

March 2017 Newsletter: Maple

Maple Production on Warren Farm

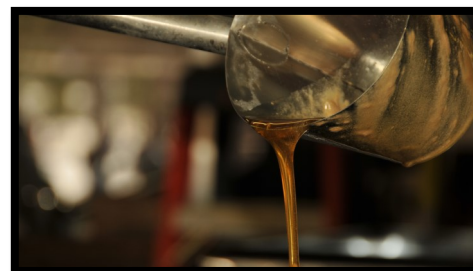
by Jan Wentworth

We began producing maple syrup about 22 years ago. It was love at first drip, and we could hardly contain our enthusiasm for the magic that is maple. Right away we invited the public to come and tour our farm and be part of this wonderful New England tradition. Always we started by asking those families that had gathered: How many of you make maple syrup? We were hoping to elicit shared stories and memories from the senior generation to pass along to the young parents with children seated in front of us. People just looked at each other instead. Hands went up. "My parents used to sugar" or "I remember my grandparents tapped trees". And there it was; people whose parents

didn't make maple, they certainly didn't, and it was unlikely their children would. That's how things slip away. So we vowed to use our occupation as maple producers to reacquaint New Englanders with their magical past, teach an appreciation for all that goes into making maple syrup, and try to get them involved again. It takes just one tap.

Maple production is a great venue for learning. There are the obvious disciplines, like nature (trees), weather (how it works with the trees), science (slope, gravity, and pressure), math (gallons of sap to syrup ratio), and physics (true boiling point of water, brix, reduction). But there are other directions to take. The study of native cultures, the influence of the industrial revolution on maple production, the political history of sugaring, food science, supply and demand, threats to the maple industry, global warming, invasive species, world economics, chemical composition of maple syrup, the list is endless. Teaching levels can be tweaked from pre-school to college. Fortunately, all topics are just a google away.

As educators, we've moved past teaching basic skills in isolation which required simple rote memory from students, with no emotional involvement or depth of critical analysis. Teaching skills through one core theme produces cross connections that



Syrup making in progress

help students realize the inter-relatedness of all learning. It allows students to see and feel the reality of what they are being taught and be more a part of their own learning experience. It taps (pardon the pun) into the strengths of all learners at some point and allows an opportunity for each one to shine. Look at the tubing in our woods. All trees are connected as one system, and by doing so, the flow is enhanced. Jan & Dale Wentworth own Warren Farm and Sugar House in North Brookfield.



Sugar Maple (*Acer saccharum*) in fall colors



Maple Trees on Warren Farm

MAC is extremely grateful to the Massachusetts State Grange Roots Initiative for their support of our programs!

www.massgrange.org



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www.massgrange.org

Don't miss MAC's Maple Lessons!

<http://www.aginclassroom.org/>

Also check out the Maple Lessons from our neighbors to the north, New Hampshire!

<http://www.agclassroom.org/nh/>



Interview with JoAnn Mossman

by Tricia Morena

What inspired you to take on the hobby or that motivated you to start? Do others in your family (or friends) take part in the process? Chris' father used to boil syrup outdoors in the yard at the farm where we now live. My husband is the 6th generation of family to live there. I'm not sure if the generations before his father boiled. We don't have a ton of sugar maples, no "sugar bush" around but we tap a variety of sugar and red maples.



Boiling the Sap

How did you learn the process? Did you need any special equipment what equipment is required to start ?

Chris watched his father, and we have friends who do it as well. We read the book, Backyard Sugarin' by Rink Mann which talks all about how to do it yourself in your yard. We recommend that book to everyone. We use plastic taps and tubing that lead into 5 gallon covered plastic buckets at the base of each tree. We empty the buckets into a large (125 gallon) food grade container we have on a trailer behind our tractor. When it is time to boil, we park the trailer uphill from our sugar shack so we have a gravity feed down through a garden hose. The hose brings the sap into the sugar shack and empties into a pre-heating pan which sits on top of our larger evaporator. We have a 2 foot by 4 foot evaporator on top of an old oil tank which was cut and rigged to be a wood stove for boiling. We have lots of pine trees on our land so that's all we burn to keep the sap boiling. Once the sap gets to a certain level in the evaporator, we know we have a few gallons left so we pour it into large pots and bring it in the house to "finish" it. We use a hygrometer to tell us when it's done. We filter it through coffee-filter like cones and put it in mason jars. The heat seals them.

Are you able to use your experience producing maple syrup in your classroom?

I have many students whose families boil, as well as a number of teachers in the building, so it is an ongoing conversation. We call into each other's rooms, "How many gallons this week?" The students love talking about it. As for direct instruction, my students are part of the "Buds, Leaves and Global Warming" study through Harvard Forest, so we talk trees all year. We actually have had Boy Scout packs visit, and friends bring their younger children by. We tell everyone if they see smoke coming out of the stack to stop by.

How long is the process? Weeks, months, any prep in the off season? Also, what kind of time commitment does it entail?

As we say when people ask us how we think the sap will run or if it will be a good sugaring year...ask us in April. (Further north they say May.) We need nights below freezing and days above freezing for the sap to run well. Sun always helps too. This year we tapped Feb. 19 and did our first boil Feb. 24 which was early for us. March has been good and as we look at the extended forecast it looks like it might go a few more weeks. We typically boil through March as long as it doesn't warm up too soon. If the trees start to bud the sap gets sour so we have to stop. Last year our last boil was April 1 and we could have gone another week but we ran out of dry wood to burn.

When we are done, we pull the taps, rinse the taps, tubing and buckets in hot water and store them in the sugar shack until next year. The initial tapping takes a couple of hours. Collecting a few times a week takes an hour or so each time.

Maple Sugaring Word Search

A T G N I B R E A K F A S T F Y I T Q U T
B P E N N S A R G N F R E P M M B U L H B
U R I U I H L Y R T I K E A A K R E E Y R
C N A R Y B O E U D N O T R E S Y R E D G
K I Q S C T U J R E I T C B U D M A B R S
E V A P O R A T E R S H C T F O D I K O T
T E G U J E G A L U H A M E M E R E A M D
U E D Y R B N P Y P I W C E B O I T U E B
R H A L O M A P L E N H T W C L L R D T O
I D S L R A I T H G G E P S H Z L E N E I
C N T I O T L O D N R L I Z U A X W A R L
K P J D I H N A Q B I A O L S G D N S X I
C U R O L G C R S U G A R B U S H G R I N
A A S G I I Z U C T B D W P G I Y L A N G
H H W Q N L P L P I A Y E N A U M R G O I
S A A L G N K M Q O K C G V R N A E U D H
R E B M A K R A D E L N B L S W C Y S P A
A N A X M B O Y D G M A E C A T B A O L E
G Y S I E E W A K O B F N J R E N V K A G
U C H P Z R R V L J L U D U L U P U C E E
S P R I N G T I M E R T I G O A B Y T X S

SAP	SYRUP	BOILING	HYDROMETER
TAP	BUCKET	HAMMER	SPRINGTIME
LID	FANCY	PANCAKES	THERMOMETER
JUG	TUBING	BREAKFAST	DARK AMBER
MAPLE	DRILL	SUGAR SAND	LIGHT AMBER
TREE	GRADE	SUGAR BUSH	FINISHING RIG
SUGAR	CUPOLA	SUGAR SHACK	
SWEET	MARCH	EVAPORATER	

Boiling 80 gallons can take up to 12 hours. That is a typical boil for the number of taps and trees we have. (We have about 50 taps this year.) Finishing it in the house and filtering it can take a couple of hours as well.

How much maple syrup do you produce each year?

Anywhere from 7-10 gallons. Last year we did 7 ½ but I didn't have enough for Christmas presents so I want to do more this year.

Are you tapping trees in your yard, or other location?

They are all on our property.

What are some things about it that you like that motivate you to continue?

March can be a really long, muddy, dull month. It's not quite winter and it's not quite spring. Sitting in a warm, steamy sugar shack really helps the month go by faster. It's a time to socialize with friends, and lugging all the sap buckets around is really good exercise. It gets us out of the house all week long. People love getting the syrup as gifts, and I'm finding more and more recipes to use it in. It's not for everybody, you truly are sitting there watching a pot boil, but we really enjoy it!

JoAnn and Chris Mossman maintain their historic family farm in Westminster. JoAnn teaches grade 6.



Maple Facts!

Did you know? (Ag Facts)

- Maple syrup does not freeze.
- Maple syrup is the only food that comes from a plant sap.
- Only the color and flavor of maple syrup change according to the outside changing temperatures; this is known as a chemical change.
- It takes approximately 40 gallons of maple sap to make 1 gallon of maple syrup.
- Maple syrup is only produced in the northeastern United States and eastern Canada, the region in which sugar maple is found.
- Vermont produces the most maple syrup in the United States. They produce more than a half of a million gallons each year. Quebec, Canada is the largest producer of maple syrup in North America.
- Where does maple syrup come from? (*sugar maple trees*)
- What do maple trees need to grow? (*water, sunlight to make food*)
- Do maple trees grow in the winter? (*no, they lose their leaves and go dormant to survive the cold temperatures and short day length*)

Apply for a MAC Mini-Grant by April 1!

Each year MAC funds a number of agriculture-related project proposals from teachers, schools, and farms working with schools. Because we are a small, nonprofit organization, those projects that most closely fit our mission receive priority in the decision-making process.

Grants are awarded three times a year. Deadlines are April 1, September 20 and November 1.

Most awards are between \$300 and \$500. The maximum possible award is \$1500.

Since 1994, MAC has given more than \$250,000 to nearly 300 projects planned and carried out by educators across the state. These have included reading programs focused on agricultural themes, projects that explore new technologies, writing and video projects, school-wide agricultural days trips to farms, purchase of books and classroom materials such as incubators to support agricultural lessons, and more.

Visit: <http://www.aginclassroom.org/guidelines> or e-mail minigrants@aginclassroom.org for more info.



- When can maple syrup be harvested? (*only in the early spring when the days are warm and the nights are cold; it is the process of freezing at night and thawing out during the day that makes sugary sap flow in the sugar maple before spring growth begins*)
- Maple sap will flow from a taphole any time the temperature drops below freezing then warms up to above freezing again. Based on the high and low temperatures listed for each day, cross out the days when the sap did not run. To run the low temperature must be less than 32 ° F and the high above 32 ° F.
- Get your Mass Agriculture Calendar & record the temps each day for March. Then calculate: How many days did the sap run?

Maple Resources

Massachusetts Introduced Pests Outreach Project
<http://massnrc.org/pests/alb/>

Massachusetts Maple Producers Association
www.massmaple.org

Cornell Cooperative Extension: Student & Teacher Activities
<http://maple.dnr.cornell.edu/kids/index.htm>

Classroom in the Sugarbush
www.goshen.edu/merrylea/sugar/classroom

Penn State Sustainable Forestry, tree & maple lessons grades K-8
<http://sftcr.cas.psu.edu/LessonPlans/Forestry/ForestryKto5.html>

Wisconsin Grade 3 Unit
<http://www.uwsp.edu/education/pcook/unitplans/syrup.htm>

Penn State Teacher Resource Center, early elementary
<http://sftcr.cas.psu.edu/LessonPlans/Forestry/MapleSyrup.html>

Science News for Kids, later elementary
<http://www.sciencenewsforkids.org/articles/20070314/TZWorksheet.asp>

Solids, Liquid, Maple Syrup, early elementary
http://www.education.com/activity/article/Solid_Liquid_Maple_Syrup_first/

Ontario Maple Syrup Producers Association, grades 1-9
<http://www.ontariomaple.com/omspa/educational-resources/74.html>

Young Naturalists Teachers Guide, grades 3rd-6th
http://files.dnr.state.mn.us/education_safety/education/teachers/activities/volunteer_studyguides/maple_syrup_studyguide.pdf

Vermont Agriculture in the Classroom, grades K-4 and 5-8
<http://www.vt-aitc.org/documents/full-Maple-Unit.pdf>

Tapping into Spring, NY state Maple Association's wealth of on-line resources
<http://www.acsu.buffalo.edu/~dbertuca/features/maple.html>

Audubon Vermont, grades K-5
http://vt.audubon.org/PDFs/sugaring_pre_post.pdf

A Mini-Grant Project

Shawn O'Neill is a first grade teacher at the Robinson Elementary School in Mansfield. She applied to MAC's mini-grant program for funds to purchase a Tower Garden Growing System to make it possible for her students to grow vegetables inside the classroom during the cold months of the year.

The Mini-Grant Committee awarded a grant to Shawn with the stipulation that it would be a pilot project. She agreed to submit a series of written reports during the year in which she compared student learning using a Tower Garden with that of students gardening out of doors. Our hope was to obtain data about the educational value growing veggies indoors using a controlled hydroponic growing setup under artificial lights vs. gardening outside under the variable and unpredictable conditions that Mother Nature provides.

Below are excerpts from Shawn's reports to the Mini-Grant Committee:

When school began in September, I knew that my new first graders would not yet be ready to measure and record data. That being said, I didn't want to wait to begin using our Tower Garden and exposing my students to this new exciting garden. I decided to create an age appropriate journal for the first half of the year. At that time, we still had some life in our outdoor garden as well. The journal includes observations and sketches of both our outdoor and indoor (Tower Garden) gardens, lists of what was planted in our Tower Garden, hands on activities where students picked, cleaned, smelled, tasted, and graphed the herbs and vegetables they grew on the Tower Garden, and a Venn Diagram, comparing and contrasting our Outdoor Garden and our indoor Tower Garden.

She added that the class had started Round 2 of the Tower Garden in January. *We planted new seeds and are about to transplant them onto the tower. I've included in this packet some sample journal pages from my students, as well as the new recording sheets that will measure the growth rate of our new plants. We will compare these to the growth rates of the plants in our outdoor garden when we are able to plant outdoors again... This has truly been an amazing experience, and my students and I can't wait for our new crop of plants!*

Here are some of the ways she's used the Tower Garden since September:

We've compared outdoor garden needs to growing hydroponically.

We've discussed some of the benefits of using hydroponics.

We've been able to grow, harvest and sample over a dozen different vegetables since September.

We've grown 5 different kinds of herbs. At the beginning of the year each student picked some basil, lavender and mint and then we wrote about it and graphed the favorites.

We've used the Tower Garden across the curriculum: Math – Measuring; Language Art – Writing Journals, Making Predictions; Arts – Sketching our plants; Science – the life cycle of plants and how they connect to the world around us

In the spring we'll be planting our outdoor gardens. Then we'll really be able to "get our hands dirty" and make some real comparisons between the two forms of gardening!

Many thanks to Shawn for sharing the exciting results-to-date of her Mini-Grant project that funds from Mass Agriculture in the Classroom made possible.



Tower Garden

Next Workshop: PreSchool & Agriculture - Gardens & More! April 29, 9-3, in Millis. Registration online!
Have any questions or suggestions for MAC?

E-mail us at: info@aginclassroom.org or call us at 508-443-1703 anytime!

Don't forget to  Like

Massachusetts Agriculture in the Classroom on Facebook today!



Happy Spring!

Thank you for helping MAC to promote Agricultural Literacy among students across the Bay State!