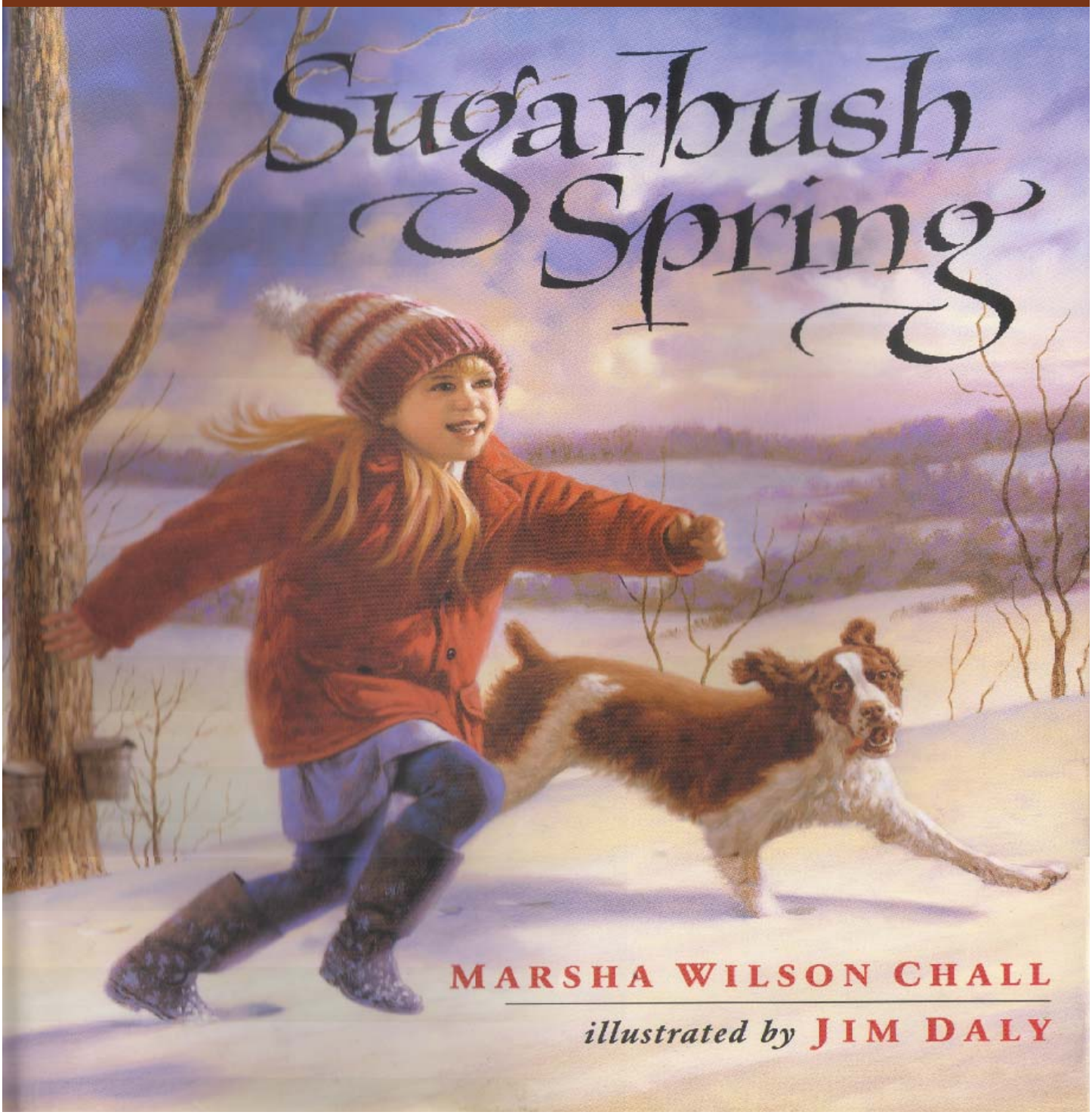
New York Agriculture in the Classroom

AG LITERACY DAY



SOLE
Sciences of Life Explorations:
Through Agriculture

Teacher Guide
Lesson: Exploring Maple Syrup

LESSON PLAN

LESSON TITLE
Exploring Maple Syrup

MONTH
April

GOAL
Students will understand how maple syrup is made, and use their senses to analyze its qualities.

OBJECTIVES

Students will:

1. Listen and read the book *Sugarbush Spring* for literacy response involving comprehending the process of making maple syrup. (NYS Learning Standard 2: Language for Literacy Response and Expression, Elementary 1)
2. Listen attentively and respond to peers during classroom discussions about maple syrup. (NYS Learning Standard 4: Language for Social Interaction: Intermediate 1)
3. Discuss the characteristics of maple syrup, including taste, smell, and appearance, using their senses. (NYS Standard 4: Physical Setting, Elementary 3)
4. Apply interdisciplinary problem solving skills by demonstrating an understanding of the steps in the maple syrup making process. (NYS Learning Standard 7: Interdisciplinary Problem Solving, Elementary 1).
5. Use a few traditional structures for conveying information such as chronological order, cause and effect, and similarity and difference, to understand the maple sugar making process and its characteristics. (NYS Learning Standard 1: Language for Information and Understanding. Elementary 3)
6. Students will describe the journey of maple syrup from sugar shack to the consumer. They will albel the sequence of steps maple syrup takes from production, processing, marketing to the consumer. (Food & Fiber Literacy 1B: Understanding Food and Fiber Systems, 2-3)

TERMS

Sap - The watery fluid in a plant that carries food and other substances, and can get sticky as it dries.
Sugarbush - A forest where Sugar Maple trees are used to make maple syrup
Syrup - A sweet, thick sticky liquid made by boiling down sap
Tapping - The process of drilling into the trunk of a maple tree and placing a spout (tap) where the sap will run out into a bucket

SAFETY

Any students with diabetes or dietary restrictions should take proper precautions prior to participating in the maple syrup tasting portion of this lesson. Check the nutrition label carefully with the classroom teacher. 1 tablespoon of pure maple syrup has approximately 13 grams of carbohydrate and no dietary fiber.

ADDITIONAL RESOURCES

Haas, Jessica. *Sugaring*.New York: Greenwillow Books, 1993.
Keller, Kristen Thoennes. *From Maple Trees to Maple* Syrup. Capstone Pr Inc, 2004.
NYS Maple Producers Association - www.nysmaple.com
www.Cornellmaple.com
www.mapleweekend.com
www.siropcool.com - contains fun interactive activies about maple syrup

STANDARDS MATRIX FOR THIS LESSON

Standards:

Month	Lesson	Math/Science/and Technology	English Language Arts	Social Studies	HEALTH	ARTS	Food & Fiber Literacy	CDOS	Other Languages	Interconnectedness
4	Exploring Maple Sugar	4:10, e3	2:4, e1				I:B, 2-3			
			4:5, i1							
			7:13, e1							
			1:3, e3							

Matrix Key:

NYS Learning Standards arranged by Standard: Category, Level
e = elementary i = intermediate c = commencement

Categories:

1 Career Development
2 Universal Foundation Skills
3 Language for Information and Understanding
4 Language for Literary Response and Expression
5 Language for Social Interaction
6 Communication Skills
7 Analysis, Inquiry, and Design
8 Information Systems
9 Mathematics
10 Science
11 Technology
12 Interconnectedness: Common Themes
13 Interdisciplinary Problem Solving
14 History of the United States and NY
15 World History
16 Geography
17 Economics

SUPPLIES AND EQUIPMENT

7 cards; each describes one steps in the maple syrup making process (attached)
1-ounce soufflé cups (1 for each student, provided by AITC)
Bottle of maple syrup (provided by AITC. local producer, or NYS Maple Producers Association)
Student activity sheet (original is attached; one copy [front and back] per student should be made)
Protective covering, such as newspaper, for desktops and floors (optional)

BACKGROUND FOR TEACHERS

The Sugar Maple is the official state tree of New York, and is very popular for its yellow and orange leaves in fall. While the process of gathering and processing maple sap into syrup is not a large component of the New York state economy, it is an interesting (and tasty!) part of it. New York produces more syrup than any state except Vermont. The beauty of the Sugar Maple in fall and the lure of maple syrup time in late spring contributes to tourism throughout the state.

Maple sugar became an important commodity for the early settlers of the United States. They used it to trade until the prices and taxes on cane sugar went down. Maple trees are a unique example among the trees that we collect food from. Instead of picking fruit from its branches, we collect the sweet sap from its trunk.

Traditionally, maple syrup was harvested by tapping a tree through the bark and into the xylem (the channels through which the sap runs), then letting the sap run into a bucket; more advanced methods have superseded this. Once trees have a diameter of ten inches at chest height and are at least forty years old, holes are bored into them and hollow tubes, called spiles, are inserted. These drip sap into buckets or into plastic pipes. Modern use of plastic tubing with a partial vacuum has increased production. A new hole must be drilled each year, due to the natural healing process of the tree, called walling-off.

In the late winter, when nights are still frosty but the days are warming, sugarmakers tap into Sugar Maple or Black Maple trees, and gather the sap. Production is concentrated in February, March, and April, depending on local weather conditions. The change in temperature causes the sap to move through the tree.

The sap is fed automatically from the storage tank, through a valve, into a corrugated (wavy) pan, where it is boiled until it forms a sweet syrup. Boiling down the sap reduces water content (since the heated water rises out of the sap as steam) and creates syrup, cream, or candy, depending on the temperature and length of time it is cooked. The process is slow, and It takes approximately forty gallons of sap to make one gallon of syrup.

Maple syrup, and its artificial imitations, are the preferred toppings for pancakes, waffles, and French toast in North America. Maple syrup can also be used in many other dishes, such as biscuits, doughnuts, fried dough, fritters, ice cream, hot cereal, and fresh fruit. It is also used as a sweetener for many baked goods, candies, and drinks.

A wonderful field trip to take students on would be to visit a local sugar shack. To find a sugar shack in your local area, visit the NYS Maple Producers Association website (www.nysmaple.com) and click on the “find a producer” link. This will provide a list of maple producers found in the various counties.

QUESTIONS FOR STUDENTS

What food products do we get from sugar maples?
How do we get those food products from the sugar maple tree?
How does the watery sap become thick and sugary?
Have you ever visited a sugar shack?
If so, how was what you saw different from what was shown in the story, and what was the same?

Maple Syrup Lesson Procedures:

I. Sap to Syrup: How is maple syrup made?

Prior to beginning this short activity, discuss the following questions with the class:
What is maple syrup made from?
What is sap?
What type of trees are used to make maple syrup?
How are sap and maple syrup different?
During what weather can maple syrup be made?

Procedure

1. Ask for seven student volunteers
2. Give each volunteer a sign to hold up, describing one of the steps in the maple sugaring process
3. Mix the volunteers up so that the steps are out of order, and have them stand in a line in front of the class.
4. Ask another student to move the volunteers into the correct order, following instructions given by the remaining students.
    a. To avoid all students calling out at once, have them raise hands and wait to be called on.
    b. Call on one student each for steps one through seven.
5. When the volunteer is finished, ask the remaining students if they agree with the order of the steps
    a. If not, ask students to explain what they would change.
    b. In order to make a change to the sequence, they must have approval from the rest of their classmates.
6. When the correct order of steps has been established, review the sequence.
7. For classes with fewer than seven students, or where having volunteers hold the signs is not practical, simply place the cards in front of the class without using student volunteers to hold them, and carry out the same procedures
8. Follow-up questions:
    a. How many of you have been to a real sugar shack?
    b. How was what you saw different from what was shown in the book? What was the same?
    c. Discuss possible reasons for the differences.

II. Tasting Maple Syrup

Prior to beginning this short activity, discuss the following questions with the class:
How many of you have had maple syrup?
How many of you like maple syrup?
What is a word that you would use to describe maple syrup?

Procedure

1. Pour a small sample of maple syrup into soufflé cups ahead of time, one for each student.
2. Explain to students that they will be using their senses to complete the front page of a worksheet looking at the smell, color, and taste of maple syrup.
3. Pass out the student activity sheet - “Fun with Maple Syrup”

4. Distribute soufflé cups in the manner most practical for the class
    a. Discuss options with your classroom teacher prior to activity
    b. Pass out at desks
    c. Have the students come up to a table and pick one up
    d. Cover table or floor with newspaper if necessary, to protect from spills
5. Instruct students to look at, smell and then slowly sip their syrup samples
6. Allow students 5-10 minutes to fill out the worksheet and then discuss their answers as a group.
7. Spend the most time on questions 5 and 6, and have students explain which foods they chose and why.

III. Conclusion

Procedure
1. After completing the lesson, have the students fill out the back page of the worksheet
    a. Write a sentence describing an interesting fact that they learned.
2. Once students have finished have some read their answers aloud.
3. Students may color the bottom of the worksheet after reader leaves
    a. Hang the pictures up around the room or hallway

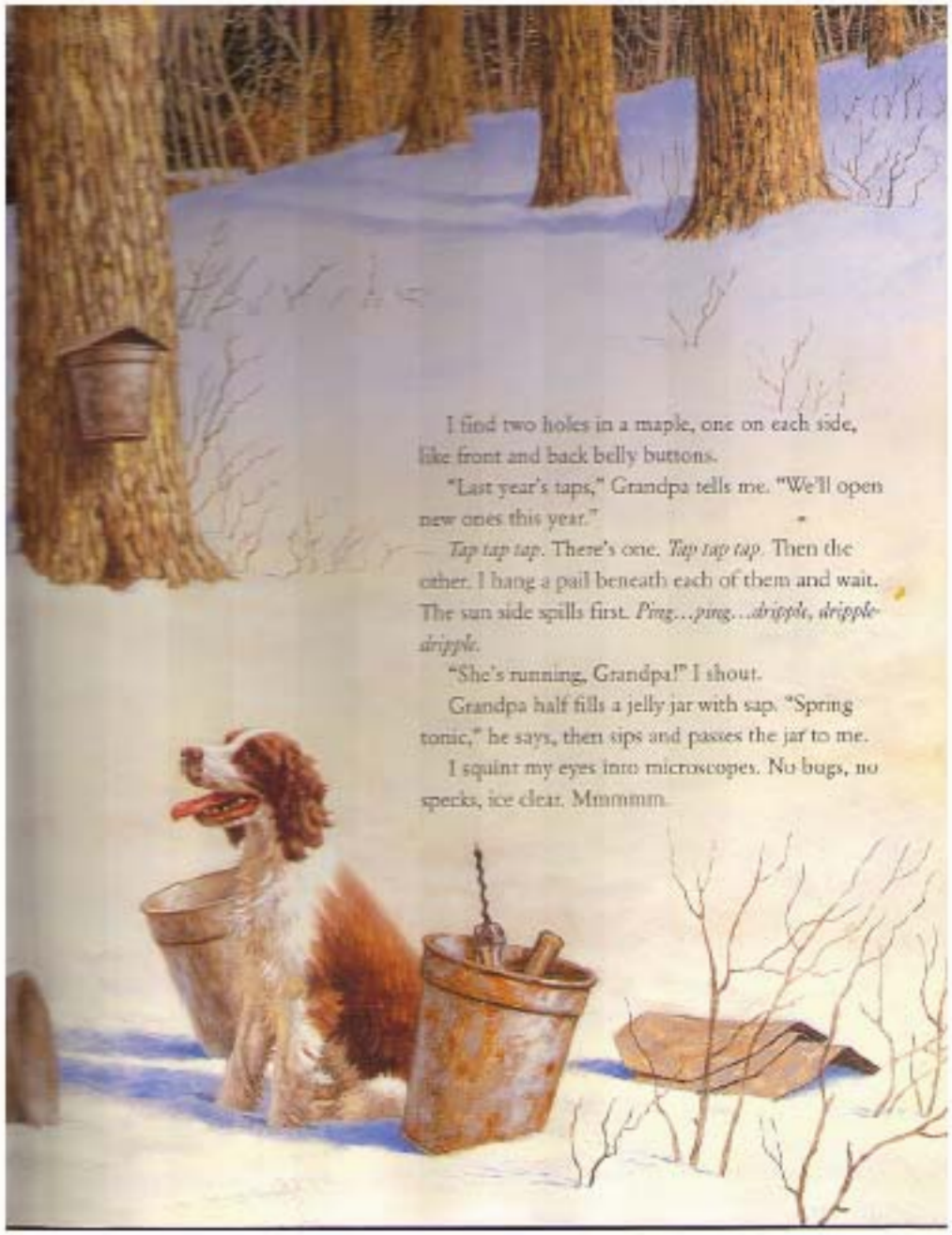
ANSWERS FOR STUDENT ACTIVITIES

Sap to Syrup
The proper order for the cards is:
1. It freezes at night and thaws in the morning
2. Find the right trees to tap by measuring them with your arms
3. Drill, tap, and hang a pail on each tree
4. Gather the sap from the buckets
5. Build a fire to boil the sap down into syrup
6. Filter the syrup and pour it into bottles
7. Use real syrup on your pancakes!!

Lesson Handouts

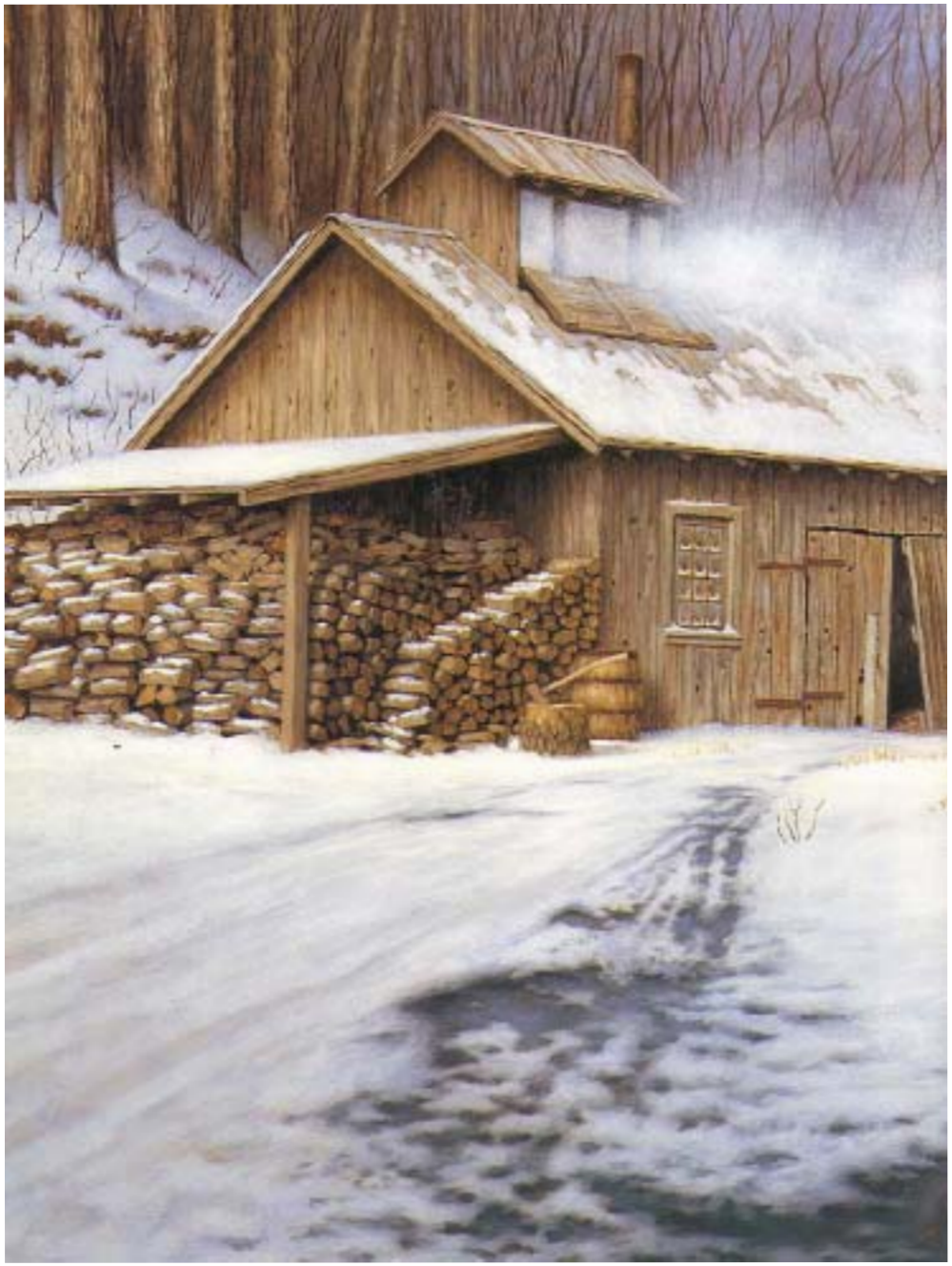
It freezes at night and thaws in the morning.

Find the right trees to tap by measuring them with your arms!



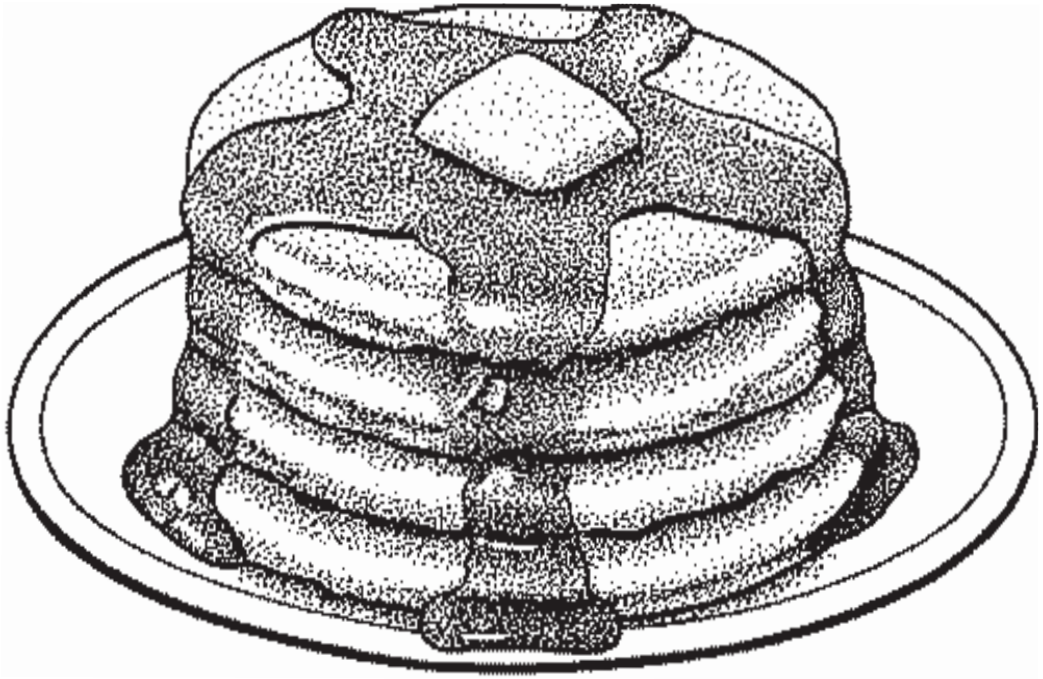
Drill, tap and hang a pail on each tree

Gather the sap from the buckets.



Build a fire to boil the sap down into syrup.

Filter the syrup and pour it into bottles.



Use real maple syrup on your pancakes!

Name _____

FUN WITH MAPLE SYRUP

Using your senses. tell us about the maple syrup that you were given.

1. Does maple syrup have a smell? (Circle one)

Yes No

2. What color is the syrup?

_____

3. What does the syrup taste like? (Circle one)

Sweet Sour Salty Bitter

4. Which food is syrup most like? (circle one)

Milk Honey Orange Juice

5. In two sentences, explain how maple syrup and the food you chose in question 4 are alike.

_____

_____

_____

_____.

6. Write a paragraph describing a few interesting facts that you learned about maple syrup today.

_____

_____

_____

_____

_____

_____.

- -cut here -

COLOR ME!

Lesson Supplements

Name _____

Sugarbush Spring
By Marsh Wilson Chall

1. Place an X after the correct box if you have been to a real sugar shack

Yes _____ No_____

2. How was what you saw different from what was shown in the story we read?

_____

_____

_____

_____.

3. Discuss several possible reasons for the differences.

_____

_____

_____

_____.

4. Have you had maple syrup? _____

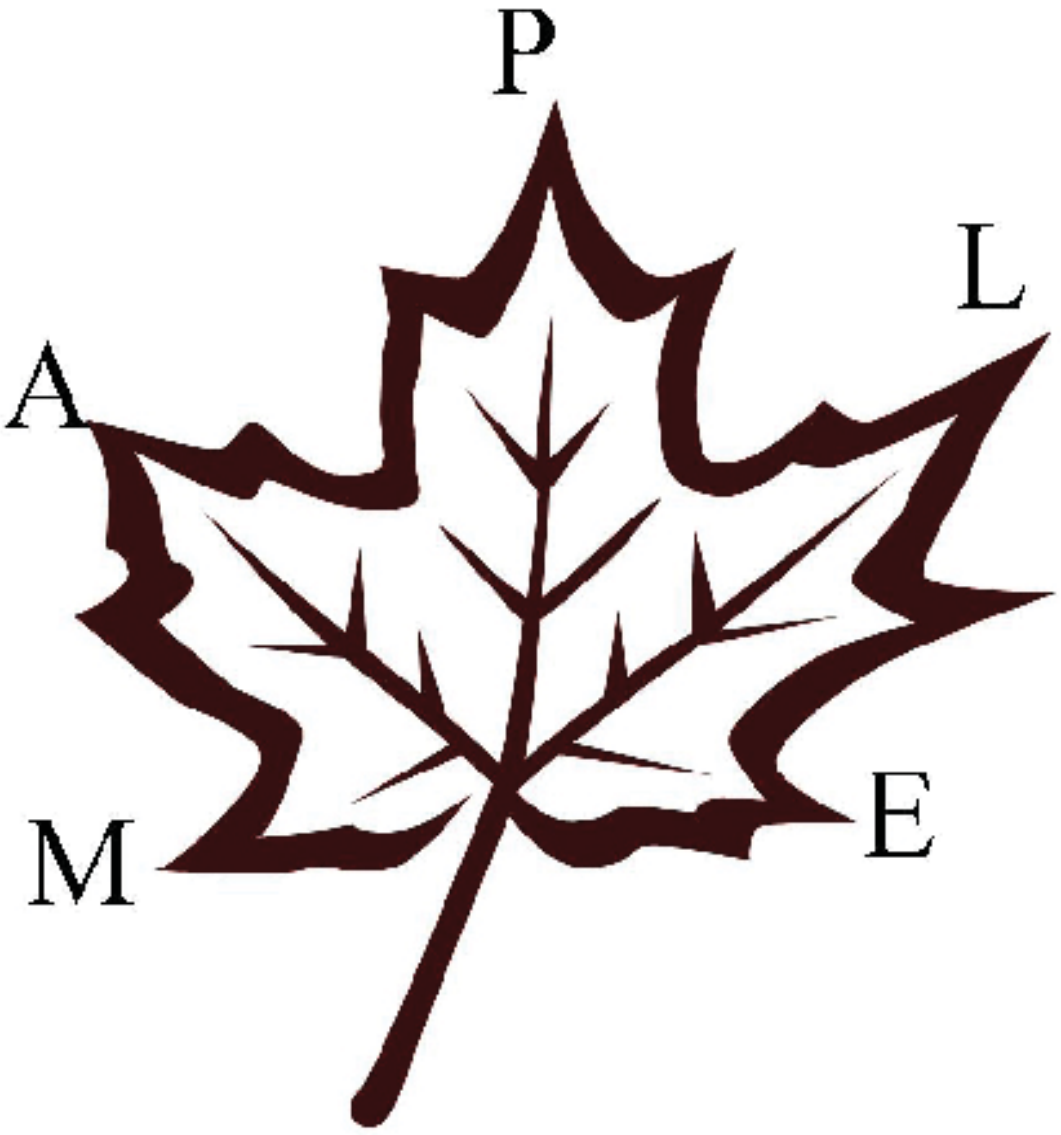
5. Do you like maple syrup? _____

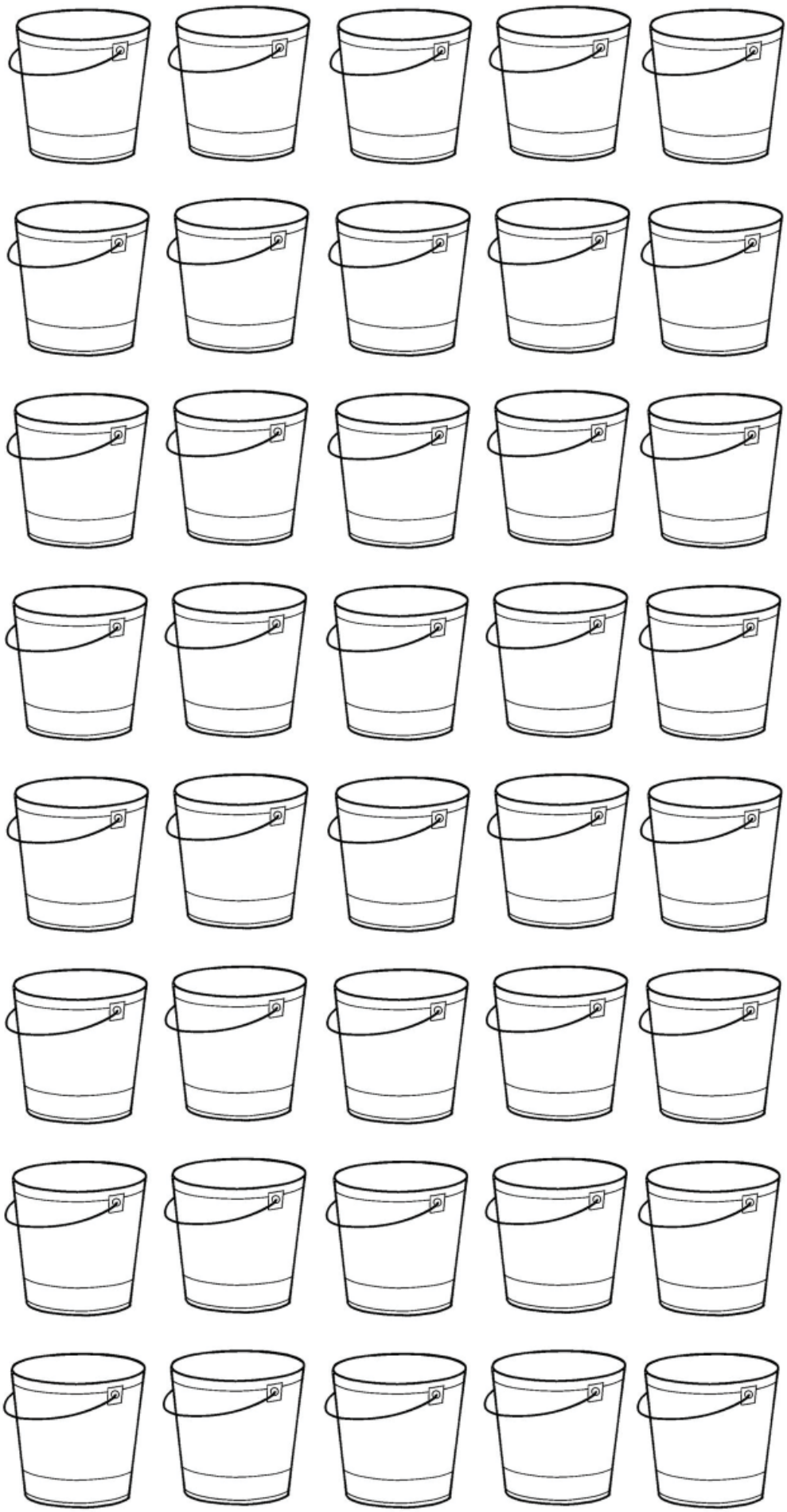
6. What is a word that you would use to describe maple syrup?

_____

Sugar Maple Leaf Identification

A sugar maple leaf has five lobes. You can remember this by thinking of the word "maple," which has five letters.





40 GALLONS OF SAP

=

1 GALLON OF SYRUP

Make your own
Maple Seed Helicopter