

Guide to Backyard Maple Sugaring



Missouri Department of Conservation
Rockwoods Reservation
2751 Glencoe Road
Wildwood, MO 63038

Introduction

“Everybody is busy making sugar, which is participated in by old and young, as if it were a family feast.” -Gottfried Duden

So wrote a European visitor to Warren County, Missouri, in February of 1826. While the northeastern United States and Canada are famous for producing maple syrup, the sweet treat has long been made wherever sugar maple trees are found, including Missouri. We hope this guide helps you begin your own maple sugaring adventure.



A Note from our Foresters

Please don't plant sugar maples. They create dense shade, which makes growth difficult for other beneficial trees like oaks and hickories. We simply encourage you to take advantage of the trees you already have. Please contact a Forester at Rockwoods Reservation at 636-458-2236 to learn more about managing your forests.

Missouri Tradition

In the 1860 census, the state of Missouri reported producing 18,289 gallons of maple “sirup” and 178,910 pounds of maple sugar.



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Gather Supplies

Supplies can be found just about anywhere! You can go commercial and buy supplies, or get creative and repurpose items you already have at home.



Taps or "spiles" and spout driver (optional) with matching drill bits



Cordless drill



Caution

All supplies that come in contact with sap and syrup must be "food grade."

Watch out for older buckets or materials that may have used lead in the soldering process.



Collection containers



Rubber mallet or hammer



Transport & sap storage containers



Evaporation pan



Stove



Cooking fuel



Filter



Thermometer and/or hydrometer



Finishing pot and syrup jars



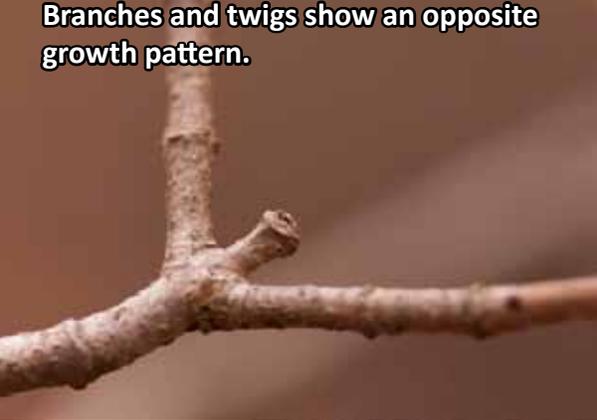
Do You Have Sugar Maples?

Just about any deciduous tree can be used to make syrup, but sugar maples are best. When you have several growing close together, congratulations, you have a sugar bush!

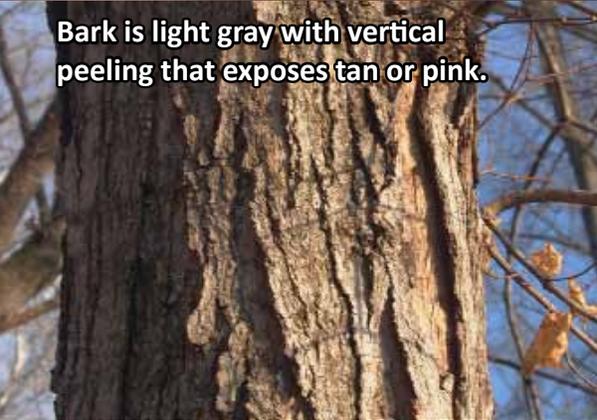
Leaves look like Canadian National Flag.



Branches and twigs show an opposite growth pattern.



Bark is light gray with vertical peeling that exposes tan or pink.



Buds are reddish-brown. Large terminal bud and two side buds.



Why Sugar Maples?

Highest concentration of sugar in sap, about 3%.

40 gallons of sap makes 1 gallon of delicious maple syrup, compared to 80 gallons of sap needed to make black walnut syrup.

What About Black Maples?

Black maples can also be found in Missouri, and look almost identical to sugar maples.

Bark is darker, almost black vs. light gray.

The syrup-making process is the same, but the product tastes slightly different.

Clean Everything

Every item involved in the sugaring process must be cleaned thoroughly before the season begins, during cooking/finishing, and at the end of the season. You have two ways to clean:

- Hot water and elbow grease (good for evaporation pans and finishing pots)
- Household bleach diluted at 20 parts water, 1 part bleach, then a thorough rinse with hot water (good for everything else)

Don't forget - buckets, taps, storage containers, and even drill bits must be cleaned!

Caution

Never use detergents or soaps. Residue will ruin syrup.

Do not allow bleach to contact metal for extended periods as it will corrode.

Industrial bleach is more concentrated than household bleach. You will have to dilute it further than 20:1 if you use it.



Oakite

Evaporation pans can become coated with residue that is nearly impossible to get off. Either scrub really hard with hot water, or buy Oakite. Easily returns pans to showroom quality, but it's highly acidic. Be sure to follow directions for use.



Oakite supplies

Tree Drilling

Be a conservationist and tap your trees with the future in mind. Take the time to plan out which trees should be tapped and which collection methods you'll use. For example, some trees on a steep slope are better for tubing as daily collections from a bucket can be dangerous. Some trees may be a touch too small and need more time to mature. Many decisions you make today could impact the long-term health of a tree and your future syrup production.



Plan for the Future

Drill a new hole each year - never use an old one.

Drill 2-3 inches left or right and 6+ inches up or down from the previous year and from other taps, if you have more than one in the tree.

Tapping will take on a spiral pattern.

The Size Must Be Right

<u>Tree Diameter (in.)</u>	<u>Max. # of Taps</u>
<10	Do Not Use
10 - 15	1
15 - 20	2
20 - 25	3

Caution

Clear wood shavings from the hole with the drill bit and a twig or stick. Do not blow into the hole! That only adds bacteria from your mouth into the tree.

Clean the drill bit with bleach wipes between every tree! Otherwise, you risk spreading disease between trees.

Only use healthy, living trees. Avoid partially dead trees and never use rotten wood.



Drill as straight and cleanly as possible. Careless drilling results in loose taps and sap running down the bark of the tree instead of into your bucket or tube.

Tree Tapping

Once you've drilled a hole, it's as simple as tapping in your "spile" or "tap" and hanging a bucket. But even here, there's a few tricks to the trade.



Metal taps require the use of a spout driver, or you will bend the tap.



Taps vs Spiles

Both are accepted and interchangeable terms used for the device to direct tree sap into a bucket.

"Tap" is used more commonly while "spile" is preferred in academic and commercial writings.

Tapping Tips

Tap the spile/tap gently into the tree until you hear and feel a solid connection.

Taps may loosen and fall out, especially if you have a big sap day and heavy buckets. Clean the spile and tap it back in. If the problem persists, you may need to replace it with a larger diameter tap.

Plastic taps can be hit directly on flat section.



Caution

Do not hammer too hard! You could break the spile or split the wood of the tree.

Weather

Maple sugaring can only be done in late winter and early spring when the trees are pulling their stored sugars up to their branches to feed growing leaves. Sap only flows when the temperature dips below 32°F (the freezing point of water) at night and rises above 32°F during the day. The greater the difference between temperatures, the more sap will potentially flow.

Predicting Sap Flow:

- The graphic depicts what could happen as temperatures change from night time lows to day time highs.
- Other factors that affect the temperature of your trees are sun exposure, wind direction, terrain, snow cover, rain, etc.
- Predicting sap flow is one of the most fun and most frustrating parts of maple sugaring. You think you've got it all worked out, but you'll rarely be right. Enjoy!

Caution

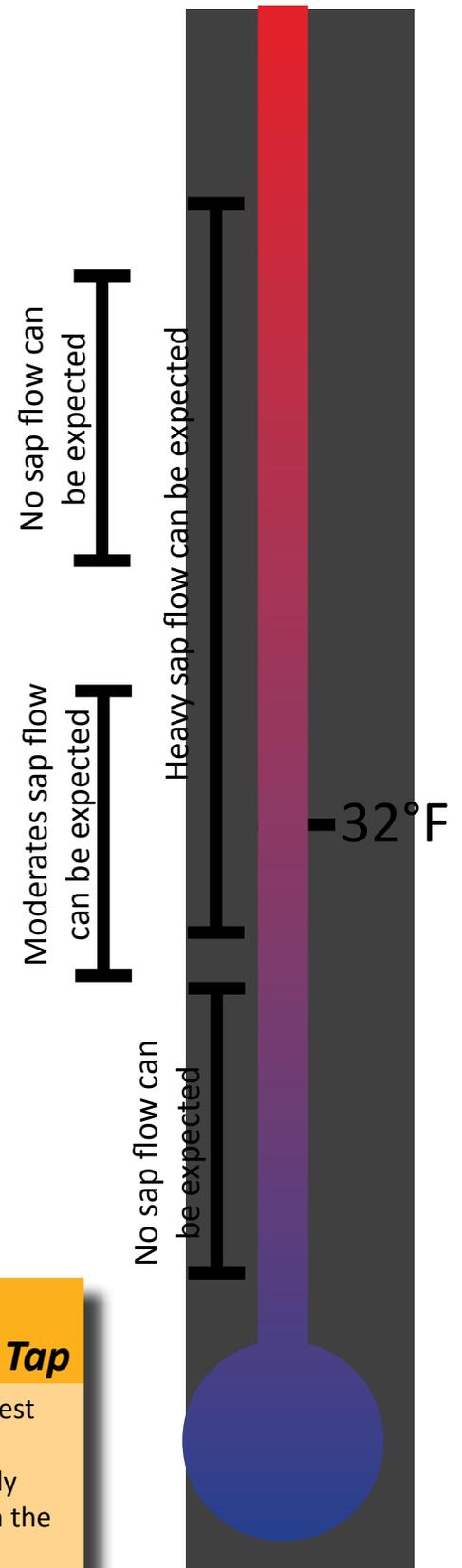
Holes that have had no sap flow for about 7 or more continuous days will become clogged with microorganisms and your tree will “shut down.”

This could happen from tapping trees too early in the season or a period of prolonged cold temperatures.

Solution: wait for a period of good weather to confirm lack of sap flow. Pull taps out and re-drill the same hole.

When to Tap

In Missouri, it's best to tap at the end of January or early February to catch the entire season.



Sap Management

Sap is the “blood” of the tree. It transports everything the tree needs to survive. In a sugar maple, it consists of 97% water, 2 - 3% sugar, and trace amounts of nutrients and minerals. Sap should be cooked right away, refrigerated, or frozen for later. Sap can last about 7 days refrigerated, and one year frozen.

Predicting sap collection:

- A single tree may produce 5 to 15 gallons of sap over the entire season.
- Moderate or low flow days may produce just drips or ounces.
- Heavy flow may produce 1, 3, or even 5 gallons in just a single day!



Strain sap through a wire mesh coffee filter to remove insects and plant debris.

Caution

Cloudy or smelly sap should be thrown out.

Sap can last about 7 days refrigerated, and about one year frozen.

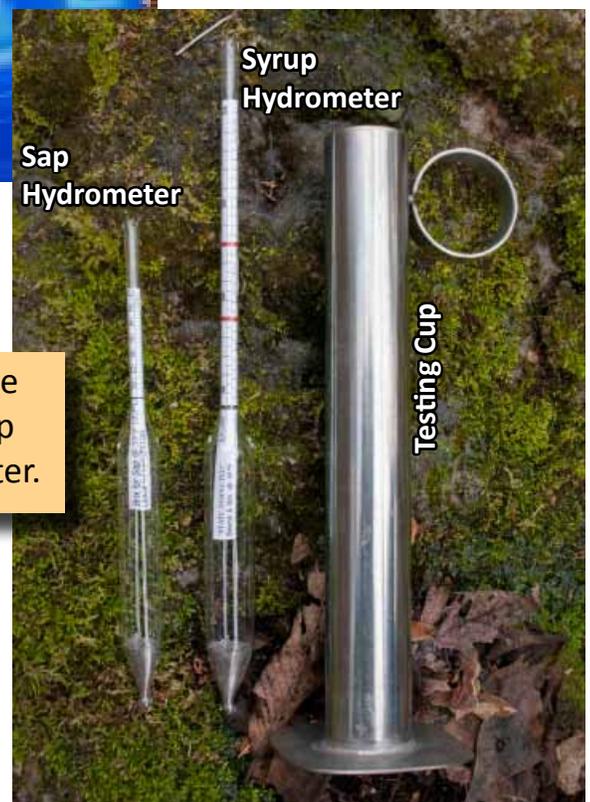
The End of Sap

Late in the season, sap begins to turn yellow. This can no longer be used to make syrup.

In Missouri, sap changes generally in the first two weeks of March.

Pull your taps, and let the tree heal on its own.

You can measure the sugar content of sap using a sap hydrometer.



Sap to Syrup

All you have to do to make syrup from sap is boil it. As water evaporates from the sap, the sugar becomes more concentrated, until it's syrup. But remember, it takes about 40 gallons of sap to make one gallon of syrup. That's a lot of water to boil away!

- Use a wide, flat pan to increase the surface area available for evaporation.
- A white foam will form on the surface of the sap as it boils. Simply skim it off.
- Once your sap is getting close to syrup, we recommend finishing it inside in a pot, where you can control the heat better and avoid burning your syrup. Make sure your exhaust fan is running.



Propane fish fryer



Cinder block stove



Half-pint evaporator stove



Inside of half-pint stove

Caution

Cooking sap should be done outdoors! Otherwise, you risk damaging paint and wallpaper, and encouraging mold.

Never let the amount of sap in your pan get too low. It can flash burn very quickly.

Finishing

Sap becomes syrup when it consists of 67% sugar and 33% water. Color isn't a good indicator. So how can you tell when it's done?



Candy Thermometer
Easy and inexpensive
When sap reaches **219°F**, it's syrup.



Syrup Hydrometer
Most accurate
Order from maple sugar supply companies. (See Resources)

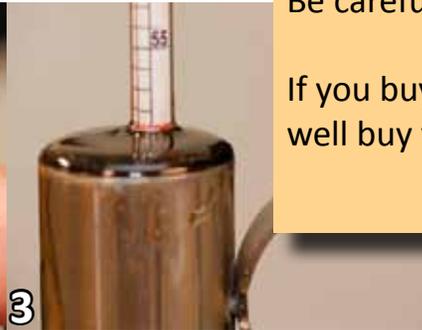
Using a Hydrometer



1
Fill the test cup with syrup.
Allow to cool to 211°F.



2
Gently place the hydrometer in the test cup. The syrup will overflow, so do this over a pot.



3
When syrup is done, the syrup level will be exactly even with one of the two red lines, depending on if the syrup is hot or cold.

Caution

Hydrometers are fragile!
Be careful if you use one.

If you buy one, might as well buy two. You will



Finishing Tips

Sap temperature will plateau around 215°F for awhile. Keep an eye on it. When the temperature rises again, it will go quickly.

If you cook your sap beyond the syrup stage, simply add distilled water and resume boiling.

Don't stir the sap as it's cooking.

Once your syrup is done, cover with a lid (to trap water and maintain syrup consistency) and move on to filtering.

Filtering and Canning

Filtering and canning are the last steps in the process. Remember, sap also carries nutrients and minerals. When you boil it, those nutrients and minerals stick together and form **sugar sand**, or niter. It can be harmful to small children if they eat too much. Filtering removes these minerals and gives your syrup a beautiful amber glow. Properly filtered and canned syrup will last for years on a pantry shelf. Opened syrup must be refrigerated.



Unused and used filter

Filtering Tips

Syrup should be between 180°F - 185°F when you filter it. Any cooler, and it may not be properly sterilized. Any hotter, and some minerals will still be in solution. The minerals will fall out of solution and form a whitish scuz on the bottom of your jar as the syrup cools.



Close-up of used filter

Canning Tips

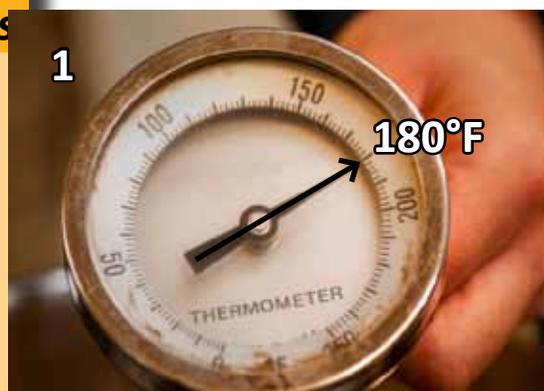
Rinse jars and lids with hot water - no detergent!

Reheat syrup to 180°F.

Fill your jars up to the neck. Extra space at the top is more space for bacteria and fungus to grow.

Make sure the lid is properly secure and turn the jar over once. This coats all surfaces with hot syrup and helps sterilize the jar.

If mold grows, simply scoop it out, re-boil syrup, and re-can.



1



3



2

Beyond Syrup

There's other things to make with maple sap besides syrup. Try making some of these sweet treats! Any of these can be made with pure maple syrup bought from the store, too.

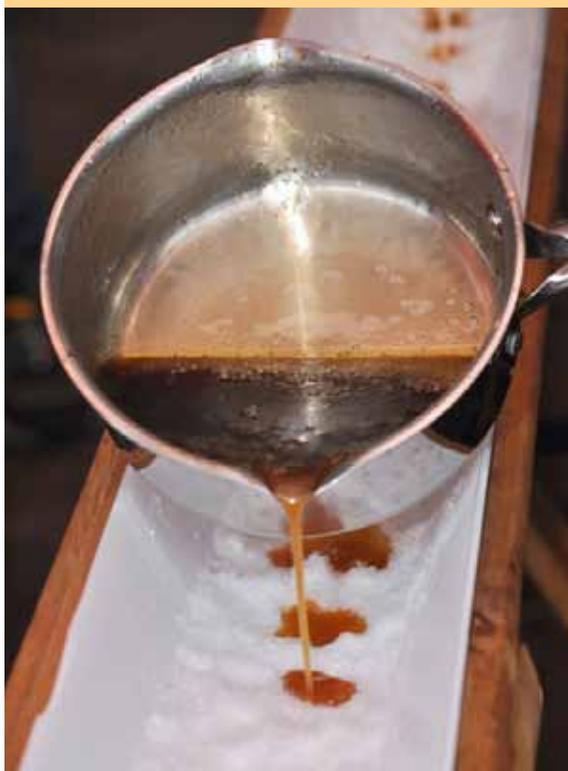
Granulated Sugar

Cook to **251°F**, then allow to cool to 200°F. Stir with electric mixer until granulation occurs.



Sugar-on-Snow

Cook to **234 - 239°F**. Without stirring, pour heated syrup onto crushed ice, about a spoonful at a time. Should be taffy-like.



Maple Butter or Cream

Cook to **235°F**, then cool to **125°F** by setting pot in cold water or ice. Beat with electric mixer until small crystals begin to form. Quickly spoon into container. Tricky, but very tasty!



wikipedia.org

Caution

It's easy to burn sugar, so keep a close eye on what you're cooking.

If you do burn it, let the pot soak in hot water. Much of the sugar will dissolve and make clean-up easier.

End of Season

Congratulations! You've survived a season of maple sugaring! But your work isn't done just yet. It's time to go back into the woods to pull taps, clean supplies, and get reset for next year. Here's a general to-do list:

- Pull taps
- Collect buckets and lids
- Wash everything. See page 5.
- Store everything in a clean dry place

How do you know when the season is over?

- Sap from the trees is yellow and cloudy.
- Weather is consistently staying above freezing temperatures, even at night.
- Leaf buds are opening on the trees.

Removing Taps

Simply wiggle and/or use a hammer/crowbar to remove taps.

Do nothing to the hole. Sap may continue to run for days or weeks.

The tree will gradually heal on its own over the next one to two years.



Pulling a tap



Healed tapping hole

Caution

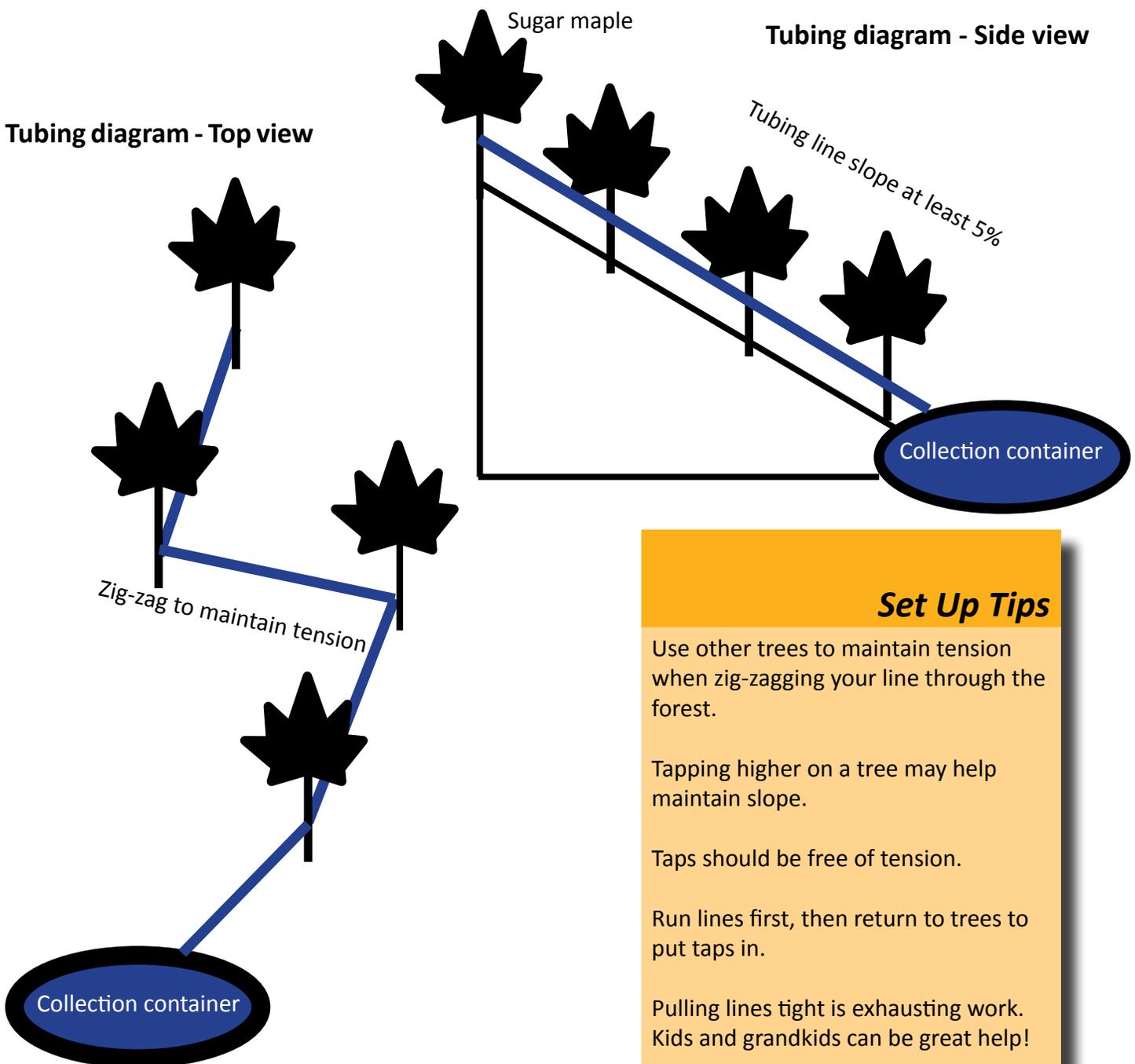
Do not use corks, tar, plugs, or other objects to plug up the hole. These objects promote bacteria growth and wood rot. The tree will naturally heal on its own.

Tubing

Tubing connects several trees to a central collection container. Tubing can save time and energy if you have many sugar maples on steep slopes. Tubing negates the need to check individual trees every day, but the initial set-up requires more effort. Certain conditions must be met for tubing to work:

- Trees need to be relatively close together
- The slope of the tubing line must be at least 5% (steeper is better)
- The tubing must be taut so no sags develop
- At least two people are required for set-up

For the purposes of this guide, we will only describe setting up a gravity fed system that connects up to 10 trees on a single line. We will not address main lines, pumps, vacuums, or other mechanical methods of sap collection.



Tubing Tools and Set-up



Tubing taps and 5/16" drill bit



Anchor tree - first tree in a line, or run, of tubing

Caution

All supplies must be food grade if you are not purchasing commercial maple sugaring products.

Do not use black or dark colored tubing. The sun will heat the sap inside and promote bacteria growth.

There can be no dips or sagging in the line. Those are places for bacteria to grow.



Tubing line

Resources

Rockwoods Reservation: Phone 636-458-2236

- The Naturalist staff have many years of experience in perfecting, modifying and adapting our operation. Contact us at any time and we'll be glad to share our successes and failures with you.

North American Maple Syrup Producers Manual Second Edition

Ohio State University Extension, 2006

Sweet Maple: Life, Lore & Recipes from the Sugarbush

James M. Lawrence & Rux Martin, 1993

Backyard Sugarin' A Complete How-To Guide, Third Edition

Rink Mann, 2006

Reviving a Sweet Tradition

Missouri Conservationist, Volume 72, Issue 1, January 2011

Maple Sugar: From Sap to Syrup: The History, Lore, and How-to Behind This Sweet Treat

Tim Herd, 2011

Leader Evaporator, Inc.: www.leaderevaporator.com / Phone: 802-868-5444

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