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National 4-H Curriculum

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EXPLORING
Your Environment

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MINNESOTA 4-H

UNIVERSITY OF MINNESOTA EXTENSION

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ABOUT SCIENCE

4-H Science, Engineering, Technology and applied Math

4-H Science is 4-H's response to the needs of youth to develop curiosity, abilities, and deepened learning in the areas of science, engineering, technology and applied math. Steeped in over 100 years of experience in working with youth in a variety of non-formal science education settings, 4-H plays a leading role in engaging youth to explore science with trained and caring adults in a positive youth development environment. 4-H works from a common framework, including National Science Education Standards, to increase literacy and improve abilities in science, engineering and technology. 4-H Science is preparing today's youth and America's future workforce.

An Effective 4-H Science Experience Engages Youth Through:

Content

- Science, Engineering and Technology content based on the National Science Education Standards and Concepts.
- Thirty Science Abilities based on the National Science Education Standards.

Context

- The Essential Elements of Positive Youth Development, critical to 4-H, are youth:
  - **Mastering** life challenges.
  - Cultivating **independence** with guidance from caring adults.
  - Developing a sense of **belonging** within a positive group.
  - Sharing a spirit of **generosity** toward others.
- Reliance on trained, caring adult staff and volunteers acting as mentors, coaches, facilitators, and co-learners.
- Perspective that youth are partners and resources in their own development.
- A hands-on, experiential approach to learning with inquiry to foster the natural creativity and curiosity of youth.

Delivery

- 4-H Science engages youth through facilitation, support, information and resources.
- 4-H Science engages 6.5 million youth each year through multiple delivery methods including clubs, camps, online.

For additional information regarding 4-H Science Concepts, standards and abilities, please refer to: *4-H Science Programming in the Context of 4-H Youth Development* located at: www.fourhcouncil.edu.setresources.aspx.

WELCOME

What are some of your favorite memories and impressions from your explorations in the environment? Perhaps you had the thrill of watching a great blue heron fish for its dinner, or perhaps you enjoyed the smell of pine on a hike through the woods. Maybe you felt the softness of moss on your bare feet, relished the taste of a tree-picked, juicy fruit, or rested in the rich pastels of desert sunsettings.

These are just some of the magical things that invite us to nature. They tug at our sense of wonder and call to the child inside of us...but often we do not stop long enough to let these experiences lead us into further exploration. Often we suppress our spirit of curiosity. So, why is it essential that we urge youth to continue to learn about their environment and their human place in the world around them?

Humans are an integral part of the environment; we have a large impact on our world. Opening up this connection to the world could encourage youth to explore on their own with the skills of inquiry and science abilities practiced in this series. The learning opportunities support their broad senses of wonder, enthusiasm and curiosity and can open new doors to varied and significant experiences.

Teaching basic ecological concepts will help youth understand how nature works and how we affect it and are affected by it. These youth will be the decision-makers of tomorrow. By becoming sensitive to the earth's needs through understanding basic ecological principles and engaging in opportunities for stewardship practice, youth will begin to understand how their actions impact the environment and, in turn, how they can make positive choices to be better stewards of the earth and have a voice for change. Two primary goals of the *Exploring Your Environment Series* are to increase learner knowledge, skills and attitudes toward the environment, and to provide a background and backdrop for understanding our environment to become better earth stewards.

CURRICULUM WEB SITE

Have the youth that you mentor check out the Exploring your Environment web site for additional resources. The website can be accessed at this URL: www.4-H.org/curriculum/environment

ABOUT THIS SERIES

The *Exploring Your Environment* series includes two youth project books and a facilitator's guide.

Exploring Your Environment: Ecosystem Services.
Exploring Your Environment: Earth's Capacity.
Exploring Your Environment: Facilitator's Guide.

The youth project books have been designed to be developmentally appropriate for youth ages 11 to 13, but may be used by youth in any grade based on their science skills and knowledge or expertise. These learn-by-doing activities, although written primarily for a 4-H project club, can effectively be adapted to the family, the classroom, camp settings, special interest projects and other groups as well. They can be used in both formal and non-formal settings.

***Exploring Your Environment* Youth Project Books**

The youth project books focus on two concepts: Ecosystem Services and Earth's Capacity. The activities focus on careful observation of the local environment and development of scientific thinking and science abilities. The goal is to make science fun and relevant to youth, assisting them to explore their environment while using low-cost equipment and encouraging the use of new technologies when available. The project books are designed to encourage curiosity and creativity, provide fun opportunities to learn with others and foster life-long learning.

The Facilitator's Guide has been developed to assist you in working with youth interested in the environment and contains information for organizing an environmental exploration program. Each project book activity focuses on an ecological concept to be explored. Each activity includes:

- **Materials Needed:** Materials necessary to complete the activity.
- **Get Grounded:** An introduction to engage the youth in the activity topic.
- **Dig In:** The activity and a series of questions to guide the learning process.
- **Think About It:** Questions to apply knowledge gained by doing the activity.
- **Natural Connections:** Content information to support the activity.
- **Dig In Deeper:** Ideas for further exploration and learning.
- **Important Facts:** Interesting facts to assist youth in understanding the activity concepts.

Refer to the 'At-A-Glance' chart for:

- 4-H Science Abilities (Science Process Skills).
- Science Standards (National Science Education Standards).
- 4-H Life Skills.

The project books encourage learning environments that evidence the Essential Elements of Positive Youth Development (Kress, 2005) including independence, mastery, belonging and generosity.

A glossary for words found in **bold** lettering within the activities is found at the back of each *Exploring Your Environment* project book and is called "Words to Explore".

Activities can be read and completed as a project book by the learners, but because we are social beings, learning with others is encouraged. Facilitation of youth learning by caring and supportive adults provides the necessary 4-H component of an engaged youth/adult partnership. Project book activities are sequentially designed to build on experiences and learning obtained from prior activities and previous books.

Activities are designed so youth have the opportunity to explore or learn by doing before they are told or shown how with the exception of safety issues. Science inquiry skills are also stressed so that youth will have the tools necessary to explore on their own. We hope to increase youth concern for the environment and assist them in gaining awareness, knowledge and understanding about the way nature functions.

EXPLORING YOUR ENVIRONMENT

PROJECT GOALS AND OBJECTIVES

Goals:

- To excite, engage and encourage youth in areas of environmental science.
- To provide youth with opportunities to discover basic ecological concepts first-hand while developing scientific thinking and abilities.
- To instruct facilitators in planning, managing and teaching an environmental education program and outdoor activities.
- To present activities and information on natural and built environments in an organized way.
- To learn about the environment through exploration with peers.
- To provide environmental education materials that reflect these characteristics:
  - Fairness and accuracy.
  - Depth of learning.
  - Emphasis on skills building and action-orientation.
  - Instructional soundness, usability, and relevance.
- To provide youth opportunities to affect change in their local communities by engaging with others and having voice in local environmental issues.

Objectives:

- Youth will be able to use scientific thinking and abilities to explore natural and man-made environments.
- Youth will have deepened interest in science as a focus of study.
- Youth will have increased awareness of career potential in the area of environmental science.
- Youth will integrate current technologies in this project area to increase digital literacy.
- Facilitators will be comfortable leading activities with youth.
- Youth and facilitators will be more capable and self-confident in exploring the environment.

Note to Facilitator:

Work to facilitate youth learning through the *Exploring Your Environment* activities with these thoughts in mind:

Awareness of our Environment

- Spark the curiosity and sense of wonder in youth so they want to explore! Keep your own curiosity alive.

Facilitation of Knowledge

- Search out answers and create more questions together! We are social learners in social environments and learn best together.
- Facilitate understanding of science concepts and the interconnectedness of all things, including how we affect the environment and how it affects our lives.

Attitudes

- Foster positive attitudes about science, the environment, use of technology and careers in environmental science.

Skills

- Encourage youth to practice skills necessary in the study of environmental science, including the 4-H Science Abilities.

Action

- Facilitate and assist young people to work toward the solution of our current environmental problems and the prevention of new ones, emphasizing action at the local level.

CHECKLIST FOR ENGAGED LEARNING

Children learn best when they are actively engaged in the learning process, are encouraged to ask questions and contribute ideas, and are recognized as a learning resource. If you have several years of experience working with youth or this is your first time, you will find these questions helpful to create a rich learning environment. You will also help youth gain new insights, not only into our environment, but into themselves and others.

THE ENVIRONMENT: CONTEXT

- Is there shared learning and conversation among adults and youth? Is the learning taking place as a social process?
- Does the setting promote safety? (physically? verbally? non-verbally? emotionally?)
- Do youth feel in control by making choices?
- Are youth given opportunities to demonstrate mastery, independence, generosity, and belonging?
- Are youth actively engaged in hands-on, minds-on activities?

THE LEARNING: CONTENT

- Is it fun? Is the learning active, intentional, and does it provide opportunity for reflection?
- Are youth inventing their way of thinking about the world?
- Are youth engaged in self-discovery?
- Are youth relating learning to real-world experiences?
- Are youth taking responsibility for their learning?
- Are youth constructing their learning by broadening their knowledge, skills, and attitudes about a topic?
- Is embedded evaluation obvious? Do the products of the learning show that youth learned (such as a speech/a constructed or built object/a completed project).
- Are youth displaying their work? In a public place? Among peers?

THE FACILITATION: DELIVERY

- Are questions used to encourage youth?
- Does the experience allow opportunity for reflection?
- Are ideas or concepts broken down into small, understandable parts (six or less)?
- Is the content adapted to meet the interests, knowledge and abilities of participants?
- Am I an active learner and listener?
- Are strategies being discussed to stimulate lifelong learning?
- Am I asking questions? Am I prompting youth to ask questions? Am I catching teachable moments to deepen the learning?

PLANNING YOUR PROJECT MEETINGS AND OUTDOOR ACTIVITIES

Teen Mentors

Social interaction is valuable in improving learning. You can encourage this by providing opportunities for youth to learn from each other. Older teens can serve as mentors and work with youth to improve communication skills, use measurement tools and new technologies, develop solutions to problems and so on. With less age and status differences, the modeling that older teens provide is often more effective than that provided by an adult in a facilitator role. Mentors will serve as role models and be there to provide encouragement, recognition and to be a friend, thereby enriching the total learning experience. Just remember that they are volunteers and need support and coaching also.

Youth Leadership

You will also want to involve the youth in the program to serve in peer leadership roles. Youth can assist in planning and conducting some experiences and should be involved in decision-making processes. Ask youth if there are activities not included in the packets that they would like to do. Additionally, do not forget to establish some group goals that come from the group. This will give ownership to the process and will make members feel more involved. You want youth to feel like they have significantly contributed; it is their program.

Program Scope and Sequence

Manage time and schedules to best fit all involved. Make an outline of the group plan for the duration of the program and give a copy to everyone. Include a list of everyone's name, phone numbers and e-mail address of those who wish to share their information.

Activity Planning

In planning your program, consider the following things:

- What natural and built areas could be used for activities? Are these within a close proximity, or will they involve a long drive?
- Are there certain field trips, tours, community service projects, etc. that people would especially like to go on or do? Remember that environmental explorations do not have to take place in the outdoors; they can happen just about anywhere – a trip to the grocery store, the mall or even the kitchen in your house.
- What kind of transportation will be used?
- What forms, such as medical release forms, insurance forms and photo release forms, need to be filled out and signed by parents or guardians?
- Is extra insurance required for field trips?
- Where will everyone meet?
- Is anyone going to bring snacks or refreshments?
- What, more specifically, are youth in the program like? What kinds of outdoor experiences have they had?
- Do you need to buy any materials?
- Can you involve other people?

Get Going

One last word of advice, have fun! Often the unexpected and spur-of-the-moment activities and lessons turn out to be some of the best parts of the trip. Be flexible and take advantage of those teachable moments.

Remember:

- Take time to listen to individuals in your group
- A good leader is also a good follower
- Show enthusiasm and excitement for what you are doing
- Do not be afraid to explore on your hands and knees
- Be involved in all activities
- Instill a "sense of wonder" about the outdoors
- Learn together

PLANNING A SAFE OUTDOOR ADVENTURE

Exploring outdoors is an adventure! Often, it is on these outdoor adventures that a sense of wonder and observation skills are used, developed, and refined by youth volunteers. The most essential ingredients for exploring the outdoors are curiosity and open-mindedness, creativity, enthusiasm, willingness to have fun and a sense of humor. In addition, youth should support and respect others while outdoors, use their best manners, and be generous and responsible in their stewardship by showing respect for the natural world.

You do not have to travel far to have a great outdoor experience. Your youth may only need to go to a local schoolyard, a farm meadow, an overgrown vacant lot, a riverside or their backyard. There are amazing things going on right under our noses if we just take the time to look! However, it is a good idea to check out both distant and local outdoor areas ahead of time. Then you can find the best route, locate some good spots for comfort breaks and estimate the length of time needed for the hike and/or activities.

Prior to any outdoor experience be sure to check that the required forms are filled out and signed by parents or guardians. These forms include medical release forms, insurance forms and photo release forms. Also, check to see if your organization requires extra insurance for field trips.

When environmental explorations take your group outside, it is important to lay down some guidelines for the group. Clear rules and codes of practice provide a strong backdrop for establishing a safe learning environment. There are certain health and safety issues the youth need to observe when exploring outdoors.

Some important things for youth to keep in mind to make an outdoor adventure a success:

- Practice safety and act responsibly at all times when you are exploring outdoors. Most accidents can be prevented. Use common sense to avoid dangerous situations, such as not engaging in horseplay. Discuss safety with adults, and talk about emergency procedures. Learn how to use a first aid kit.
- Always know the boundaries of the area for the activity because you do not want to get lost. Establish that you have someone who knows where you are heading and when you think you will be back. Or, set up some kind of meeting signal (a whistle, handclap, etc.) to identify the need for the group to get together. This will be important for emergencies or if something especially interesting is found.

- Learn how to use a compass.
- Do not damage or destroy the plants and animals you are studying and leave all animal homes unchanged. Have a positive impact on the environments you visit and set a good example to others.
- Learn about poisonous or dangerous plants and animals in your area. If you do not know what something is, let it be! Do not threaten or harm animals, and be careful around cornered or frightened animals, even those that appear to be tame. They may be dangerous.
- Be sure to use collection equipment and safe handling techniques when collecting insects. Some insects are poisonous and you may even have unidentified allergies to insect bites. Remember when you are handling live specimens to be careful with them and return them to where you found them as soon as possible.
- Dress appropriately, considering both the weather and the location of the event. A walk in a bog requires old clothes and shoes. A trip to a pond may require boots and an adventure into a cave may require cover-alls. Wear a hat to keep the sun out of your eyes and the bugs away from your face. Wear a long sleeve shirt and long pants to avoid getting bitten and scratched. Wear sneakers or hiking boots and a jacket or sweater if necessary.
- Bring a backpack full of "goodies" to help make your adventure meaningful. Some suggestions for what to bring along:

magnifying glass	map	sunscreen
field guides	matches	whistle
first aid kit	small flashlight	walking stick
pocket knife	small notebook	compass
tape measure	pencil	water
a bandanna	plastic bags	camera
binoculars	plastic bug jars	organic bug spray

- Bring special equipment or tools for testing, measuring, or collecting and even items such as masking tape, tweezers, string or note cards, depending on the activities planned for the day.
- Do not forget to write in your Field Notes! There will be so much to observe and discover that you will want to record all your new discoveries!

USING YOUR FIELD NOTES

Each *Exploring Your Environment* project book doubles as the youth's Field Notes. Every activity includes note pages on which the youth may draw or write ideas, thoughts, feelings, experiments and observations as they do each of the activities. As they observe and record in their Field Notes, often they become more aware of the complexity of the environment. Each youth should keep their Field Notes handy to use for the duration of the projects.

Encourage youth to keep an on-going record of their *Exploring Your Environment* adventures. Recording thoughts, feelings, observations and drawings in the Field Notes can be a great way for nature-explorers to reflect on their outdoor and environmental project experiences. This is another way for them to expand their awareness and appreciation of the natural world and basic ecological concepts while learning to discover the beauty in commonplace events and places.

Suggest information to include in their Field Notes entries such as, date, time, weather, location, description and/or drawing of the area, feelings about their time spent outdoors, what they liked or did not like about the adventure or the activities, and what they learned. Include information about any encountered wildlife such as: the kind, color, what it was doing, the amount of time youth watched it, etc. They can use their senses – sight, touch, taste, smell and hearing – for detail, or try writing stories, letters, poetry or whatever feels right to them.

Urge the youth to include photographs, pressed leaves of non-protected wildflowers and even "drawings" they make with materials found at the outdoor site.

Provide questions to prompt thinking and observation. Some suggested Field Note questions are:

- I learned that...
- I noticed that...
- I became aware of...
- I was pleased that...
- I was surprised that...
- I hope that...
- I will...
- I want to learn more about...
- The strongest feeling I have is...