Family Forestry Expo

TEACHER'S GUIDE

Using the Student Workbook—Extension ideas—Educational Standards

TABLE OF CONTENTS

Introduction

Student Workbook Chapters

Introduction

Teachers!

Thank you for your interest and participation in the **Flathead Family Forestry Expo**. The expo event provides great hands-on exposure for students to learn and investigate the role forests play in our everyday lives. Through short talks, demonstrations and hands-on activities, students have an opportunity to discover that a forest is a dynamic living system.

"Forests - Landscapes of Many Uses"
Expo highlights the many benefits and resources our forests provide -- forest products and diverse recreational opportunities, home for wildlife, clean water, and places to explore our early history.

Using the Student Workbook
The student workbook provides a tool or guide to help you and your students prepare for the expo visit. The material can also be used for post-field trip review in the classroom. The eleven workbook chapters give background material, suggested activities, and discussion items on the forest stations that students attend at the expo site. As you use the workbook, encourage students to explore how the different topics, from "First People in the Forest" to "Forest Recreation", are related. Discover how the parts of a forest are connected and work together as a dynamic living system.

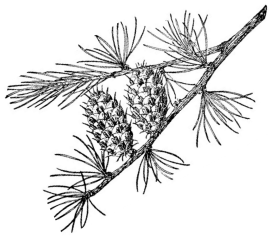
Extension ideas for each workbook chapter and links to the Montana Content Standards and the Next Generation Science Standards are included in this teacher's guide. **Supplement the workbook with videos https://www.youtube.com/@familyforestryexpo5207.**

Poster Activity - Share what your students learned!
As a follow up activity to the workbook, create a class poster(s) that share what students have learned. What are the many parts of a forest? How are they connected? And change? Have students work in small groups, as individuals or the whole class to create a poster that illustrates what they've discovered about the forest environment and the opportunities and resources forests provide us every day.

Create posters to reflect the *"Forests - Landscapes of Many Uses"* theme, linking back to the material covered in the Forestry Expo student workbook - how all people are dependent on the forest and its resources; role of forests and the multiple opportunities and resources they provide; how all parts of a forest, including people, are connected and work together as a system.

Be creative with your poster - example media for poster artwork could include paint, ink, crayon, cloth, collage, or photos.
Include "Tree Poem" descriptions as part of your poster illustration. Place poems directly on your poster. Use cinquain poetry – 5-line poem.

Using words.



Tree Poem (2 words)
Part of your poster (4 words)
Creating, Learning, Expressing, Writing, Discovering, Exploring (6 words)
A fun way to describe what you learned (8 words)
Cinquain Poetry (2 words)

Or syllables.

Poem (2 syllables)
Create and learn (4 syllables)
Write to describe forests (6 syllables)
Trees are one part of a forest (8 syllables)
Enjoy! (2 syllables)

If you have a poster to share, bring it with you on the day your class visits expo.
Someone will collect poster when you arrive.

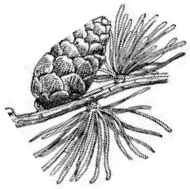
Posters will be displayed at the Family Forestry Expo weekend event.

Other Resources

List of Education Trunks in NW Montana
There are several trunks available to check out and use in the classroom prior to or after your Forestry Expo field trip. Scan code for link to a list of Flathead Valley trunk information. https://flatheadcore.org/education-trunks-in-the-flathead-valley/

Project Learning Tree
Visit the Project Learning Tree website for additional resources and ideas to prepare your students for their expo field trip or extend what they learned. http://www.plt.org/

Interested in a PLT workshop? Contact – holly.mckenzie@mt.gov



First People in the Forest

In this chapter, students will learn about the study of archaeology and how Indigenous peoples in our region used and cared for forest resources.

Extensions:

- Create an "archaeological dig" picture of your classroom. Have students search for items if found hundreds of years from now, that would be artifacts used to tell our story.

- Have the students pick one or two forest materials that people use or have used to research. For their research, have the students check at least two resources to get as much information as they can on the way material was used. Compile the reports of everyone in the class and bind them together to make a book on Indigenous peoples' use of the forest. Donate your class's book to the school library.

- Discuss what the students learned at Expo about how Indigenous peoples met many of their basic needs by using forest resources. Have students write a paragraph comparing how they met their needs in the past, say 2,000 years ago, with how needs are met today. You may want to ask students to include the fact that some people use the same resources today in some of the same ways they were used thousands of years ago.

Assign students to interview an elder family or community member about how they have used the forest during their lives. Have students share their findings in class.

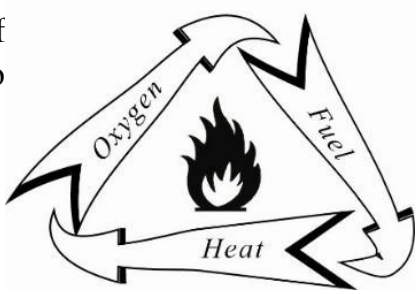
Fire in the Forest

In this chapter, students will learn about the positive and negative effects of wildland fires.

Extensions:

- Ask a local forester to your class to discuss how foresters view fire in the forest today versus the way they viewed it 25-50 years ago.

- Take students on a walk around the school grounds. Look for trees in your area that look like they might be well adapted for fire. For example, some trees have tough, thick bark that can resist fires that would kill thinner barked trees. Other trees have cones that need the heat produced by fire to release their seeds. Ask students if they can find examples of these types of adaptations and have the students report their findings to the class.



Fire Triangle - Taken from *Ecosystem Matters - Activity and Resource Guide for Environmental Educators*. Living with Fire chapter.

1. Fires need heat, fuel, and oxygen to burn. This is known as the "fire triangle". *Draw* a triangle and label each of the three sides with the word and a picture for each of the three parts.

2. Initially, the heat is provided by an ignition source, which can be human or natural. Name two natural and two human-caused sources of heat for fire ignition.

3. Fires need fuel to burn. In a forest, what sort of fuels might you expect to find? Name three potential fuels.

4. Oxygen is available in the air. Weather has a great influence on when fires occur and on how they spread. Hot temperatures and dry winds can create severe fire conditions by affecting fuel, moisture, and oxygen. What can dry winds do to fuels to make them more likely to burn?

5. If you cut off any one of these elements, a fire will not burn. What are some ways firefighters might cut off each of the three parts of the fire triangle?

Fish and Wildlife of the Forest

In this chapter, students will learn about animals as part of the forest ecosystem.

Extensions:

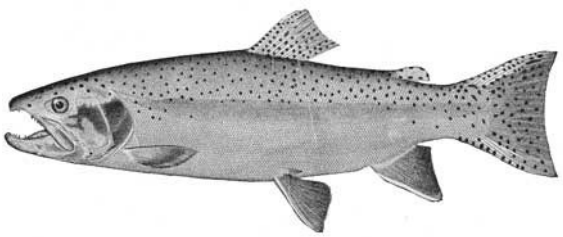
- Invite a local wildlife specialist into the classroom (from the Forest Service, the MT Dept of Natural Resources and Conservation or Fish, Wildlife and Parks, etc.) to discuss the habitat requirements and ecological niches of different western Montana animals. After the visit, construct a mural or set of posters picturing a mature forest, a young forest, and a brushy opening. Draw, cut from magazines, or print off, pictures of animals you'd be likely to find in each of these three areas.

- Construct a food web playing the "who eats whom?" game. Have one student think of an animal. Other students can then list on the board what the animal eats (use broad groupings like plants, insects, small mammals, etc.) Then list what eats that animal. Connect each of these items with arrows. The food web you develop can be as complicated as you want.

- Make a display from pictures of animals that inhabit the forests of western Montana. Prepare a report on where in the forest you'd be likely to find each of the tracks. What can the tracks tell you about the habitat the animal lives in and the niche it occupies? For example, webbed feel implies a watery environment. What might hooves or clawed feet imply about animal lifestyle?

- Put the words "herbivore", "carnivore", "omnivore", and "decomposer" on the board. Have students in the class list all the western Montana animals that they can think of that fall into each category. Have each student select an animal and give a report to the class on that animal, emphasizing the habitat the animal lives in and the niche it occupies in the forest (what it eats, what eats it, what affect it seems to have on the forest).

- Free download -- https://www.plt.org/together-for-birds-activity-collection/



Forest Streams

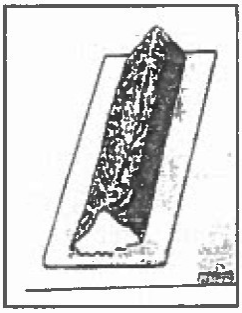
In this chapter, students will learn about the Flathead Valley's watershed and riparian areas.

Extensions:

- Hill and Stream Demonstration

Materials: cookie sheet, aluminum foil, lightweight cotton cloth, potting soil or dirt, 2" x 12" piece of sod, water bottle fitted with sprinkler head or sprayer.

Procedure:



1. Using crumpled foil, make a hilly landform shape to represent a hill without vegetation. The "hill" should have a crest but should not be too steep on the sides.

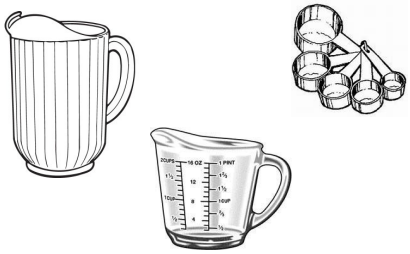
2. Place it lengthwise in the center of the cookie sheet; the soil should reach the short ends of the cookie sheet. Loosely drape the cloth over the hill. Along one long edge, tuck the edges of the cloth under the foil. Along the other long edge, place the cloth edge under a strip of sod.

3. The model shows a hill with streams on either side. The side with the sod simulates a stream with a good buffer of riparian plants. Predict and observe which stream will have the most sedimentation.

4. Using the water bottle, douse the hill with water, getting even amounts of water on both sides. The soil should "erode". Does the "riparian area" of sod stop the sediment from going into the stream? What happens on the other side?

"Bag of Water" Activity taken from the Wilderness and Land Ethic Curriculum, K-8. U.S. Forest Service.

Materials: 5-gallon bucket or plastic bag, measuring cup, pitcher, two smaller containers, measuring spoon, labels for each container.



Procedure:

Ask individual students to complete the following steps:

1. Fill a bag or bucket with 5 gallons of water.

2. Take out two cups and place in the pitcher. This is labeled "all fresh water". The rest is in oceans.

3. From the two cups, place 1-1/2 cups in a smaller container. This is labeled "freshwater in ice caps and glaciers".

4. From the 1/2 cup remaining in the pitcher, take out 1/4 teaspoon. What is left in the pitcher

should be labeled "all deep ground water".

5. The 1/4 teaspoon is labeled "all freshwater lakes".

6. Of the 1/4 teaspoon, take out one drop. This represents "all the freshwater streams and rivers".

<u>As a class, discuss the concepts of limited and renewable resources.</u>

Where does fresh water come from? Is there "enough" of it?

What kinds of natural and human activities tend to conserve fresh water?

What kinds of activities tend to use more or disperse fresh water? Can deserts be "made"?

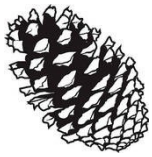
<u>Forest Plants</u>

In this chapter, students will learn about plants as part of the forest ecosystem and how to identify plants and their parts and functions.

Extensions:

Have a scavenger hunt in the schoolyard to find different plants and identify:

Stems: alternate or opposite
Leaves: simple or compound
Flower -- Cone
Weed or non-native plant
Native plant



- If you have a *Project Wild Activity Guide*, check out the "Visual Vocabulary" activity for grades 4-7.
- Research and list some values of plants that are found in Montana. You can use the Internet, library, field guides, interviews, etc. https://fieldguide.mt.gov/ https://www.mtnativeplants.org/

<u>Tree Identification</u>

In this chapter, students will learn how to identify trees using different characteristics of a tree.

Extensions:

- Make a large poster of a tree and label the main parts (trunk, limbs, leaves, bark, roots, fruit, etc.). Next to each of these parts, list all the products you can think of that are made from that part.

- Plan some questions to ask station presenters at the expo, such as...How many trees would it take to build a house? How many trees does it take to make a cord of

wood? How many trees would you likely burn in a year if you heat your house with wood? How many acres of trees would you need to heat your house with wood for 10 years?

- Tree Stories - Borrow or get a cross section(s) from a tree. Your local Dept of Natural Resources and Conservation Office, Forest Service office or private timber company may have cross sections you can borrow.

  With students, identify the parts of the tree (bark, phloem, cambium, xylem, and heartwood).

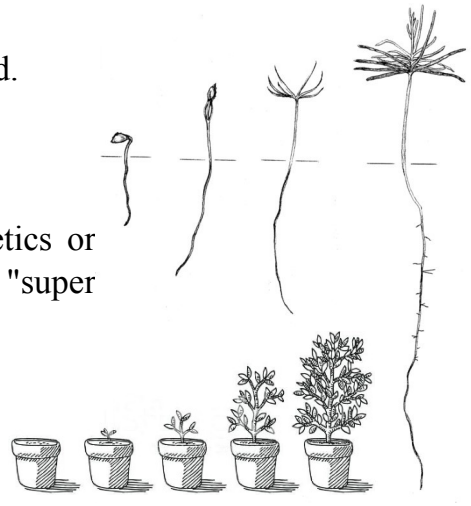
  Explain how to count the rings to find the age of the tree (count only the light OR only the dark rings). As a class, count the number of growth rings. Look for signs of disturbances in the tree's life, like fire, drought, insect damage.

  Use paper plates and have students "create" their own tree "cookies". Make a "tree cookie" the same age as themselves. Have them use sticky labels or write on the plate when important events in their lives took place.

- If you have a *Project Learning Tree Activity* book, check out the "Who Works in the Forest?" activity for grades 3-6.

Forest Management

In this chapter, students will learn how and why a forest is managed.



Extensions:

- Invite a forester (possibly one who deals with forestry genetics or tree improvement) to your classroom to discuss "best trees" or "super trees". What are they, how are they selected and grown, and how well do they grow when planted in the forest?

Start a forest in your classroom.

- Collect seeds from Douglas-fir or ponderosa pine and almost any tree species found in your area (conifer seeds work particularly well).

- To duplicate the natural freeze-thaw cycle that is needed to start most seeds growing, place the seeds in a porous cloth, tie off the ends and soak the seeds in cold water (about 60°F) for 24 hours. Drain the seeds until dry, then store them in a plastic bag in the refrigerator for about six weeks.

- At the end of 6 weeks, place the seeds in flowerpots filled with potting soil. Using different pots, place the seeds on top of the soil and bury with a thin layer of soil (about 1/4") and bury some deeper (1/2" - 1"). Label the pots so you know which have seeds buried near the top and which have deeply buried seeds. Keep the soil moist, but not saturated (you don't want to drown the seedlings), place the seeds in a warm (room temperature) spot. Note the differences in sprouting time.

- You might want to make two or more identical pots for each treatment so you can experiment.

  For example, you might want to put one set of pots in the sunlight and another in the dark to see how light affects sprouting. Once the seedlings have sprouted, you could experiment with light, water, and fertilizer to see how these elements affect seedling growth.

  You could also let some seedlings grow very close together, while you thinned the seedlings in other pots. Be sure to label the pots and accurately record the treatment for each pot.

  Write down your observations and share the information with other classes so they can benefit from the experiment without duplicating the experiment.

- In nature, most plants reproduce from seeds, but some reproduce by sprouting, layering, suckering, or some other ways that don't require seeds. Ask a local greenhouse or tree nursery if someone can come to your class to give a demonstration of how plants reproduce.

Forest Recreation

In this chapter, students will learn about forest recreation and safe recreation practices.

Extensions

- Have students write their own narrative describing a forest recreation experience.

- If you have *a Project Learning Tree Activity Guide,* check out the "I'd Like to Visit a Place Where" activity for grades 4-8.

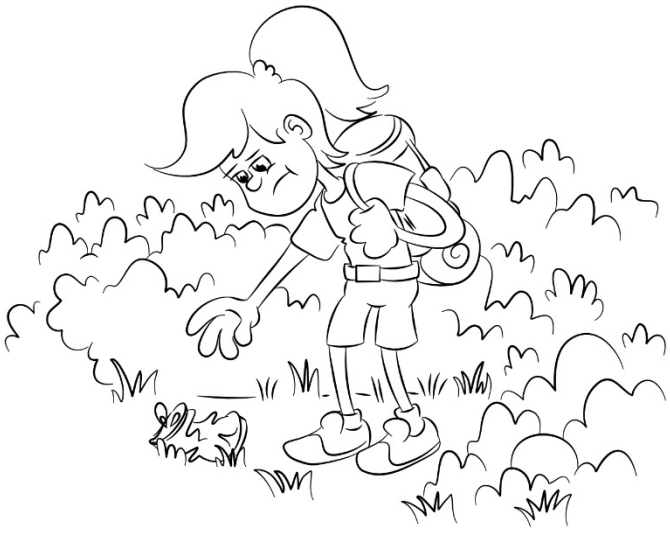
- Check out the Leave No Trace website, https://lnt.org/ for information, a description of the Leave No Trace principles and Youth Educator Library.

- Do a "Ready Relay".

  In a large open room or outdoors, lay out many different items you would need to plan, or take with you, on a hike or camping trip (trowel/toilet paper, map/compass, camera, stove/ fuel canister, trash bag, first aid kit, sunscreen, etc.).

  Split class into two teams. Each person runs to the items laid at the opposite end of the room, chooses, and picks up one item they would take with them on a hike.

  Once all the items are chosen OR everyone has had an opportunity to select an item, have each team report out on why they chose the items they did. How do the items tie to a Leave No Trace principle?



CONTENT STANDARDS	FORESTRY EXPO Workbook Chapters
Montana Content Standards	
Science	
Support an argument that plants get the materials they need from growth chiefly from air and water. **5-LS1-1**	Forest Plants, Forest Products, Tree Identification
Develop and critique a model to describe the movement of matter among plants, animals, decomposers, and the environment. **5-LS2-1**	Forest Plants, Fish and Wildlife of the Forest
Obtain and combine information from various sources about ways individual communities use science ideas to protect the earth's resources, environment, and systems and describe examples of how American Indians use scientific knowledge and practices to maintain relationships with the natural world. **5-ESS3-1**	ALL Chapters
English Language Arts & Literacy (2011)	
Quote accurately from a text when explaining what the text says explicitly and when drawing inferences from the text. **RI.5.1**	ALL Chapters
Determine two or more main ideas of a text and explain how they are supported by key details; summarize the text. **RI.5.2**	ALL Chapters
Explain the relationships or interactions between two or more individuals, events, ideas, or concepts in a historical, scientific, or technical text based on specific information in the text and include texts by and about American Indians. **RI.5.3**	ALL Chapters
Determine the meaning of general academic and domain-specific words and phrases in a text relevant to a grade 5 topic or subject area. **RI.5.4**	ALL Chapters
Compare and contrast the overall structure (e.g., chronology, comparison, cause/effect, problem/ solution) of events, ideas, concepts, or information in two or more texts. **RI.5.5**	ALL Chapters

Montana English Language Arts Content Standards (2027)	
Develop and apply expanding word knowledge and morphological awareness through shared reading, independent reading, and classroom conversation. **MT.5. RV.1**	All Chapters
Determine the meaning of general academic and domain-specific words and phrases in a text, including those with cultural significance to Montana Indigenous Peoples. **MT.5. RV.2**	All Chapters
Explain the development of a stated or implied central idea or theme over the course of a text, including those by and about Montana Indigenous Peoples. **MT.5.RC.3**	All Chapters
Use key details to compare and contrast two or more elements within a fiction or nonfiction text. **MT.5.RC.4**	All Chapters
Writing	
Write informative/explanatory texts to examine a topic and convey ideas and information clearly. **W.5.2**	ALL Chapters
Draw evidence from literary of informational texts to support analysis, reflection, and research. **W.5.9**	ALL Chapters
Social Studies	
Identify resources and labor that are used to produce goods and service. **SS.E.5.3**	Forest Products, Forest Recreation
Describe the role of manufacturing and agriculture in the economy of the United States **SS.E.5.5**	Forest Products, Forest Management
Understand the unique historical perspectives of American Indians. **SS.H.5.4**	First People in the Forest