hen to call them back in case of danger. At night, they roost on the ground all crowded together under mother hen who keeps them warm and dry with her body.
  - It isn't long before they grow a little bigger and stray farther away from mother hen. They are foraging for food when they hear her give a loud warning call *PUTT! PUTT! PUTT!* Even though they have never heard this sound before, the young poults know this means freeze or hurry and hide! There is danger nearby! As soon as the poults hear this sound, they freeze or hide. Then they look for mother hen and follow her away from the danger. Sometimes they become food for another animal like a fox or a snake, but many of the poults eat and eat and eat and grow and grow and grow.
  - The poults are always growing, and very soon they have wing feathers. It is hot summer time. Now they are roosting in the trees at night with all of the other turkeys in the flock. Every night they fly up into the trees, and every morning they *Yelp! Yelp! Yelp!* as they fly down. Now they look like mother hen or a young jake (male). They stay close to mother hen but now hunt for those yummy tidbits farther away. They hang out with all of the other turkeys in their flock, foraging for food and listening for danger and always growing. They spend the fall and winter foraging for food. Sometimes when it is really cold and the ground is frozen, they have trouble finding food. Some of the weaker members of the flock die and become part of the soil.
  - Soon it is spring, and one day the turkeys move away from the rest of the flock. One hen hears *Gobble! Gobble! Gobble!* off in the woods. She answers with an excited *Kelp! Kelp! Kelp!* She sees a fine turkey who sings a fine song so she stays with him all day long! Soon the hens and the gobblers go back to the flock and are again foraging for food.
  - Then one spring day mother hen makes a nest with leaves and sticks and twigs. She lays eggs in the nest and sits on the eggs to keep them warm and safe and dry until they hatch.

## QUESTIONS FOR DISCUSSION

- How is Jane like her mother? How is she not like her mother?
- What would happen to the snake and fox if they didn't eat a young turkey?
- What would have happened to Jane if she had to share the food she found with 2 more turkeys?
- Why do you think turkeys lay so many eggs?

## ASSESSMENT

<b>Discussion of Story</b>	Actively contributed to discussion, pointing out changes in the turkeys as the story progressed	Attentively listened to the discussion but did not contribute
<b>Identifying Similarities</b>	Suggested 3–4 similarities between young turkeys and the adults	Suggested 1–2 similarities between young turkeys and the adults
<b>Identifying Differences</b>	Suggested 2–3 differences between young turkeys and the adults	Suggested 0–1 difference between young turkeys and the adults
<b>Acting</b>	Enthusiastically acted out all stages of the life cycle of the turkey	Acted out some of the stages but participated only minimally

## LEARNING CENTER ACTIVITIES

**ART**—Encourage the children to create a map of the area the turkeys in the story traveled, indicating places where key events occurred (nest, food, snake, fox, roost trees, hunter, gobbler, etc )

**MATH/MANIPULATIVE**—Provide turkey life cycle cards at each stage of development and challenge children to put them in correct order

**READING**—Make the story into a flannel board story and challenge the children to retell the story using the felt pieces

**WRITING**—Put out small blank books for the children to write “All About Books” illustrating other bird species life cycles Be sure to include colored pencils or markers for illustrating

**GROUP**—When escorting children through the halls, ask them to pretend that the teacher is mother hen and the children are the young poults They must be very quiet so they don't draw the attention of predators Mother hen can help softly, contentedly as she leads the poults down the hall The teacher can also practice helping for danger to gather the poults together in order to get their attention or quiet everyone down