

Unit title: Sustainable Forestry in Our Backyard

Teacher name: Jessica Wilmot

Grade level: 4

Length of Unit: 10 days about 20 hours

Timeline: Days 1-5: tree prep, site prep, felling, branch removal, trunk moving, milling, board stacking, tree studies, clean up. Days 6-10: building, nailing, raising, assembling.

Essential questions to consider (worded in student-friendly format):

How can we use natural resources responsibly?

In what ways do trees help us?

How does composting some of our school waste help the school and community?

How does heating your home with wood help the environment?

How can people create and transfer heat?

Why is it important to use the right kind of wood for heating and building?

Students will understand (~NGSS disciplinary core ideas):

4-ESS3 Earth and Human Activity

Students who demonstrate understanding can:

Obtain and combine information to describe that energy and fuels are derived from natural resources and their uses affect the environment.

4-PS3 Energy

Students who demonstrate understanding can:

Make observations to provide evidence that energy can be transferred from place to place by sound, light, heat, and electric currents.

3-5-ETS1 Engineering Design

Students who demonstrate understanding can:

Generate and compare multiple possible solutions to a problem based on how well each is likely to meet the criteria and constraints of the problem.

CCSS addressed

Reading: Informational Text

Key Ideas and Details

1. Refer to details and examples in a text when explaining what the text says explicitly and when drawing inferences from the text.

Reading: Informational Text

Craft and Structure

4. Determine the meaning of general academic and domain-specific words or phrases in a text relevant to a grade 4 topic or subject area.

Reading: Informational Text

Craft and Structure

5. Describe the overall structure (e.g., chronology, comparison, cause/effect, problem/solution) of events, ideas, concepts, or information in a text or part of a text.

Reading: Informational Text

Integration of Knowledge and Ideas

7. Interpret information presented visually, orally, or quantitatively (e.g., in charts, graphs, diagrams, time lines, animations, or interactive elements on Web pages) and explain how the information contributes to an understanding of the text in which it appears.

Writing

Research to Build and Present Knowledge

9. Draw evidence from literary or informational texts to support analysis, reflection, and research.

Apply grade 4 Reading standards to literature (e.g., "Describe in depth a character, setting, or event in a story or drama, drawing on specific details in the text [e.g., a character's thoughts, words, or actions].").

Apply grade 4 Reading standards to informational texts (e.g., "Explain how an author uses reasons and evidence to support particular points in a text").

Writing

Production and Distribution of Writing

6. With some guidance and support from adults, use technology, including the Internet, to produce and publish writing as well as to interact and collaborate with others; demonstrate sufficient command of keyboarding skills to type a minimum of one page in a single sitting.

Speaking & Listening

Comprehension and Collaboration

2. Paraphrase portions of a text read aloud or information presented in diverse media and formats, including visually, quantitatively, and orally.

VT History and Social Studies Standards addressed

H&SS3-4:12

Students show understanding of human interaction with the environment over time by...

- Identifying and participating in ways they can contribute to preserving natural resources.
- Describing a community or state environmental issue.
- Describing how patterns of human activities (for example, housing, transportation, food consumption, or employment) relate to natural resource distribution.

Students will be able to (~NGSS science and engineering practices):

Differentiate between wood sources for heating and building use a Venn diagram in order to categorize.

List at least two ways of creating and transferring heat.

Explain why using trees from your own property for building is more beneficial to the environment than buying from a big box store.

Identify and classify trees on their own or school property for use either as heat or construction or both.

Describe at least two uses for hemlock trees.

List ways that compost helps our environment.

List ways that composting helps our school.

Advertise to the community how the composting program helps decrease waste and increase sustainability awareness at the school level.

Determine the best compost combinations and ratios for our school compost system.

List steps in the design and building process and apply those structural considerations to models.

Assessments of learning:

How are students going to show that they understand, know and can do the above things?
Consider NGSS PEs, formative assessments, summative assessments, and performance-based assessments.

-Students brought in and collected leaves from trees on their own and school property for identification purposes. They drew and listed characteristics of the leaves as well as wrote about the characteristics of the tree (rough bark, deciduous or conifer etc.) and were given a simple key with pictures to use to determine the type of tree. They then used a chart for wood heat as well as their own research to determine the uses for each tree they classified. They made Venn Diagrams to compare their uses.

-Students participated in a waste audit according to the "Do the Rot Thing" lesson plan. See www.cvswwmd.org for complete lesson template.

-Students participated in choosing bin design, tree felling, branch clearing, log moving, board cutting and stacking, and building the compost bin for our school. See Green Mountain Farm to School Guide to School Composting for bin designs and layout.

- Students created brochures to "sell" the bin and composting to the broader school community.

- Students analyzed wood heating charts and gave arguments to support what wood they would burn during the winter that would be most suitable and sustainable for their needs. Some examples included "Oak, because it has a high BTU compared to other wood and I have some on my property." And "I would use maple because I have a big maple tree in my yard and I have to rake the leaves so I think we should chop it down and burn it for heat. But we don't have a wood stove, we have a pellet stove." See <http://mb-soft.com/juca/print/firewood.html>.

- Students made hand warmers to help clarify and demonstrate another form of heat.

Activities to support learning targets: (include brief write-ups, or simply source citations if commonly available)

-Any Venn Diagram app or template will do for wood comparison.

- S'more brochure maker for advertising the compost project to the broader school community.

- Participation in all aspects of building the compost shed.

- Creation of hand warmers.

- Design and creation of solar ovens to make s'mores ~ a tribute to our brochure making website.

Supporting resources: (websites, book titles, videos, human resources, etc.)

<http://www.exploratorium.edu/sites/default/files/snack-NGSS-planning-tool.pdf>

Exploratorium gives teachers this free resource to use for their science "snacks" however, it pertains to any science related activity you do in your class and can help you develop a classroom curriculum that aligns to NGSS and VT State Standards. I encourage teachers to use it with any unit or activity they employ as a guide for future tweaking.

<https://www.smores.com/app/dashboard>

Simple dichotomous key was used to identify trees commonly found in VT.

http://www.cvswwmd.org/uploads/6/1/2/6/6126179/do_the_rot_thing_cvswwmd1.pdf

<http://mb-soft.com/juca/print/firewood.html>

Nick Zandstra Knock on Wood Topsham, VT.