



**Vermont Evaporator Company
Presents:**

**Curriculum for Little Kids, Big Kids and
Biggest Kids!**

For use with the Sapling Evaporator

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Evaporation Experiment

Background: Making maple syrup is easy and fun, and there's a lot to learn during the process. 'Sugar maple sap contains as much as 2% sugar, and it takes about 40 gallons of sap to make 1 gallon of syrup. If you tap another variety of maple, it can take even more. The process of making maple syrup provides opportunities to discuss a plethora of topics including: scientific observations, sugar content calculations, hydrometers, the evaporation process, tree identification, Native American history, and provides a tasty treat sure to please all students.

Procedure:



1. Tap your trees and collect maple sap.
 1. For tree ID, check out the tree id infographic at the end of this packet as well as the blog post: Hobby Maple Syrup Makers: Time to Identify Your Trees. <https://vermontevaporator.com/2020/09/time-to-identify-your-trees/>
 2. For how to tap your trees, check out the infographic at the end of this packet as well as the blog post: DIY Maple Syrup: How to tap, <https://vermontevaporator.com/2021/01/diy-maple-syrup-how-to-tap/>
2. When you have collected a sufficient amount of sap, pass through cheese cloth or a pre-filter and pour at least 5 gallons of sap into the Sapling Evaporator Pan.
3. Start a fire in your Sapling Evaporator. Small pieces of soft wood get hotter quicker.
4. Once the sap starts boiling, simply keep fire going and talk with your students about what they see, smell, and taste, and how that differs between the three chambers of the Sapling Evaporator Pan. You can use the attached sheets to track your observations.
5. Ensure you replenish the sap in the pan by adding sap to the back of the pan, either with a Sapling Warming Pan, or a scoop full at a time. Make sure there is always 1-2 inches of sap in the pan at all times to prevent burning!
6. Continue to make observations throughout the day. You can pour off into a vessel for observation by the pour off valve, but be careful, it can get hot! And make sure to add more sap to the back.
7. Pour off sap when color gets dark, texture is almost syrup like, and temperature is close to 218° F. You can finish on a burner next to the evaporator, or even a kitchen inside. You can use any thermometer to track your syrup to 218° F.
8. When you are cleaning up for the day, be sure to remove the pan from the evaporator completely before pouring off the sap/syrup. If the pan is empty and still over a fire, it will burn the pan. By removing it first you ensure your Sapling pan will be around for another sugaring season!

For Little Kids



Maple Evaporator Worksheet

Name _____

Date _____

Weather _____

Temperature _____

How are you feeling today? _____



OBSERVATION #1

What does the sap in the pan look like?

What can you smell while the sap is boiling?

What does the sap taste like?

What else can you notice?

OBSERVATION #2

What does the sap in the pan look like?

What can you smell while the sap is boiling?

What does the sap taste like?

What else can you notice?

OBSERVATION #3

What does the sap in the pan look like?

What can you smell while the sap is boiling?

What does the sap taste like?

What else can you notice?

DRAW A PICTURE of what is happening while you wait. It could be the evaporator, the sap, the steam, or a friend.



Evaporator Pan Drawing

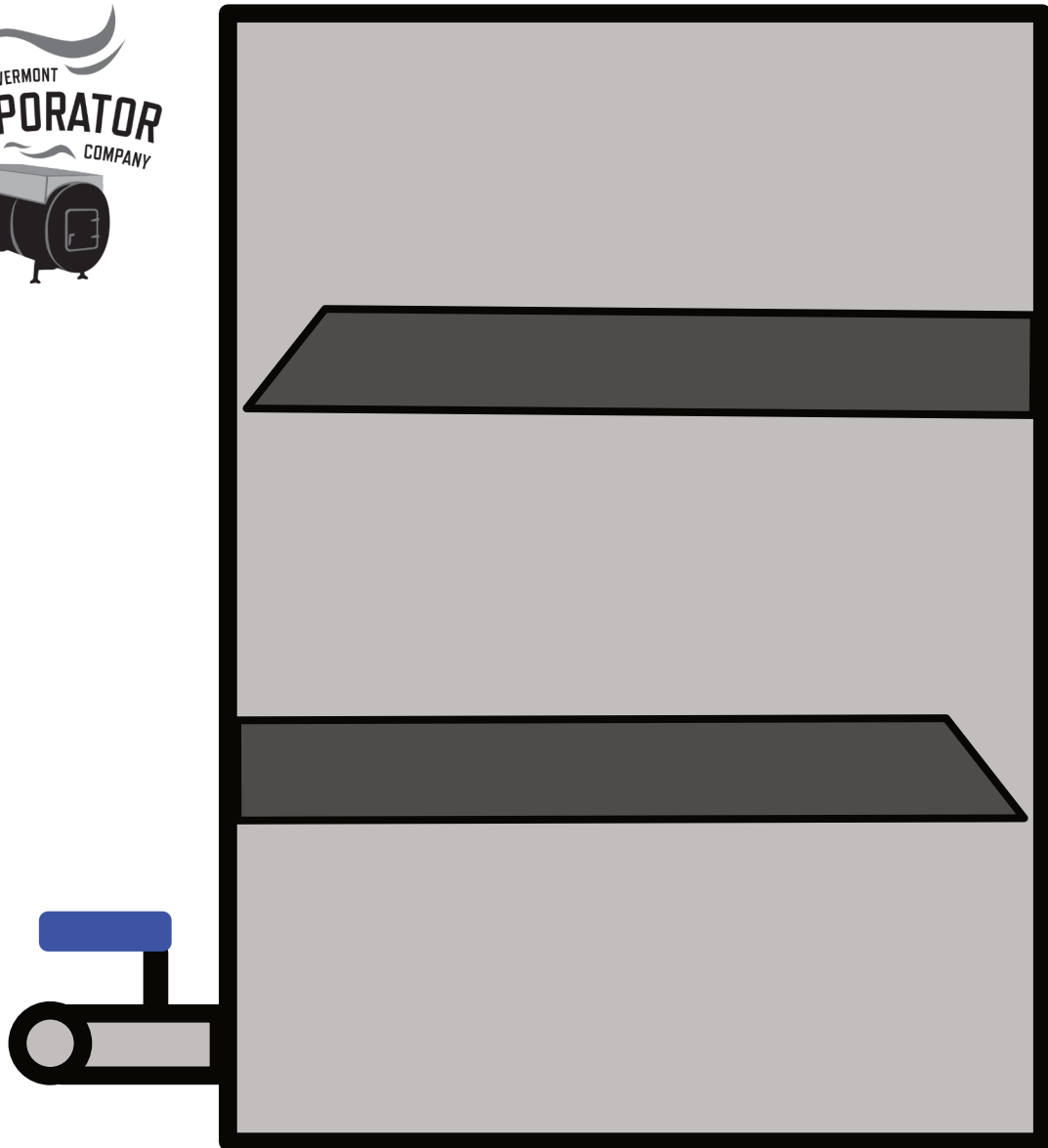
On the evaporator pan below, draw:

a SQUARE where the fresh sap enters the pan

Circle where the syrup comes out of the pan

Put a triangle where the sap is darkest

Put a star where the sap is lightest



Additional materials for Little Kids:

Infographics located at the end of the packet:

- Maple Tree Identification
- Syrups of the World
- Sap/Cider to Syrup
- Maple four ways
- Maple producing states
- How to tap a tree
- Grades of maple
- Filtering and storing
- Cord of wood
- Continuous boil pan
- Baking with Maple
- Backyard Bingo



Recommended Little Kid books:

- Maple Trees by Marcia S. Freeman
- Curious George Makes Maple Syrup
- Sugar on Snow by Nan Parson Rossiter
- Sugar White Snow and Evergreens by Felicia Sanzari Chernesky
- At Grandpa's Sugar Bush by Margaret Carney and Janet Wilson
- The Big Tree by Bruce Hiscock
- The Sugaring-Off Party by Jonathan London
- Sugarbush Spring by Marsha Wilson Chall

Maple School Blog posts:

MAPLE SCHOOL: THE MATH OF TAPPING A MAPLE TREE

<https://vermontevaporator.com/2020/04/maple-school-the-math-of-maple/>

MAPLE SCHOOL: THE EARLY HISTORY OF MAPLE SYRUP

<https://vermontevaporator.com/2020/04/the-early-history-of-maple-syrup/>

MAPLE SCHOOL: MAPLE SYRUP STORY HOUR

<https://vermontevaporator.com/2020/04/maple-school-maple-syrup-story-hour/>

MAPLE SCHOOL: WHY DOES SAP RUN? SCIENCE!

<https://vermontevaporator.com/2020/04/maple-school-why-does-sap-run-science/>

Additional resource for teachers:

Master's Project: Maple: A Sap to Syrup Guide, A Manual for Career and Technical Centers of Vermont by Lynn Michelle Wolfe

<https://scholarworks.uvm.edu/cgi/viewcontent.cgi?article=1022&context=rsmpp>

Infographics



The Hobby Sugar Maker's Quick Tree ID



Sugar Maple

- Five fat lobes
- Smooth edges
- Multicolored in the fall

Red Maple

- Three fat lobes
- Saw toothed edges
- Early, red foliage in fall

Silver Maple

- Five skinny lobes
- Smooth edges
- Light green ("silver") on underside
- Late to turn in fall



Tree Syrups:



Alder	Hickory
Birch	Ironwood
Black Walnut	Linden
Butternut	Maple
Carob	Shagbark Hickory
Cherry	Spruce Tip
Cherry Blossom	Sycamore
Coconut Palm	


Syrups of the World

Flower Syrups:



Clover
Dandelion
Elderflower
Fireweed
Forsythia
Ginger
Queen Anne's Lace
Rose
Violet

Fruit Syrups:



Apple Cider
Apricot
Berry
Cherry
Nectarines
Peach
Pear
Plum
Rhubarb



Ratio of Sap/Cider to Syrup

Maple



40:1

Birch



110:1

Apple



8:1



Maple Four Ways

Syrup



- Start with sap
- Boil to 219° F
- Filter

Cream



- Start with syrup
- Do not stir
- Boil to 235°F
- Cool to 100°F
- Stir until lighter in color and the thickness of peanut butter (30+ minutes)

Candy



- Start with syrup
- Do not stir
- Boil to 246°F
- Cool for 5 minutes
- Stir until lighter and thicker (1-5 minutes)
- Pour into shallow pan(s) lined with lightly oiled parchment paper to 1" thick or so
- Cool completely
- Cut into cubes

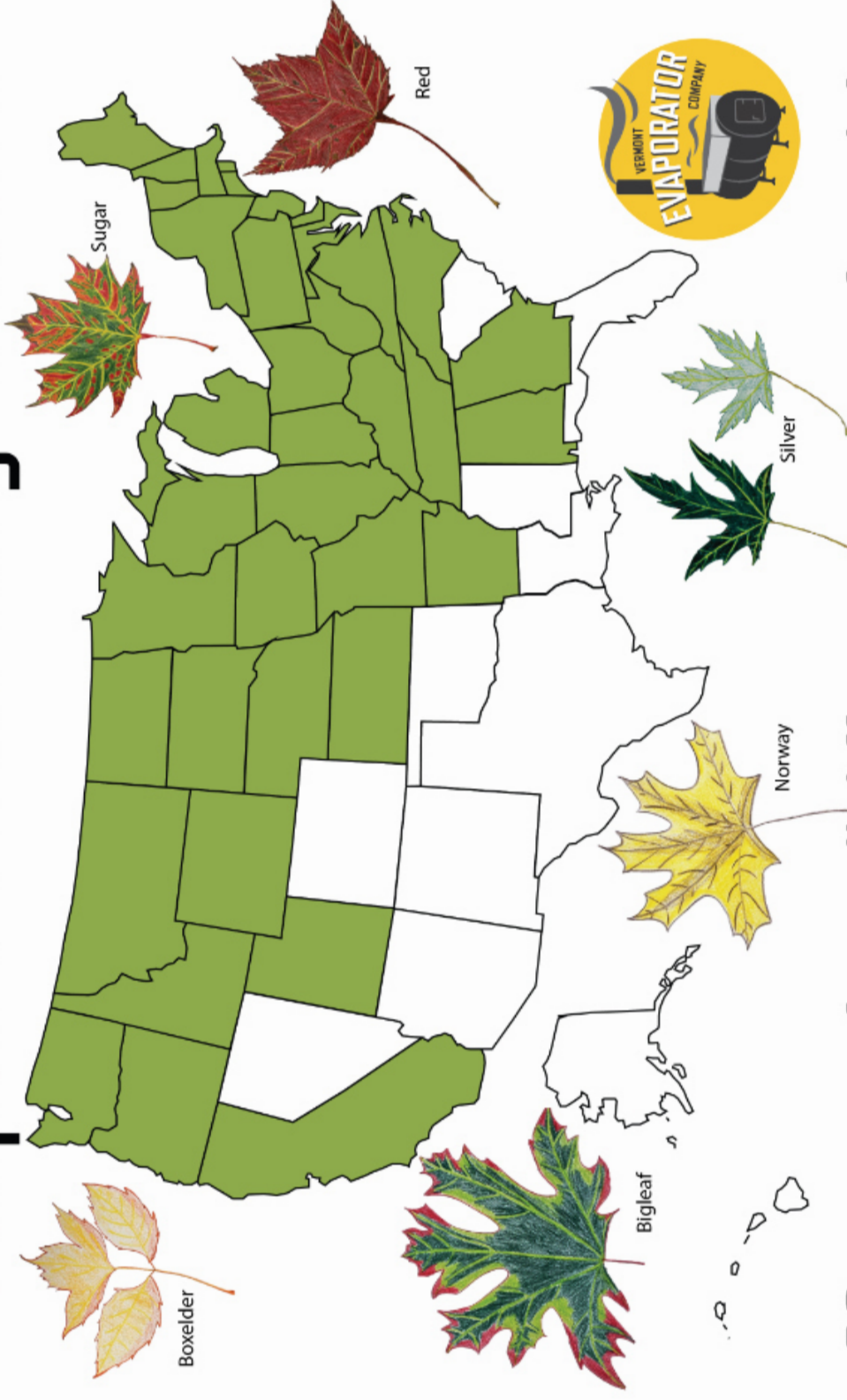
Sugar



- Start with syrup
- Do not stir
- Boil to 257° - 262°F
- Take off heat
- Stir vigorously as maple cools and crystals form (20+ minutes)
- Sift and grind any lumps with mortar and pestle or food processor



Maple Producing States



38 states... from all different species of maple!



How To Tap a Tree

Avoid knots and wounds

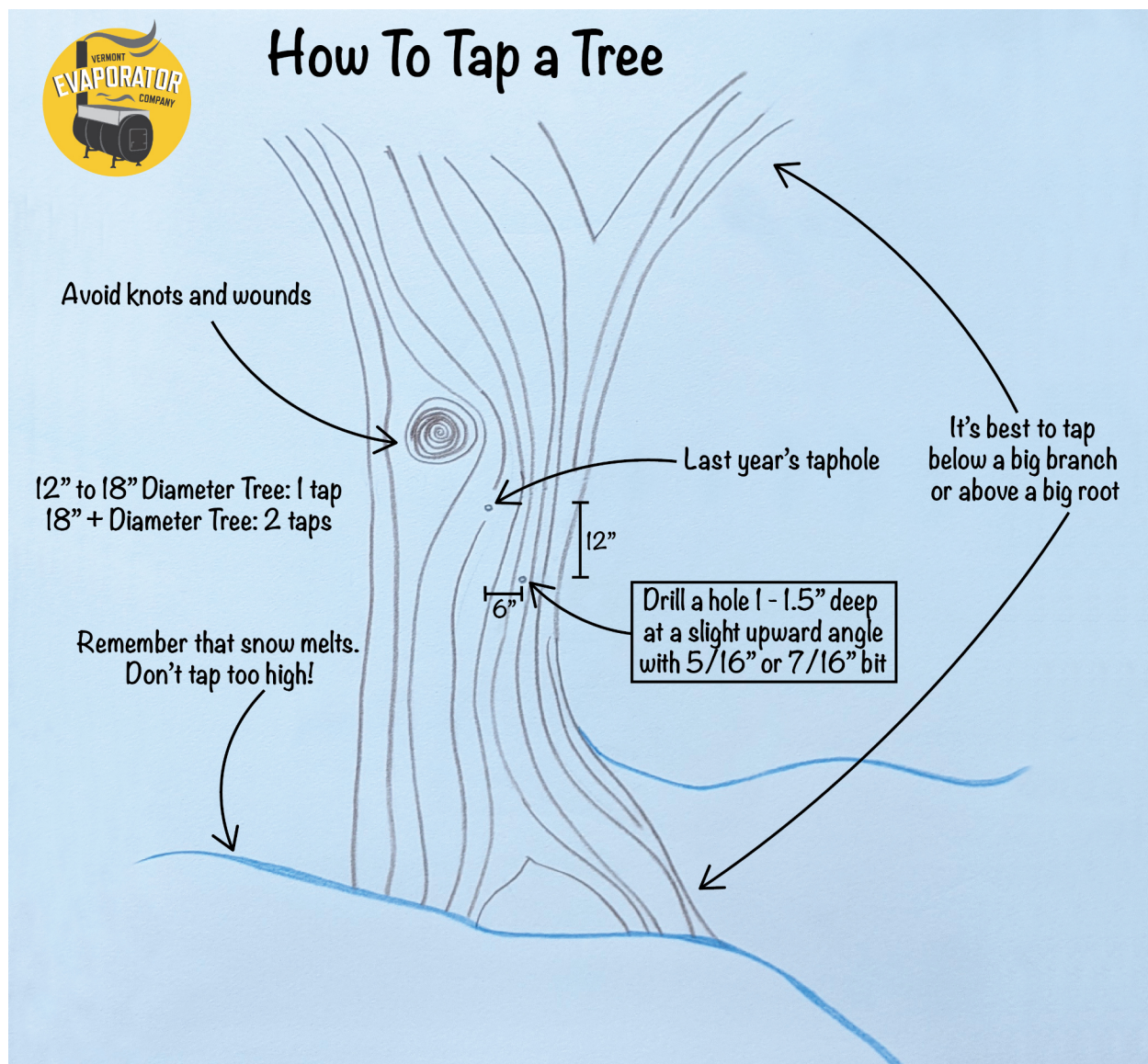
12" to 18" Diameter Tree: 1 tap
18" + Diameter Tree: 2 taps

Remember that snow melts.
Don't tap too high!

Last year's taphole

It's best to tap
below a big branch
or above a big root

Drill a hole 1 - 1.5" deep
at a slight upward angle
with 5/16" or 7/16" bit



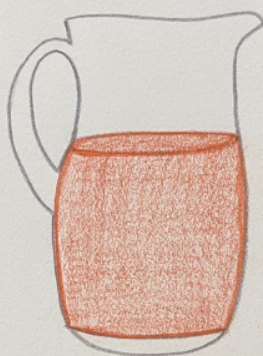
Grades of Maple Syrup & Their Uses



Golden Color
with
Delicate Taste

Fancy

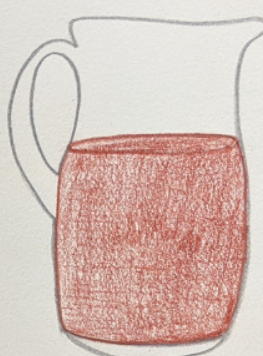
- drizzled over vanilla ice cream
- mixed with soft cheese or butter
- as the sole ingredient of maple cream, candy or sugar



Amber Color
with
Rich Taste

Versatile

- with pancakes or waffles
- in salad dressings and sauces
- in chocolate milk, hot cocoa & mixed drinks



Dark Color
with
Robust Taste

Practical

- with roasted and baked vegetables and meats
- paired with smoky and spicy foods



Very Dark Color
with
Strong Taste

Work Horse

- preserving & canning fruits, veggies and meats
- in baking

Filtering and Storing Maple Syrup

219° syrup in

②

...but as long as it is at least 180° when put in sterilized bottles or jars, it does not need to be reheated prior to bottling. So it pays to have everything ready to go before you start!

①

Let syrup pass through two prefilters nested inside one maple syrup filter. (When inner prefilter becomes clogged, remove and use only one.)

Syrup will cool as it filters...

③

Screw on cap or lid, lay bottle or jar on its side for 30 seconds. Store upright sealed containers at room temperature for up to 2 years!

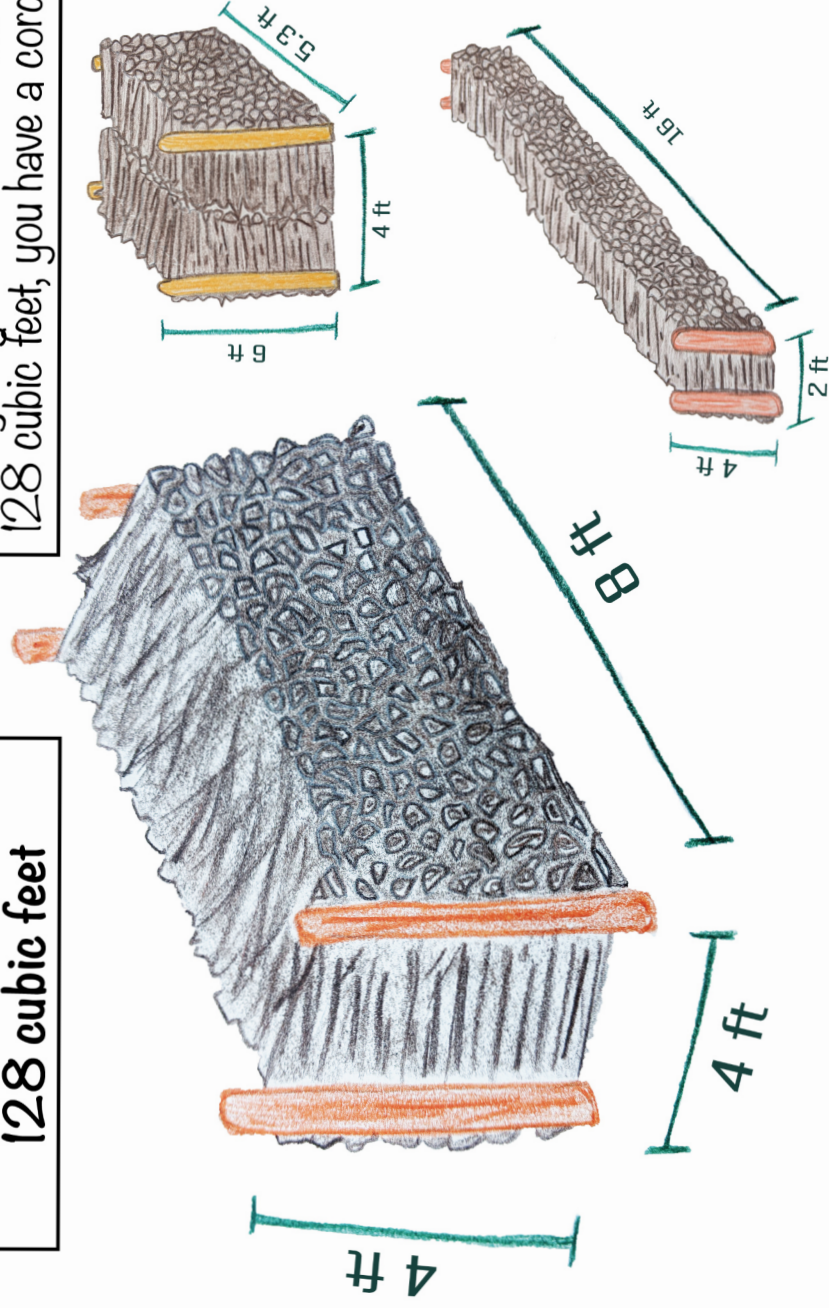




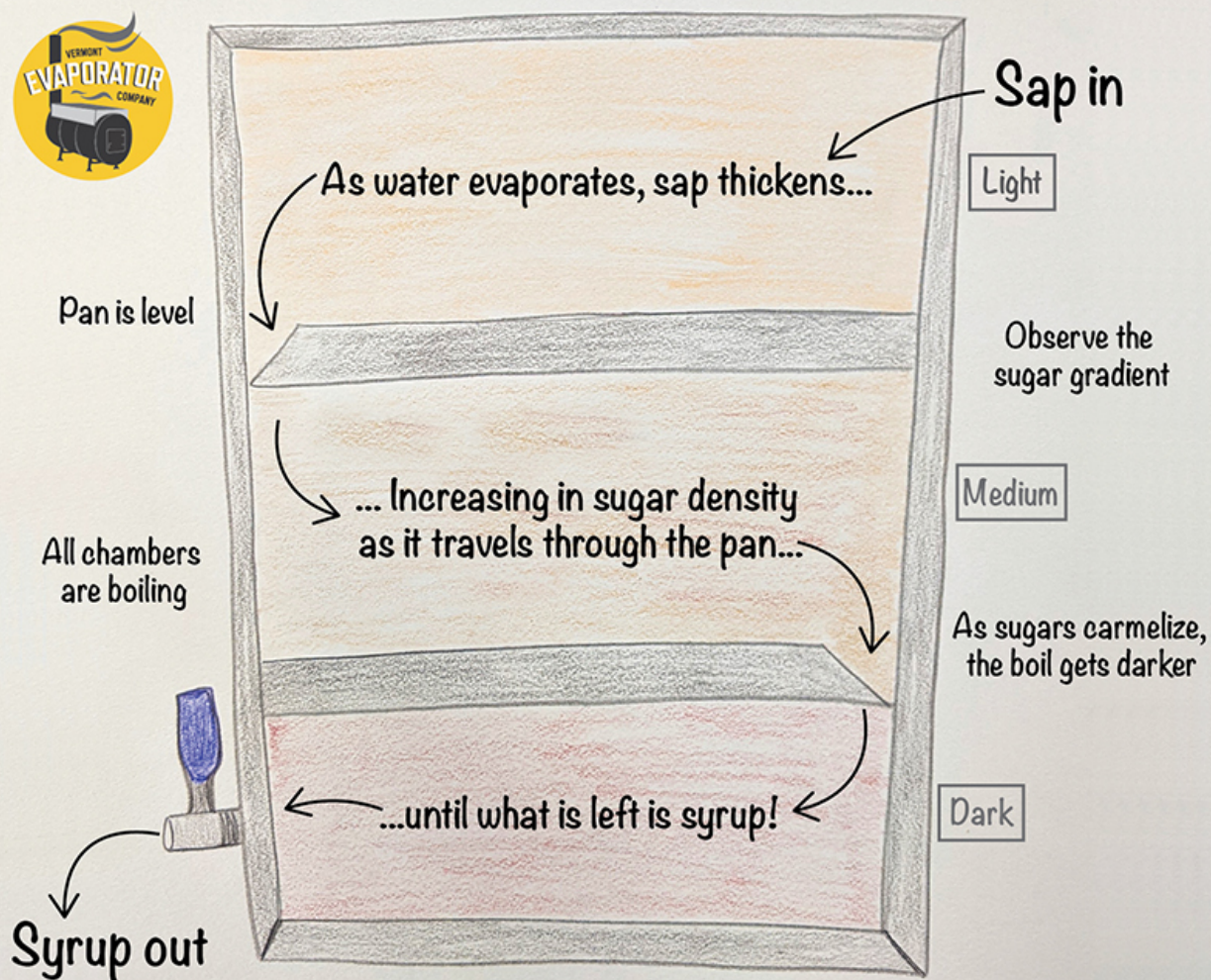
How To Measure a Cord of (Sugar) Wood

One cord of wood measures
4 ft x 4 ft x 8 ft
and has a volume of
128 cubic feet

However, you can have
different size wood piles.
As long as your volume measures
128 cubic feet, you have a cord.



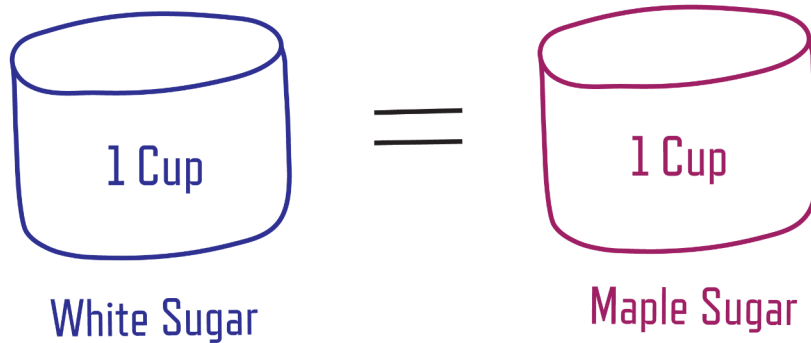
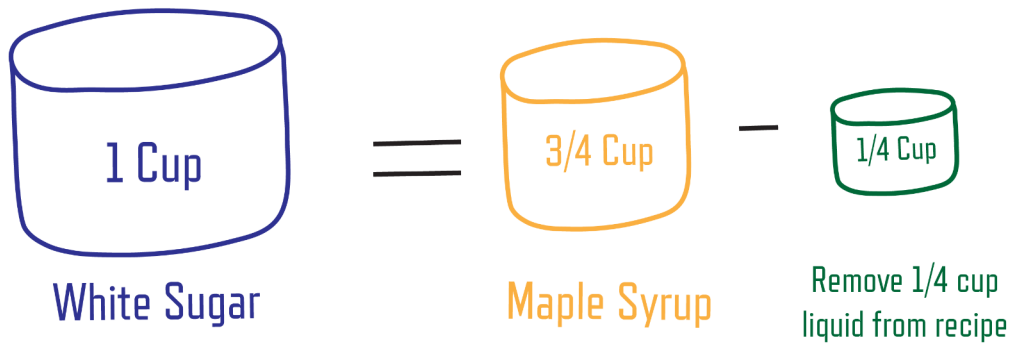
From Sap to Syrup on a Continuous Boil Pan





Replacing White Sugar with Maple in Baking

For each 1 cup of white sugar to be replaced:



Backyard Bingo



