PROJECT BENEFITS

- Featuring a commodity which teachers are familiar with sparks their interest in ag ed

- Format of program allows for teachers to pick and choose which components fit best into their classroom

- An opportunity to establish a relationship with a commodity group
Three components to the project:

- **VIDEO** focusing on the educational aspects of maple production
- General **POSTER** for classroom and sugarhouse display
- A variety of **CURRICULUM** for K-12 emphasizing differing core academic subjects

ALL RESOURCES ARE AVAILABLE AT www.agclassroom.org/nh/resources/maple
VIDEO

- We researched content and wrote a script and/ or outline of points to be covered
- Produced by the New Hampshire Farm Bureau
- “Hosted” by an FFA State Officer
- Filmed at two local sugarhouses
Primary Video touches on a number of academic concepts involved in the maple sugaring process.

Several short supplementary videos focusing on specific areas.
Tapping into Maple Tradition

Evaporation:
Applying high, even heat to the sap causes it to boil—water is removed and the sugar content is concentrated from around 2% to more than 60%, ultimately producing maple syrup. Several chemical reactions are also involved.

Life Inside the Trunk:

When the temperature is below freezing, the pressure in the tree is reduced, creating a vacuum or suction.
When the temperature is above freezing, the pressure in the tree increases, creating positive pressure, which pushes sap out of any hole in the tree. A healthy tree has extra sap which flows into the bucket.

Xylem: moves water and dissolved nutrients from the roots to the top of the tree—as water evaporates from the tree, it creates negative pressure inside the xylem.
Phloem: carries products of photosynthesis, especially glucose, which absorbs water from the nearby xylem making a sugary sap to transport the sugar.

Grading:
Maple syrup is graded or categorized based on the flavor and how much light passes through (transmittance). Variations are due to weather, soil, climate, and season. Quality of all grades is the same.

Golden: Generally from the first sap of the season when days are warm and nights are cold.
Amber: Usually made mid-season when there have been slight changes to the sugar content of the sap.
Dark: Made later in the season when the sugar content of the sap has dropped and it takes more time to make syrup.
Very Dark: Typically made from sap at the end of the season. Natural chemical reactions help to darken the color.

For more on maple syrup provided by the New York State Department of Agriculture, Markets & Food.
<table>
<thead>
<tr>
<th>TITLE (link)</th>
<th>LEVEL</th>
<th>SUBJECT</th>
<th>DESCRIPTION</th>
<th>RELATED RESOURCES</th>
</tr>
</thead>
<tbody>
<tr>
<td>Background Information</td>
<td>All</td>
<td>Science Cycles</td>
<td>General background information applicable to most lessons.</td>
<td></td>
</tr>
<tr>
<td>Be A Sugar Maker</td>
<td>K-2</td>
<td>Science, Language Arts</td>
<td>Role play the sugar making process with the option to expand into the water cycle. Tagging for maple is a wonderful accompaniment to the activity.</td>
<td>Sugar Making Tool Cards</td>
</tr>
<tr>
<td>Find the Sugar Maple</td>
<td>3rd-6th</td>
<td>Science, Language Arts</td>
<td>Learn about how to identify the different kinds of maple trees native to NH. Then make a flipbook with pictures or photos of the different trees and explain their uses for identifying trees.</td>
<td>Sugar Maple Inquiry Cards, NHMMA Photosynthesis Poster</td>
</tr>
<tr>
<td>Nature’s Factory At Work</td>
<td>3rd-6th</td>
<td>Science</td>
<td>Students will learn about the lifecycle of a tree. Discover the process of photosynthesis and learn about the water cycle. Also explore solutions and evaporation.</td>
<td></td>
</tr>
<tr>
<td>Pancakes</td>
<td>1st-2nd</td>
<td>Science</td>
<td>Describe the physical properties of materials and observe physical and chemical changes as they heat in a pan and how maple syrup is harvested from trees.</td>
<td>Sugar Maple Inquiry Cards</td>
</tr>
<tr>
<td>Tapping Into Maple Tradition</td>
<td>2nd-5th</td>
<td>Language Arts, Science, Math</td>
<td>Oral and written communication, mathematical representation, physical and conceptual models to describe and explain scientific concepts and ideas. Use inquiry strategies to investigate and understand the natural world. Younger students will learn to use the process approach to writing coherently and using appropriate conventions.</td>
<td>Sugar Maple Inquiry Cards</td>
</tr>
<tr>
<td>Where’s The Maple?</td>
<td>4th-5th</td>
<td>Social Studies (GIS mapping), LA</td>
<td>Engage students in the process of maple sugaring by reading Maple Syrup Season and completing a chronology activity. Students can then be guided through an ArcGIS online activity, showing them why NH has businesses based on maple sugar and allows them to map and explore historical sugar houses.</td>
<td>Maple History Short Video, Legends, Make A Blinking Container, A Day At Sugar Camp, Sugar Maple Inquiry Cards</td>
</tr>
<tr>
<td>Looking Back, Thinking Forward</td>
<td>3rd-6th</td>
<td>Social Studies</td>
<td>Learn about the maple sugaring process; the equipment and its changes over time, climate, and technology. How has it changed through history and what role does it look like in the future?</td>
<td></td>
</tr>
<tr>
<td>Maple Temperatures</td>
<td>Math</td>
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<td>Explore different temperatures involved with maple sugaring. Learn about using a thermometer to take the temperature and use fractions to convert it from Fahrenheit to Celsius and back.</td>
<td>Maple Weather - Will It Rain Today?, Sugar Maple Inquiry Cards</td>
</tr>
</tbody>
</table>
CLASSROOM CONTEST

- Culminating activity integrates interdisciplinary concepts
- Could be as simple as a pancake breakfast
- With the support of the New Hampshire Maple Producers, we offered the Tucker Mountain Challenge, a classroom maple syrup production contest
- Classes submitted a quart of maple syrup which they produced
- Judged on density (Brix), color/grade and taste
CONTEST OUTCOMES

- Schools developed relationships with local sugar makers
- One school approached neighbors to tap their trees and thanked them with maple syrup
- Some classes invited the rest of the school to see what they were doing
- Several schools used the contest for great PR
- A few sugar houses being added on school property