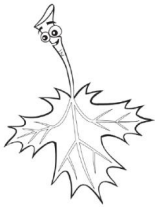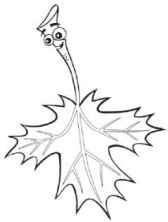# Maple Vocabulary

Name _____

A **precaution** to those who would like to make your own maple syrup it takes a lot of **rigorous** work at a **frigid** time of year. Some years a maple producer will **encounter** deep snow when trying to work in the woods. A maple producer needs the **trait** of being an **optimist** that good sap weather will **prevail** so syrup production will **thrive**. A maple producer must take the **initiative** to collect the sap each time there is a sap flow because sap is very **perishable**, at a **minimum** collecting the sap every other day without **complaint**. If the maple producer will **persevere** under the hardships and hard work the sap will be **transformed** into some wonderful maple syrup.

Unscramble the words below shown in bold above then use
The second box to put them in alphabetical order.

1. Roctanpuei
2. lvlraep
3. norunctee
4. latinetiiv
5. mminmui
6. goorisur
7. otmrsfaerdn
8. rttia
9. tiotimsp
10. itacplmon
11. erevrpees
12. vriteh
13. Aeseihplrb
14. difgir

1. _____
2. _____
3. _____
4. _____
5. _____
6. _____
7. _____
8. _____
9. _____
10. _____
11. _____
12. _____
13. _____
14. _____

Maple Vocabulary

Name ___ **Answers** ___

A **precaution** to those who would like to make your own maple syrup it takes a lot of **rigorous** work at a **frigid** time of year. Some years a maple producer will **encounter** deep snow when trying to work in the woods. A maple producer needs the **trait** of being an **optimist** that good sap weather will **prevail** so syrup production will **thrive**. A maple producer must take the **initiative** to collect the sap each time there is a sap flow because sap is very **perishable**, at a **minimum** collecting the sap every other day without **complaint**. If the maple producer will **persevere** under the hardships and hard work the sap will be **transformed** into some wonderful maple syrup.

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1. _precaution_____
2. _prevail_____
3. _encounter_____
4. _initiative_____
5. _minimum_____
6. _rigorous_____
7. _transformed___
8. _trait_____
9. _optimist_____
10. _complaint_____
11. _persevere_____
12. _thrive_____
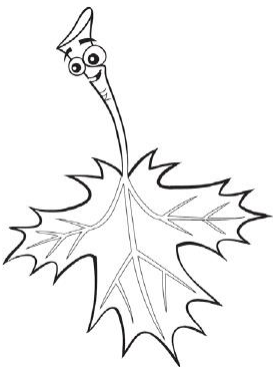13. _perishable_____
14. _frigid_____

Types of Statements

Name _____

Fact: States something happens, has happened or is certain to be true, or is real or exists

Opinion: States something believed to have occurred, believed to exist, or believed to be true

Reasoned Judgment: An argument using objective information supporting one side of an argument or opinion.

| <u>Statement</u>	<u>Type</u>
1. Maple syrup is best with pancakes.	_____
2. There are more than 1,500 commercial maple producers in New York.	_____
3. Maple can spoil from heat, therefore it is important to store syrup in a cool, dry place.	_____
4. Sap flow starts when temperatures begin to alternate above and below freezing.	_____
5. Maple syrup is graded by color, flavor, and quality.	_____
6. More people should start to grow maple as a hobby.	_____
7. Maple trees should not be tapped before they are 10 inches across because they are too small and tapping could affect tree growth.	_____
8. The "Sweet Tree" program is working to breed maple trees to have 4-6% sugar in their sap instead of the normal 2-3%.	_____
9. All foresters should use plastic tubing systems to collect maple sap rather than collecting in from buckets hanging on a tree.	_____
10. Maple 'sugar bushes' should have some non-maple trees thinned away by a forester so that the maple tree can get more light and therefore grow better.	_____

Types of Statements

Name <u>**Answers**</u>

Fact: States something happens, has happened or is certain to be true, or is real or exists

Opinion: States something believed to have occurred, believed to exist, or believed to be true

Reasoned Judgment: An argument using objective information supporting one side of an argument or opinion.
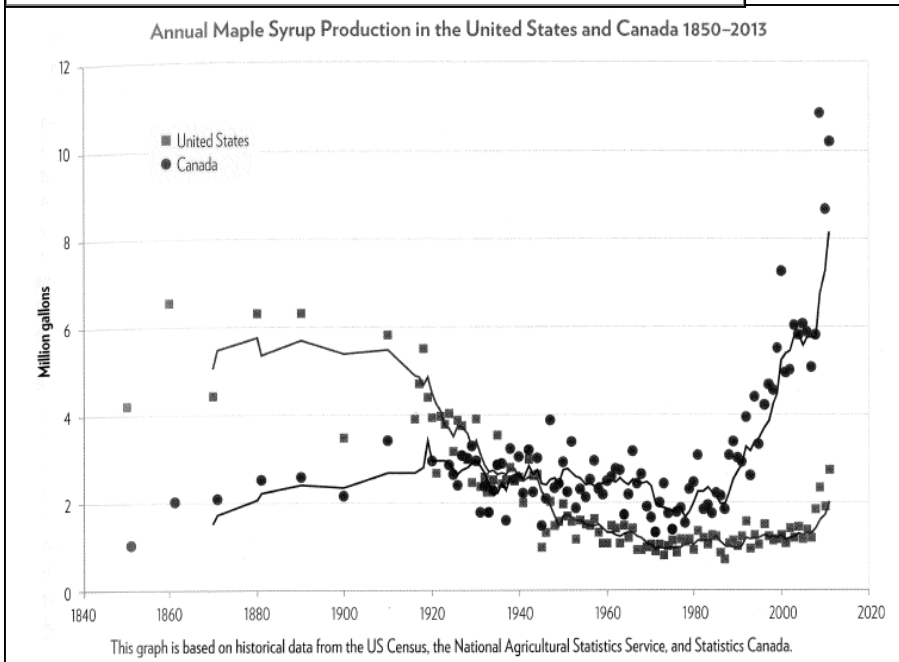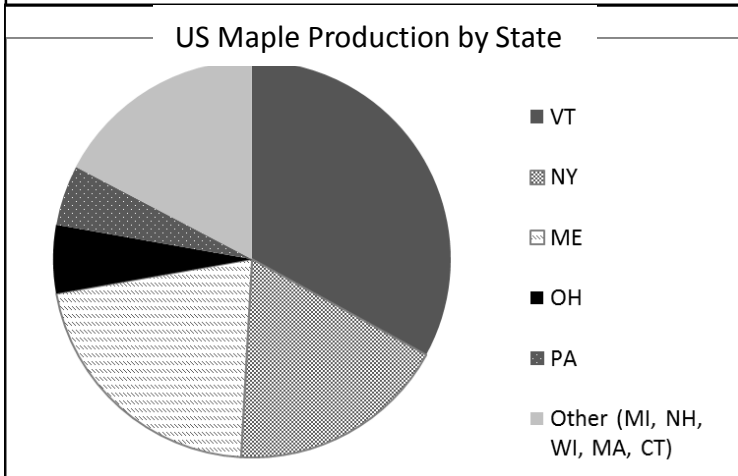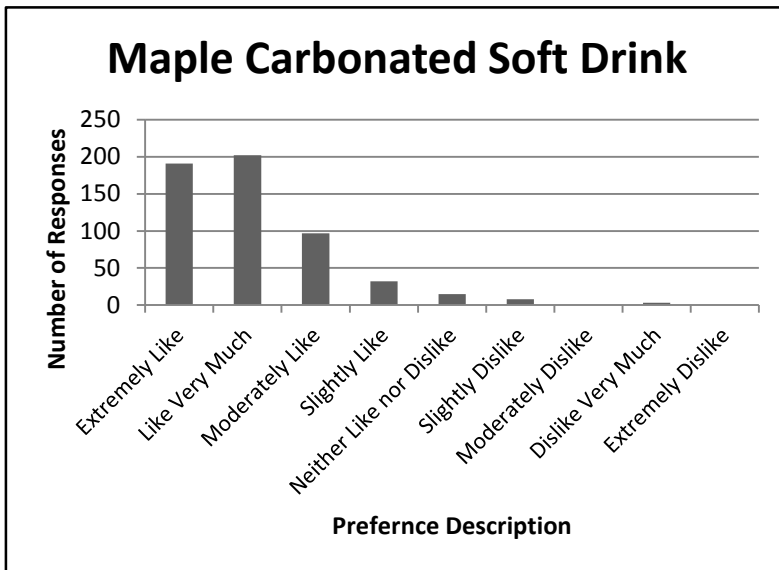
<u>Statement</u>	<u>Type</u>
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2. There are more than 1,500 commercial maple producers in New York.	*Fact*
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8. The "Sweet Tree" program is working to breed maple trees to have 4-6% sugar in their sap instead of the normal 2-3%.	*Fact*
9. All foresters should use plastic tubing systems to collect maple sap rather than collecting in from buckets hanging on a tree.	*Opinion*
10. Maple 'sugar bushes' should have some non-maple trees thinned away by a forester so that the maple tree can get more light and therefore grow better.	*Reasoned Judgment*
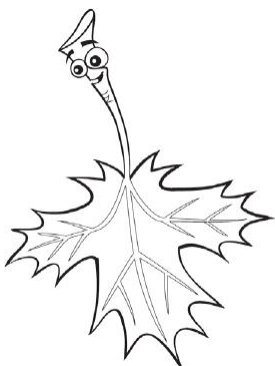
Understanding Graphs

Name _____

Graphs are used to visually represent data. Three maple related graphs are given. In the space beside each graph, describe in words what the graph shows. Also say why each type of graph was chosen to represent the data

Maple Carbonated Soft Drink

Number of Responses

| 250 | 200 | 150 | 100 | 50 | 0 |

Extremely Like, Like Very Much, Moderately Like, Slightly Like, Neither Like nor Dislike, Slightly Dislike, Moderately Dislike, Dislike Very Much, Extremely Dislike

Prefernce Description

US Maple Production by State

■ VT
▨ NY
▨ ME
■ OH
▨ PA
■ Other (MI, NH, WI, MA, CT)

Annual Maple Syrup Production in the United States and Canada 1850–2013

Million gallons

■ United States
● Canada

1840 1860 1880 1900 1920 1940 1960 1980 2000 2020

This graph is based on historical data from the US Census, the National Agricultural Statistics Service, and Statistics Canada.

Understanding Graphs

Name ___**Answers**___

Graphs are used to visually represent data. Three maple related graphs are given. In the space beside each graph, describe in words what the graph shows. Also say why each type of graph was chosen to represent the data
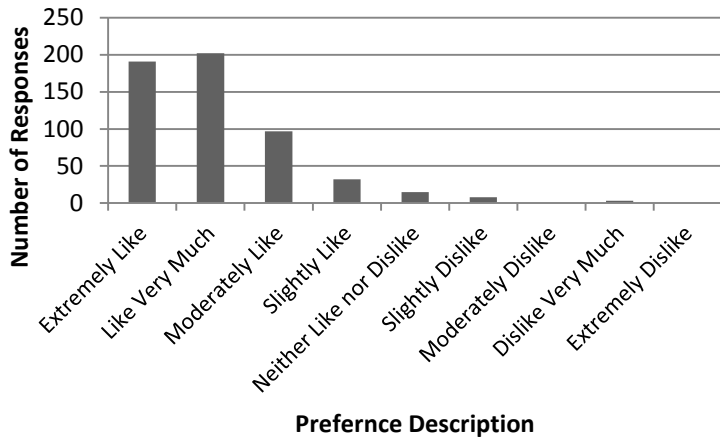
Maple Carbonated Soft Drink

Number of Responses (y-axis: 0, 50, 100, 150, 200, 250)

x-axis (Preference Description): Extremely Like, Like Very Much, Moderately Like, Slightly Like, Neither Like nor Dislike, Slightly Dislike, Moderately Dislike, Dislike Very Much, Extremely Dislike

Preference Description

This graph shows that most of the people sampled really or extremely like maple soda. Much fewer people disliked the drink, and "like very much" has the highest number of responses

A bar graph was chosen because the number of responses were added together and a bar graph easily compares values.
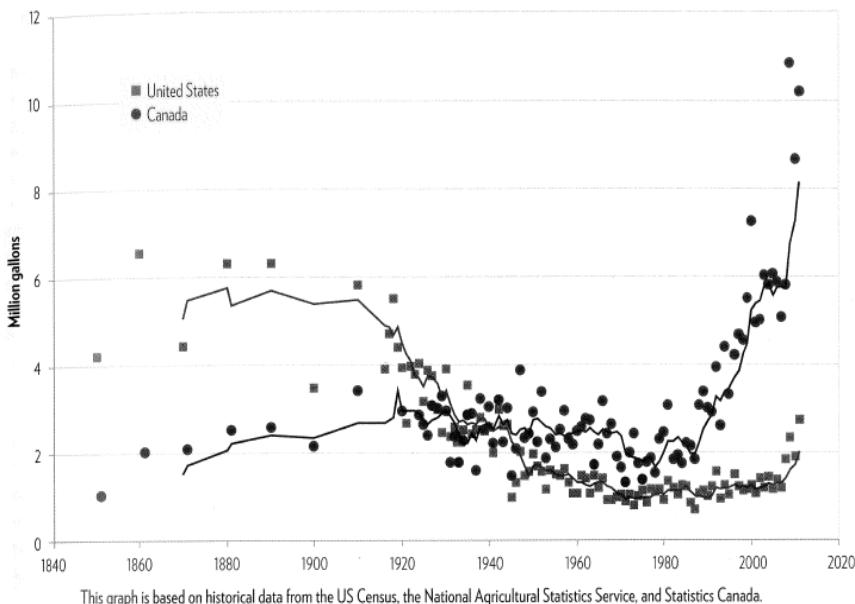
US Maple Production by State

Legend: VT, NY, ME, OH, PA, Other (MI, NH, WI, MA, CT)
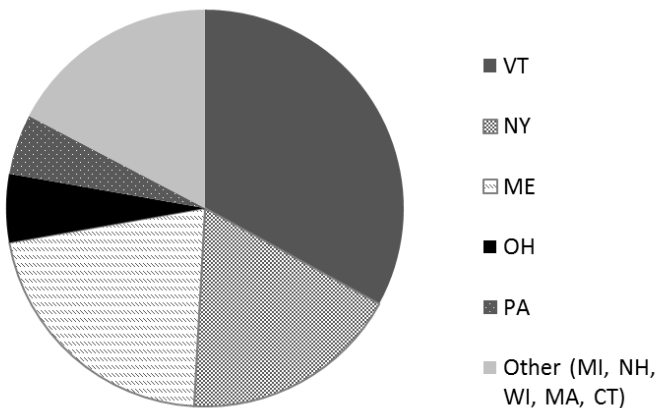
This graph shows the states that produce large amounts of maple syrup in the US. Vermont makes the most with New York and Maine being close for second place. There are many states that can be grouped together in the 'other' category.

A pie graph was chosen to show how each state relates to the whole US. This type of graph is good for showing how parts add up to the whole.

Annual Maple Syrup Production in the United States and Canada 1850–2013

y-axis: Million gallons (0, 2, 4, 6, 8, 10, 12)
x-axis: 1840, 1860, 1880, 1900, 1920, 1940, 1960, 1980, 2000, 2020

Legend: United States, Canada

This graph is based on historical data from the US Census, the National Agricultural Statistics Service, and Statistics Canada.

This graph shows the total maple syrup production over time for the US and Canada. It also illustrates future predictions. Since the 1920s, Canada has produced more syrup than the fairly constant US levels.

A line graph was chosen because it is good for illustrating change across time.
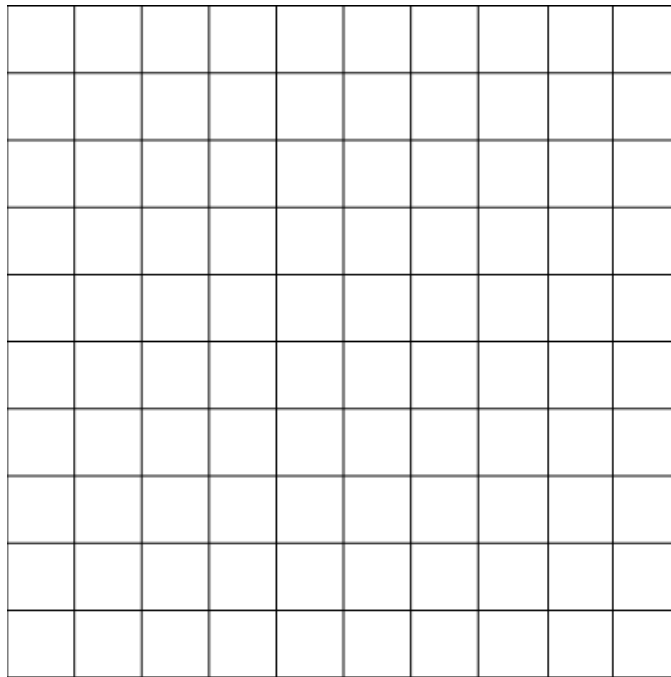
Using Variables

Name _____

In order to make maple syrup, **40 gallons** of tree sap are needed to be concentrated to **1 gallon** of syrup.

1. Write an equation with X to represent gallons of finished syrup and Y to represent gallons of sap needed

2. Plot this line. Make sure to label your axis

3. If you wanted 1 gallon of syrup, how many gallons of sap are needed?

   _____

   2 gallons of syrup?

   _____

   5 gallons?

   _____

   ½ gallon?

   _____

Using Variables

Name __**Answers**__

In order to make maple syrup, **40 gallons** of tree sap are needed to be concentrated to **1 gallon** of syrup.

1. Write an equation with X to represent gallons of finished syrup and Y to represent gallons of sap needed

$$Y=40x$$

2. Plot this line. Make sure to label your axis

200

100

20

½ 1   3   5
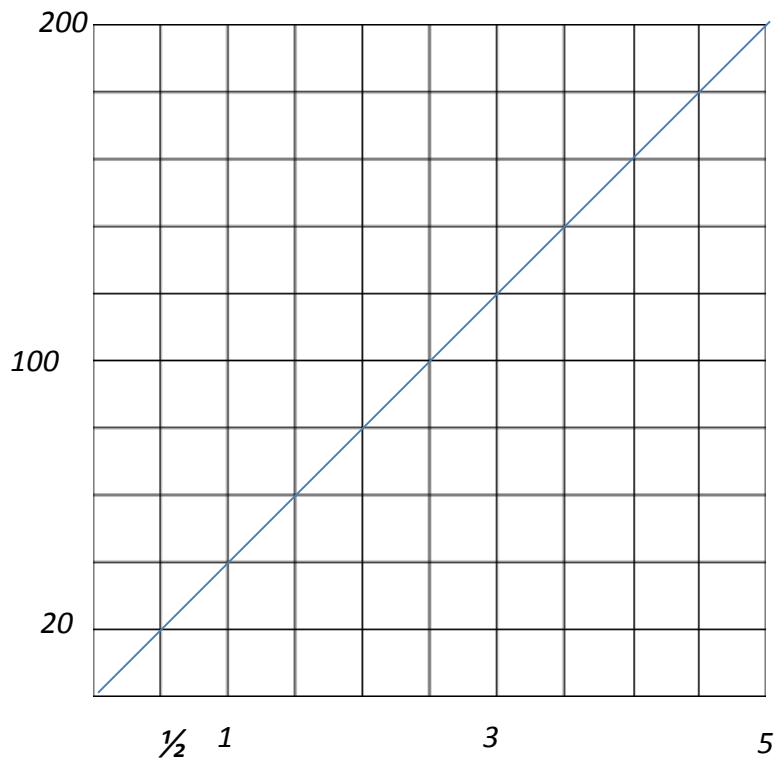
3. If you wanted 1 gallon of syrup, how many gallons of sap are needed?

_40_

2 gallons of syrup?

_80_

5 gallons?

_200_

½ gallon?

_20_

Observations and Explanations   Name _____

While working with maple trees and syrup, you've noticed some things. For each observation, write a possible explanation for why the thing would be happening. Then write a sentence or two about how this observation would affect maple growers and what they could do to make their maple production better.

Observation 1: Sugarbushes that have some trees cut (called sugarbush "thinning") tend to have trees that produce sweeter sap.

Observation 2:   Sap from the maples starts to taste bad in late spring.

Observation 3: Forests and sugarbushes with a large deer population have few to no maple seedlings visible.

Observations and Explanations

Name

While working with maple trees and syrup, you've noticed some things. For each observation, write a possible explanation for why the thing would be happening. Then write a sentence or two about how this observation would affect maple growers and what they could do to make their maple production better.

Observation 1: Sugarbushes that have some trees cut (called sugarbush "thinning") tend to have trees that produce sweeter sap.

Less competition for light among trees means more growth, production, and photosynthesis . As trees need light to produce sugars, more light means sweeter sap.

Observation 2: Sap from the maples starts to taste bad in late spring.

In spring, the buds start to come out. The tree diverts its energy into making leaves instead of the sap..
When the tree starts growing leaves, the sap is no long considered good quality as it develops an off-flavor labelled "buddy".

Observation 3: Forests and sugarbushes with a large deer population have few to no maple seedlings visible.

Deer, like people, have favorite foods. They also like to eat sweet things and preferentially eat the maple seedlings. Maple seedlings can only grow where the deer can't reach them so if they are around, they're not visible.

Maple Forest Adaptations   Name _____

Maple trees are well adapted to the northern forest environment.
A characteristic of maple trees is given. You should answer the following questions:
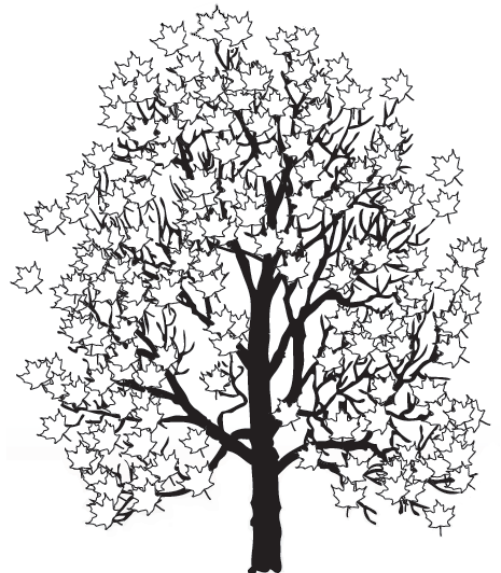How does the adaptation relate to the maple's environment? How does it help the maple
grow, survive, or reproduce?
Remember, an adaptation can benefit the tree in more than one way.

First list some general qualities of a New York forest. (example: there is a long,
cold winter every year)

Maple Adaptions:

1. Maples lose their leaves in winter.

2. Maples can grow in shaded areas.

3. Maple seeds are sometimes called helicopters seeds. They can "fly" for some distance
after they are dropped.

4. Maple roots cover large areas underground.

5. Maple leaves have large surface areas.

Maple Forest Adaptations

Name __**Answers**__

Maple trees are well adapted to the northern forest environment.
A characteristic of maple trees is given. You should answer the following questions:
How does the adaptation relate to the maple's environment? How does it help the maple
grow, survive, or reproduce?
Remember, an adaptation can benefit the tree in more than one way.

First list some general qualities of a New York forest. (example: there is a long,
cold winter every year)

*Long winter, fair amounts of rain in the spring, lots of species of trees, lots of deer
and other wildlife, lots of cloudy days*

Maple Adaptions:

1. Maples lose their leaves in winter.

   *Their leaves would freeze in winter; there is not enough light for enough
   photosynthesis; dropping leaves helps fertilize the soil*

2. Maples can grow in shaded areas.

   *This allows younger trees to grow some even though they are under the canopy of
   other trees*

3. Maple seeds are sometimes called helicopters seeds. They can "fly" for some distance
after they are dropped.

   *It is good for the seeds to be able to travel a greater range and get away from the
   mother tree as to not compete with the mother tree.*

4. Maple roots cover large areas underground.

   *This allows them to access a greater area of nutrients and
   water; also stabilizes them which helps when there are
   strong winds.*
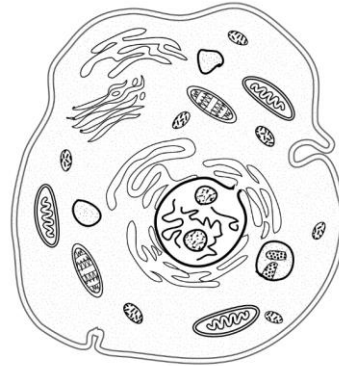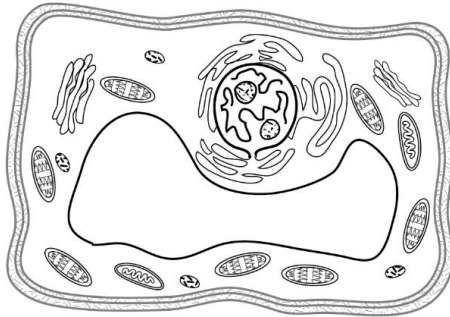
5. Maple leaves have large surface areas.

   *A larger surface area means more light can reach the leave
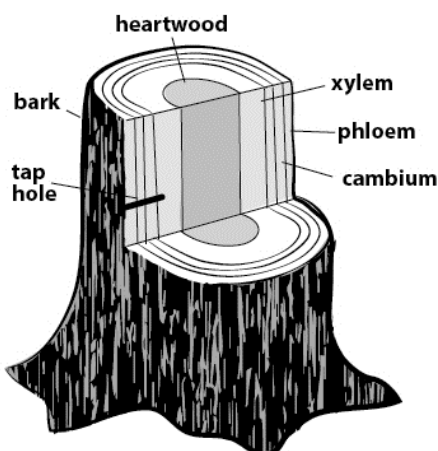   for photosynthesis.*
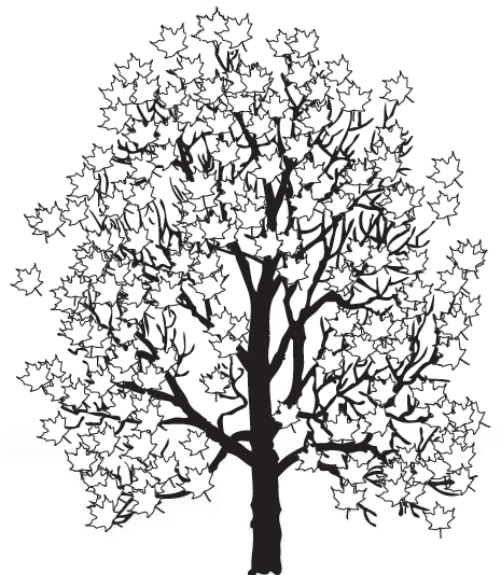
Anatomy of a Maple Cell   Name _____

Plants and animals are multicellular organisms made up of cells with different functions. However, plant and animal cells are also different from each other.

Questions:

1. Describe three differences between plant and animal cells? Label the cells above as plant or animal.

2. What is the role of a chloroplasts? What is the role/importance of a cell wall?

3. What are some ways a animal cells take on different roles to work together to make up a large animal?

4. For a maple tree (and most trees) only some cells out of the organism are alive, mainly in the leaves and the cambrium (the living layer from which the trunk of the tree grows). What would be the purpose of the dead cells? What are the advantages of only having some living cells when you're a large tree?
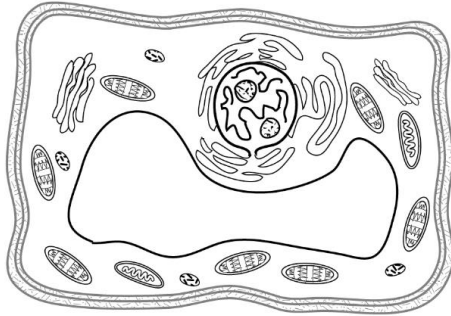
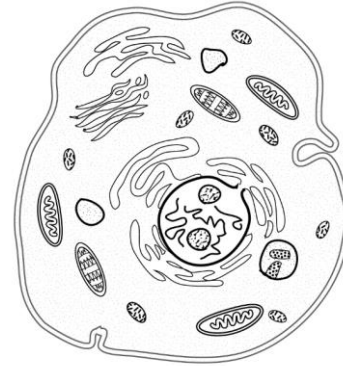# Anatomy of a Maple Cell

Name __ **Answers** __

Plants and animals are multicellular organisms made up of cells with different functions. However, plant and animal cells are also different from each other.

Plant Cell

Animal Cell

Questions:

1. Describe three differences between plant and animal cells? Label the cells above as plant or animal.

    Plant cells have a cell wall, chloroplasts, one large vacuole.

2. What is the role of a chloroplasts? What is the role/importance of a cell wall?

   *Chloroplasts are used for photosynthesis which is how the plant makes their food.*
    A cell wall provides protection and a rigid structure that supports the plant.

3. What are some ways a animal cells take on different roles to work together to make up a large animal?

    Cells are able to have different focuses and specializations all which contribute to overall function. A brain cell and a muscle cell must be and act very different from each other, so specialization is necessary.

4. For a maple tree (and most trees) only some cells out of the organism are alive, mainly in the leaves and the cambrium (the living layer from which the trunk of the tree grows). What would be the purpose of the dead cells? What are the advantages of only having some living cells when you're a large tree?

    Dead cells provide structure allowing the tree to grow tall and the leaves to reach the light. Less energy is needed because there are less living cells requiring it.
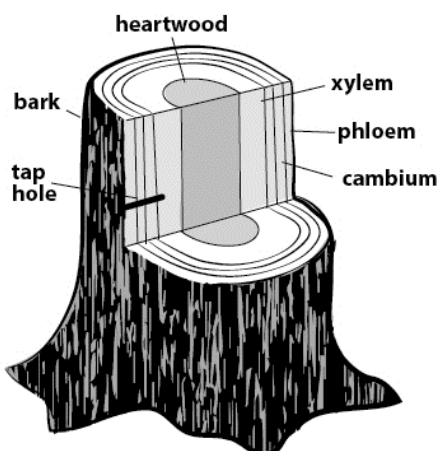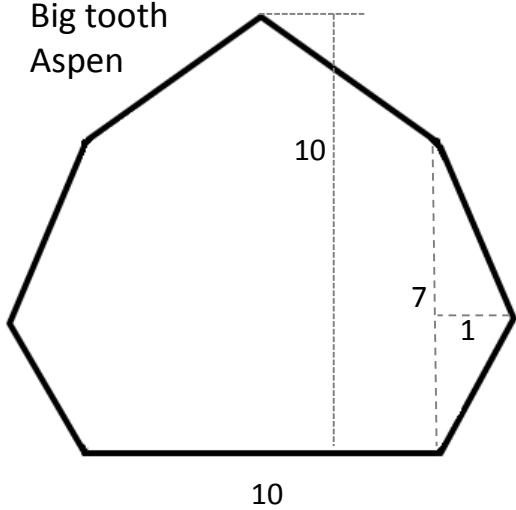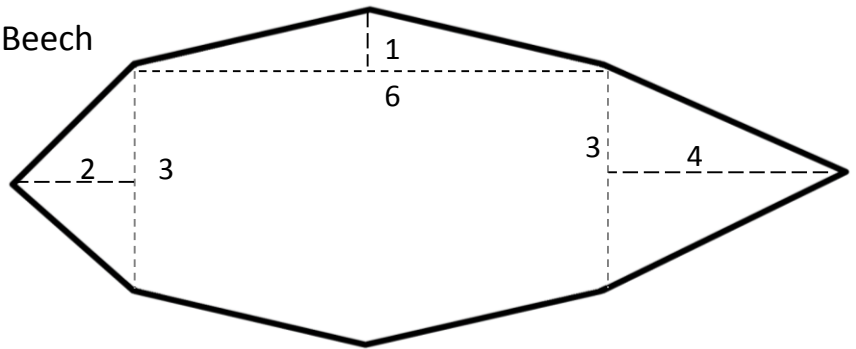
Area of a Leaf

Name _____

Maple trees grown in forests that have many other tree species. Most species can be told apart by the shape of their leaves. For this exercise a simplified outline of a leaf is given. Find the area by breaking it down into easier shapes, such as triangles and rectangles.
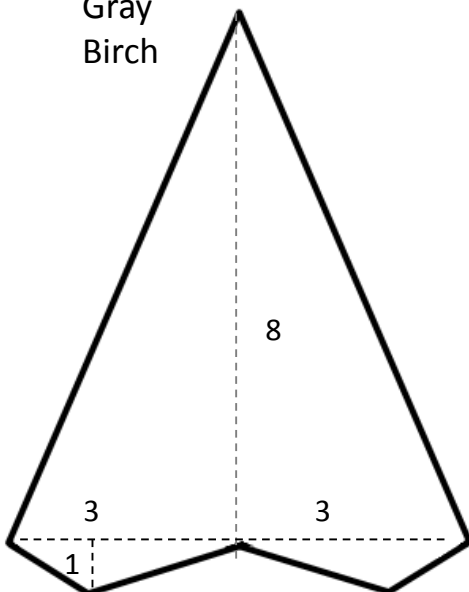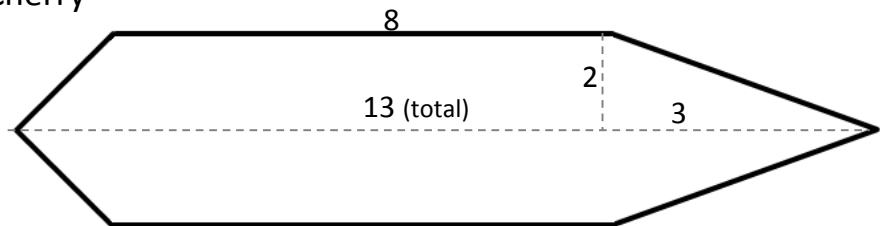Drawings are not to scale, and leaves are assumed symmetrical.

Beech

1
6
2 3
3
4

Big tooth
Aspen

10
7
1
10

Gray
Birch

8
3   3
1

Pin
Cherry

8
2
13 (total)
3

Area of a Leaf

Name __**Answers**__

Maple trees grown in forests that have many other tree species. Most species can be told apart by the shape of their leaves. For this exercise a simplified outline of a leaf is given. Find the area by breaking it down into easier shapes, such as triangles and rectangles. Lengths are given in centimeters (cm).

Drawings are not to scale, and leaves are assumed symmetrical.

Beech

3

3

18 cm²

6

3

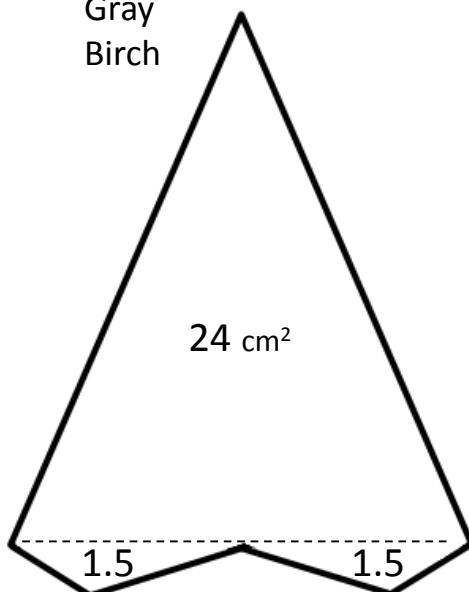*18 cm² + 3 cm² + 3 cm² + 3 cm²= 33 cm²*

Big tooth Aspen

15

70 cm²

3.5

3.5
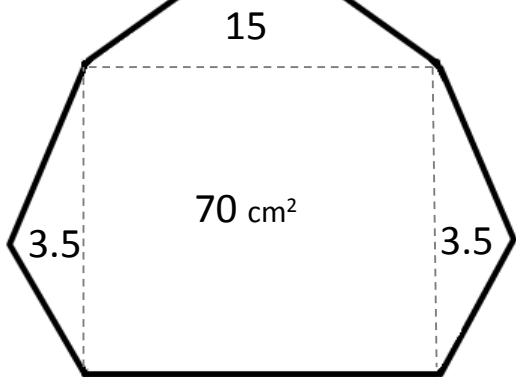
70 cm² + 3.5 cm² + 3.5 cm² + 15 cm²= 92 cm²

Gray Birch

24 cm²

1.5

1.5

Pin Cherry

4

32 cm²

6

32 cm² + 6 cm² + 4 cm² = 42 cm²

24 cm² + 1.5 cm² + 1.5 cm² = 27 cm²

Making a Claim

Name _____

Evidence is needed to make an argument believable. From the list given, choose which pieces of evidence support the claim. Explain your reasoning why you thought the evidence is useful or not.

Claim: As a small-scale hobbyist producing maple syrup it is easier to use plastic tubing to collect sap than let it flow straight into buckets.

Potential Evidence:

1. Plastic tubing can be inexpensive.

2. It takes more work for a person to gather and transport the sap from all of their buckets.

3. Most hobbyists only tap a few trees.

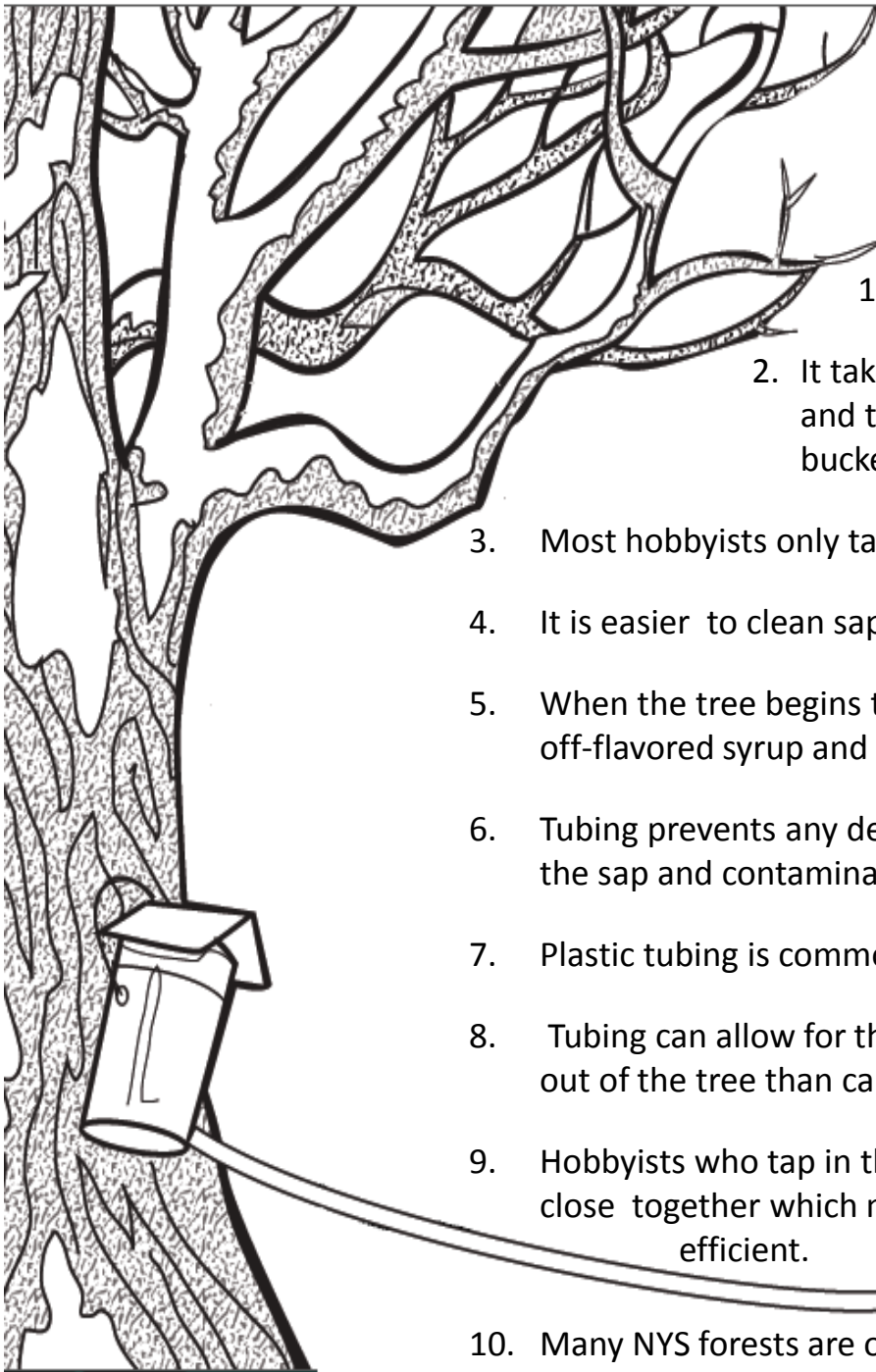4. It is easier to clean sap buckets than the plastic tubing.

5. When the tree begins to grow leaves, the sap will make off-flavored syrup and is not worth collecting.

6. Tubing prevents any debris or animals from getting into the sap and contaminating it.

7. Plastic tubing is commonly white or blue.

8. Tubing can allow for the use of suction to pull more sap out of the tree than can be gathered with buckets.

9. Hobbyists who tap in their back yard usually have trees close together which makes the use of tubing very efficient.

10. Many NYS forests are overrun with deer who will eat maple saplings preferentially over other species.

Making a Claim

Name __\boxed{\textbf{Answers}}__

Evidence is needed to make an argument believable. From the list given, choose which pieces of evidence support the claim. Explain your reasoning why you thought the evidence is useful or not.

Claim: As a small-scale hobbyist producing maple syrup it is easier to use plastic tubing to collect sap than let it flow straight into buckets.

Potential Evidence:

1. **Plastic tubing can be inexpensive.**

2. **It takes more work for a person to gather and transport the sap from all of their buckets.**

3. Most hobbyists only tap a few trees.

4. It is easier to clean sap buckets than the plastic tubing.

5. When the tree begins to grow leaves, the sap will make off-flavored syrup and is not worth collecting.

6. **Tubing prevents any debris or animals from getting into the sap and contaminating it.**

7. Plastic tubing is commonly white or blue.

8. **Tubing can allow for the use of suction to pull more sap out of the tree than can be gathered with buckets.**

9. **Hobbyists who tap in their back yard usually have trees close together which makes the use of tubing very efficient.**

10. Many NYS forests are overrun with deer who will eat maple saplings preferentially over other species.
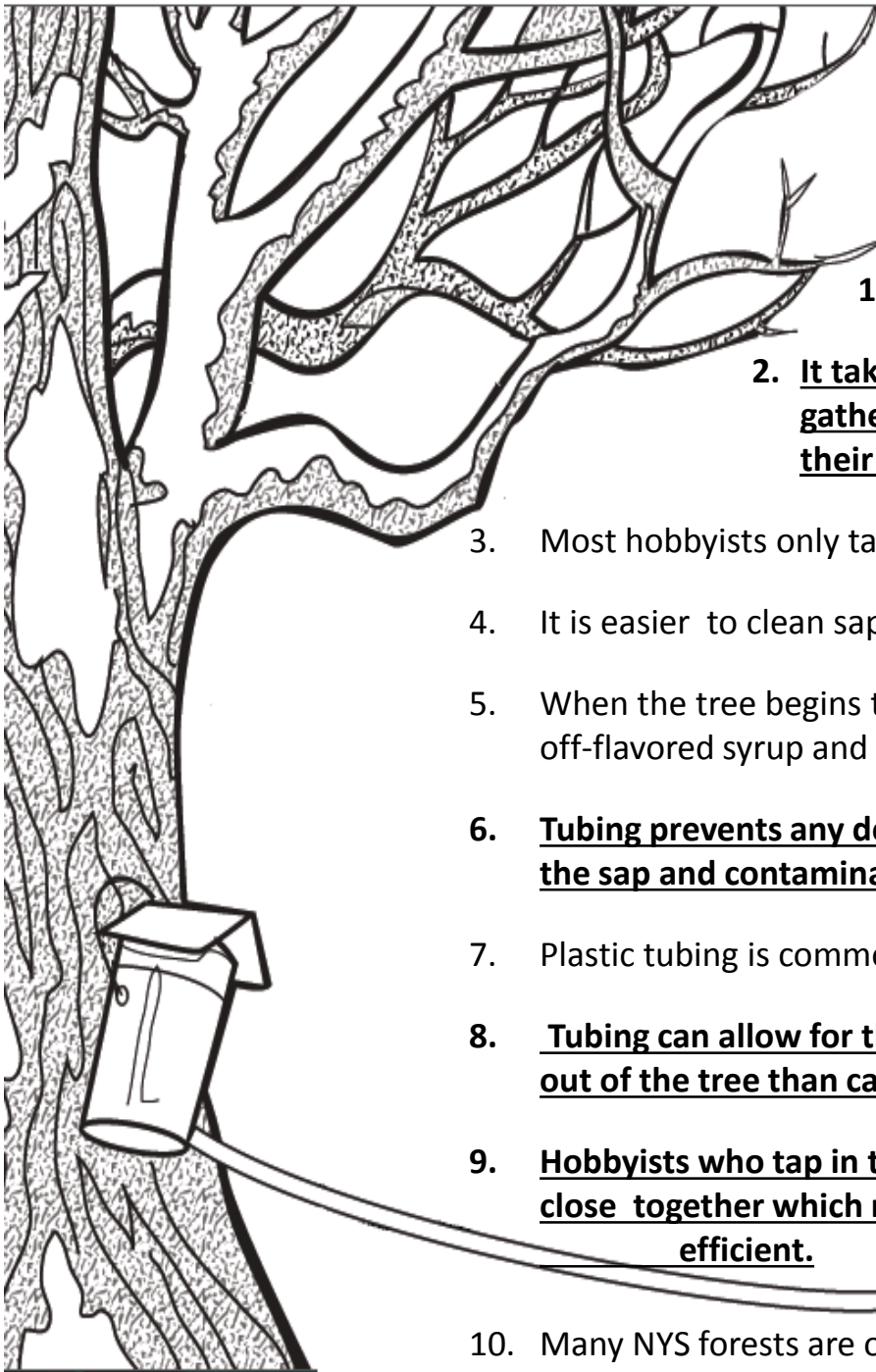
Phases of Matter

Name _____

Making maple syrup requires multiple steps of heating and cooling, and therefore has all phases of matter involved in the process. Thin sap is boiled so that the water evaporates leaving a thicker syrup. That syrup can be further boiled and then cooled to make maple hard candy.
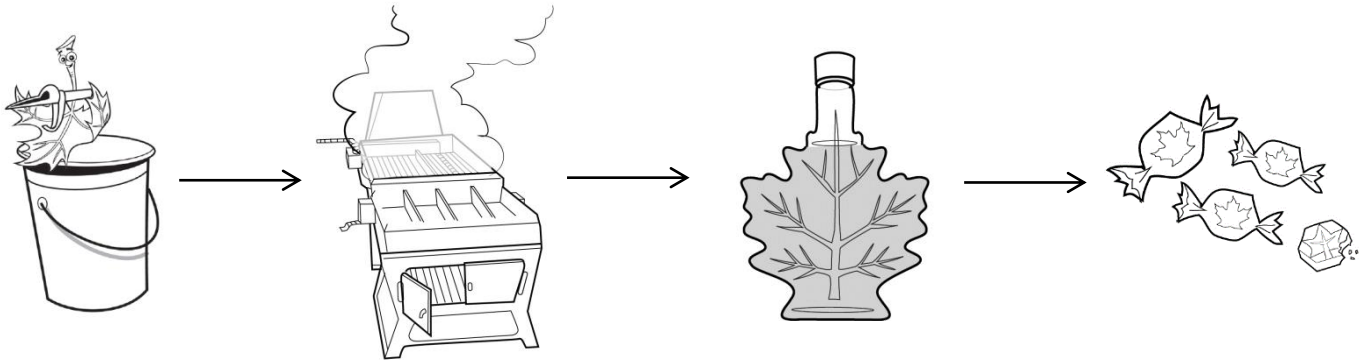
Draw the particle arrangement for each phase of matter:
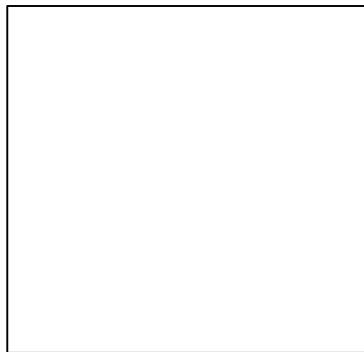
Sap	Water Vapor	Hard Candy

Describe how particles act in each phase.

How does the heating and cooling processes of making maple products relate to the phases of matter?

Phases of Matter

Name __**Answers**__

Making maple syrup requires multiple steps of heating and cooling, and therefore has all phases of matter involved in the process. Thin sap is boiled so that the water evaporates leaving a thicker syrup. That syrup can be further boiled and then cooled to make maple hard candy.
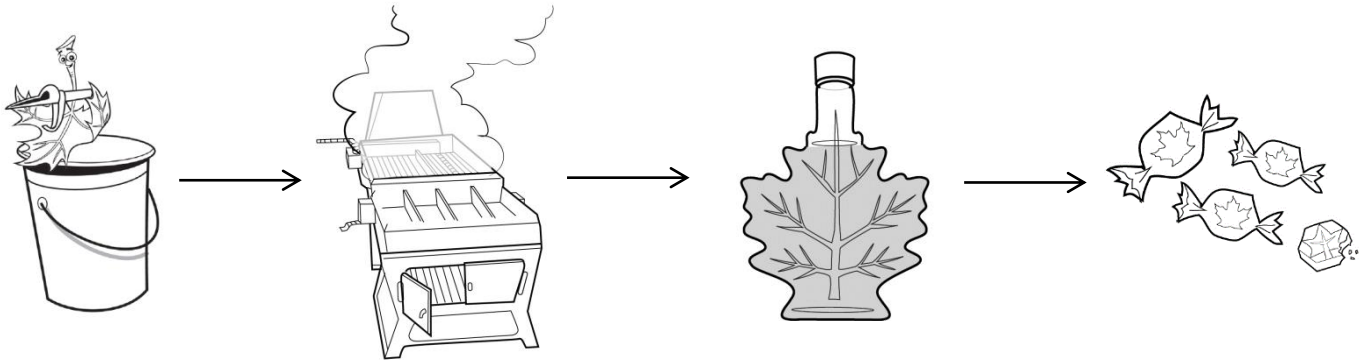
Draw the particle arrangement for each phase of matter:

Sap	Water Vapor	Hard Candy
An organized pattern of dots near each other	*Somewhat close together, in no pattern*	*Fewer, and some way to show fast movement*
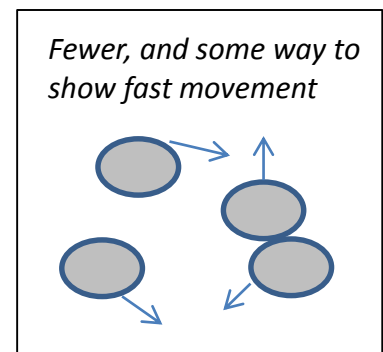
Describe how particles act in each phase.

Solids: particles are very close together. They vibrate but cannot move
Liquids: particles move slowly. The liquid takes the shape of the container it's in.
Gases: particles move rapidly.

How does the heating and cooling processes of making maple products relate to the phases of matter?

Heating something gives it energy, and the amount of energy controls which phase the matter is in.
Heating gives the particles more energy, breaking bonds, and allowing them to move more. With heat, solids can turn to liquids and liquids to gas.
Cooling is the opposite. For example hot liquid poured into candy molds where it takes the shape and becomes solid when cooled.

Maple Museum

Name _____

The American Maple Museum in Croghan, New York was founded in 1977. They have preserved in snapshots the evolution of the North American maple syrup industry to teach the public about maple syrup production throughout history. They also hold the American Maple Hall of Fame which gains two new people every year.

The location was acquired in 1980 as a generous gift from two individuals who also donated much of their personal collection of <u>vintage</u> syrup making equipment, logging tools and antiques to the museum. Other artifacts, tools and equipment that have been used since the earliest times of syrup production, have been gathered from maple syrup regions across the U.S. and Canada.

The rooms are organized by the different stages in maple syrup production. It is a great introduction to how syrup is, and has been, made. Before heading on a sugarbush tour of the nearby sugar operations, a visitor can stop at the gift shop for souvenirs including clothing and jewelry. The museum also has frequent breakfasts of delicious pancakes, sausage and pure maple syrup served in their own dining room by volunteers interested in maple.

More information about the museum can be found at Americanmaplemuseum.org

Reading Questions:

1.   What is the goal of the maple museum?
    A. Let people make syrup   B. Protect old maple equipment
    C. Create unique maple products
    D. Educate the public about the history of making maple syrup

2. In this passage "vintage" means?
    A. Good quality   B. Old   C. New   D. Large

3. Which is not something that can be done at or near the museum?
    A. Take a tour   B. See old maple equipment
    C. Plant maple trees   D. get maple jewelry

4. The museum has artifacts from both Canada and the US.
    A. True   B. False

Maple Museum

Name ___ **Answers** ___

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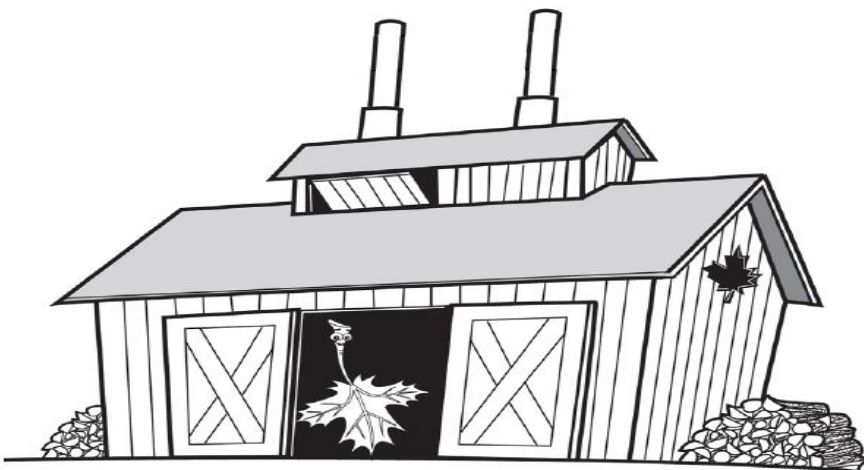   **A. True**   B. False

Grammar Check   Name _____

Read the following paragraph about maple trees and syrup production and correct all spelling and grammar errors you see.
Hint: there are 17 errors.

Pure and tastey New York maple syrup starts as sap within sugar maple trees. A grove of sugar Maple trees tapped for sap is called a sugar bush. New York maple producers thin there sugar bush to increase sunlight to favor the bigest and best quality sugar maple trees. Trees cut in the sugar bush are either used for firewood in the sugarhouse, selled as logs for lumber, or left to provide habitat for wildlife. trees with large and full crowns produces the most and the sweeter sap. Sugar concentration in the sap of sugar maples is about two%. Maple trees in most of new york is tapped in February or March by drilling a small hole in the tree. Trees will have 1 2 or 3 taps depending on size. A spile, or spout, is than put in the tap hole. Spiles have buckets or plastec tubing attached to them. Sap is either poured from buckets and quickly channeled through tubing into large tanks before its proccesed into finished maple products in the sugarhouse.

Grammar Check

Name **Answers**

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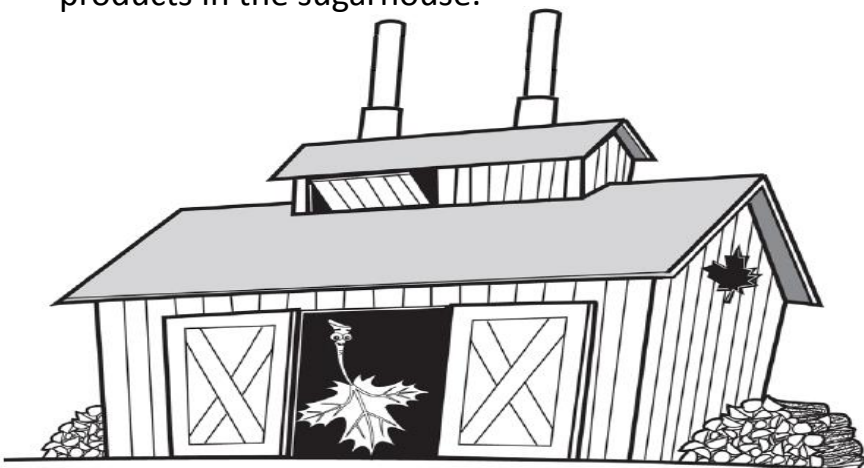
Maple Production - Word Search
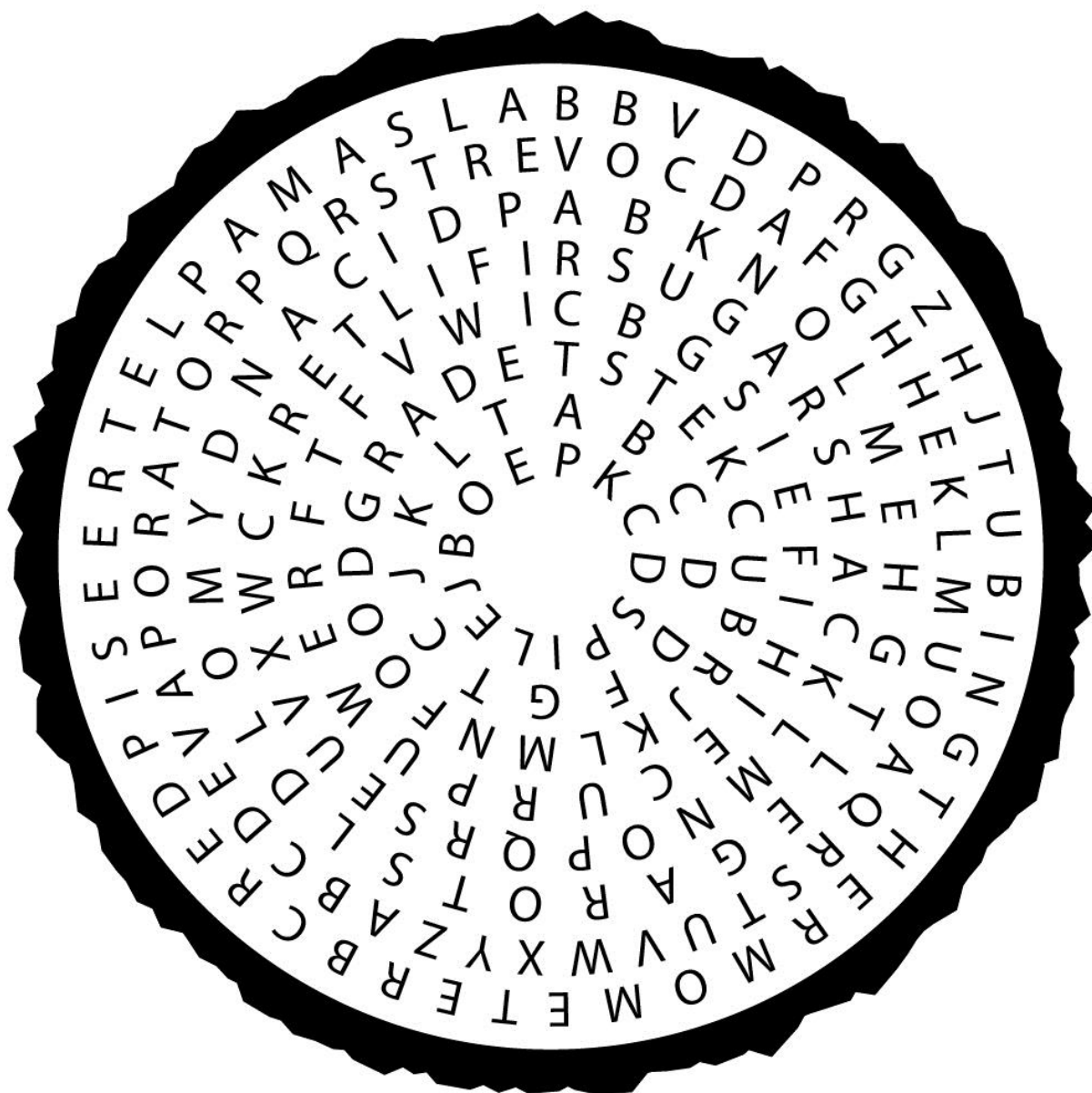
Name _____

Spile
Tap
Evaporator
Thermometer
Candy Molds
Tubing
Buckets
Cover
Filter
Drill
Storage
Fuel
Pan
Food Grade
Sugar Shack
Maple Trees

Maple Production - Word Search

Name _____ **Answers**
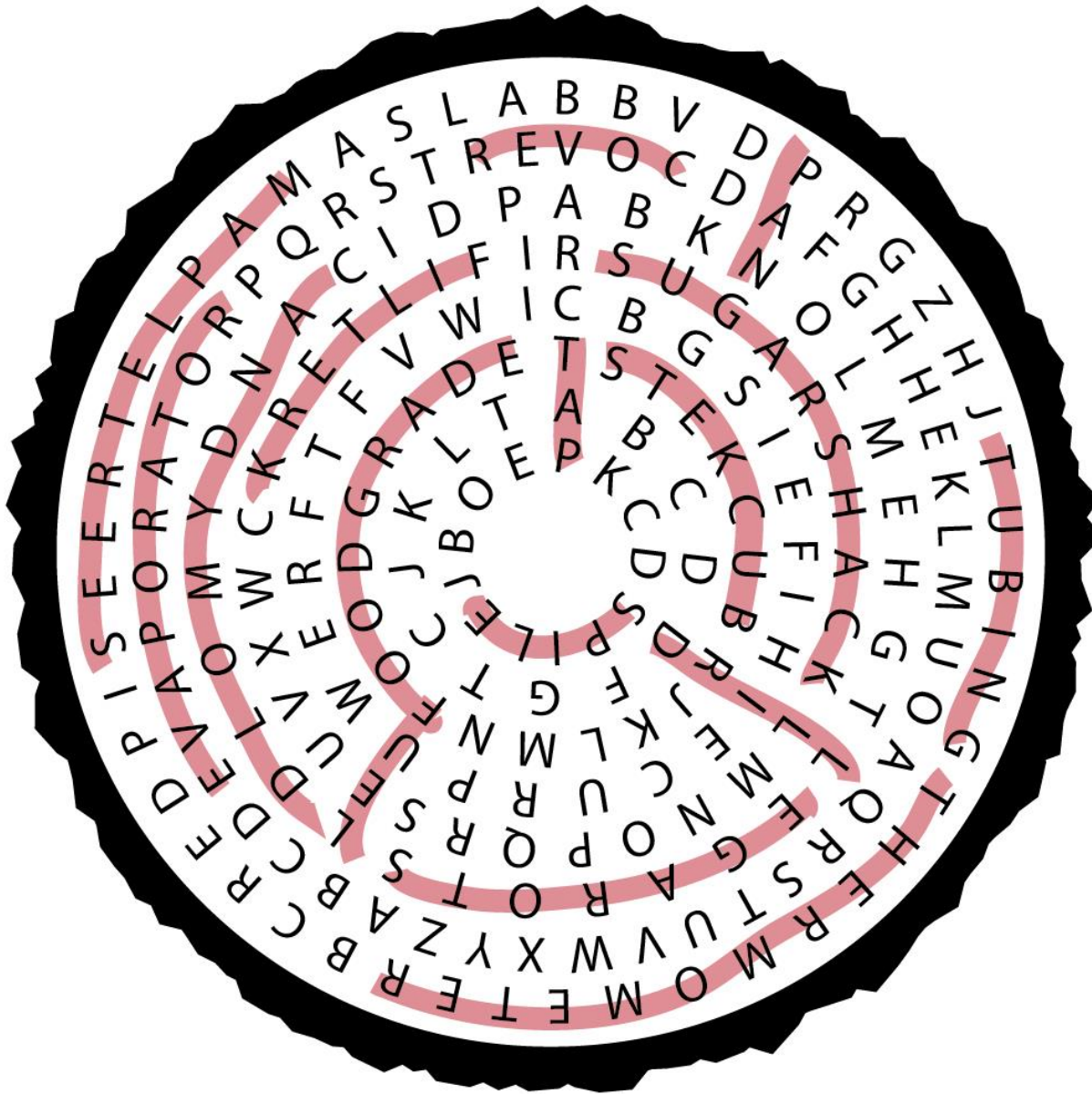
Word list:
- Spile
- Tap
- Evaporator
- Thermometer
- Candy Molds
- Tubing
- Buckets
- Cover
- Filter
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- Storage
- Fuel
- Pan
- Food Grade
- Sugar Shack
- Maple Trees

NYS Forest Food Web

Name _____
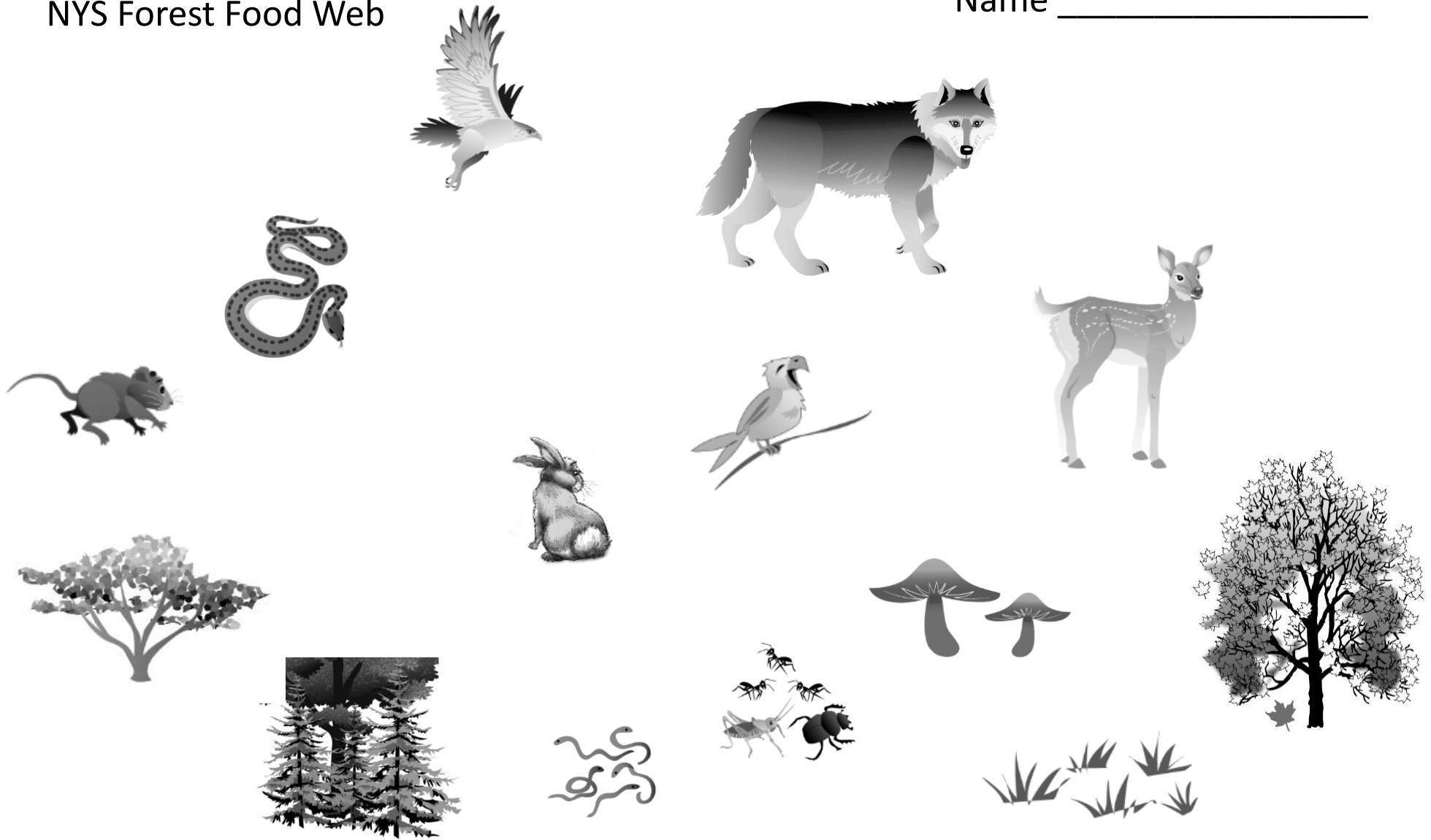
Link the organisms in the food web and label them with their role as a producer, consumer, or decomposer.

Using this food web, what do you think would happen if there were many more deer in the area? Deer populations have grown a great deal in New York State in the past few decades. Which species would be better off? Which species would be worse off? (Note: deer will choose to eat maple species over other tree species if given a choice)

NYS Forest Food Web

Name ___ **Answers** ___

Secondary or tertiary Consumer

Secondary Consumer

Secondary Consumer

Primary or secondary Consumer

Secondary Consumer

Primary Consumer

Primary Consumer

Decomposer

producer

producer

Decomposer

Consumer or Decomposer
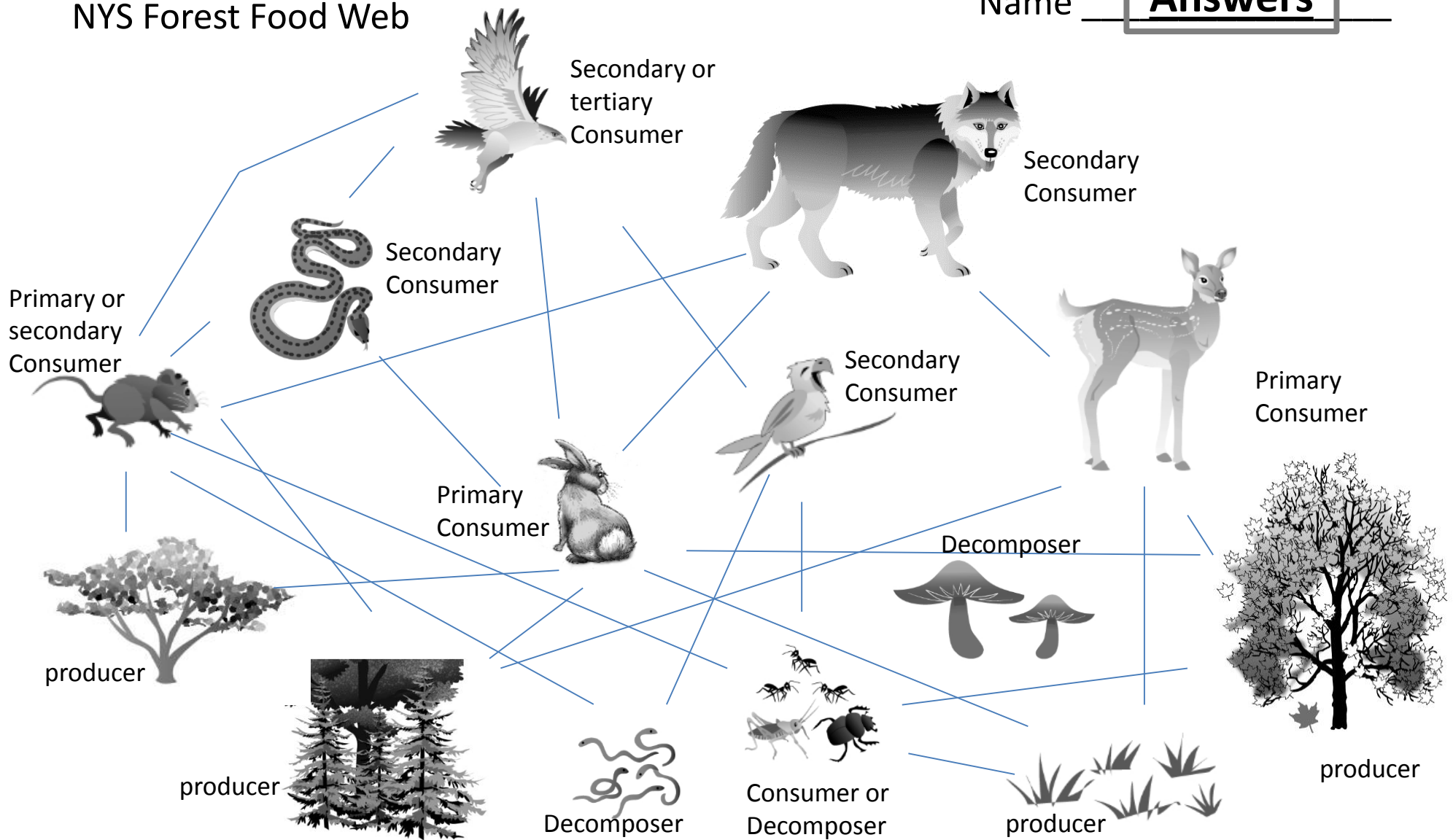
producer

producer

Example answer: If there were more deer in the area, and they like to eat maple trees, then there will likely be less maple trees and other producer species. Those organisms that compete for food with the deer might also be worse off.
The coyote would likely be better off as it now has more food available.

Crossword:
Maple Treats

Name _____

Across

Down

9. You can roast maple _____ over a campfire.

11. Maple trees are usually tapped from February to _____.

12. To measure the temperature of the sap as it is heated to become syrup a candy _____ is used.

16. While watching a movie, you can eat maple flavored _____.

17. Maple cream can be _____ on muffins or bread.
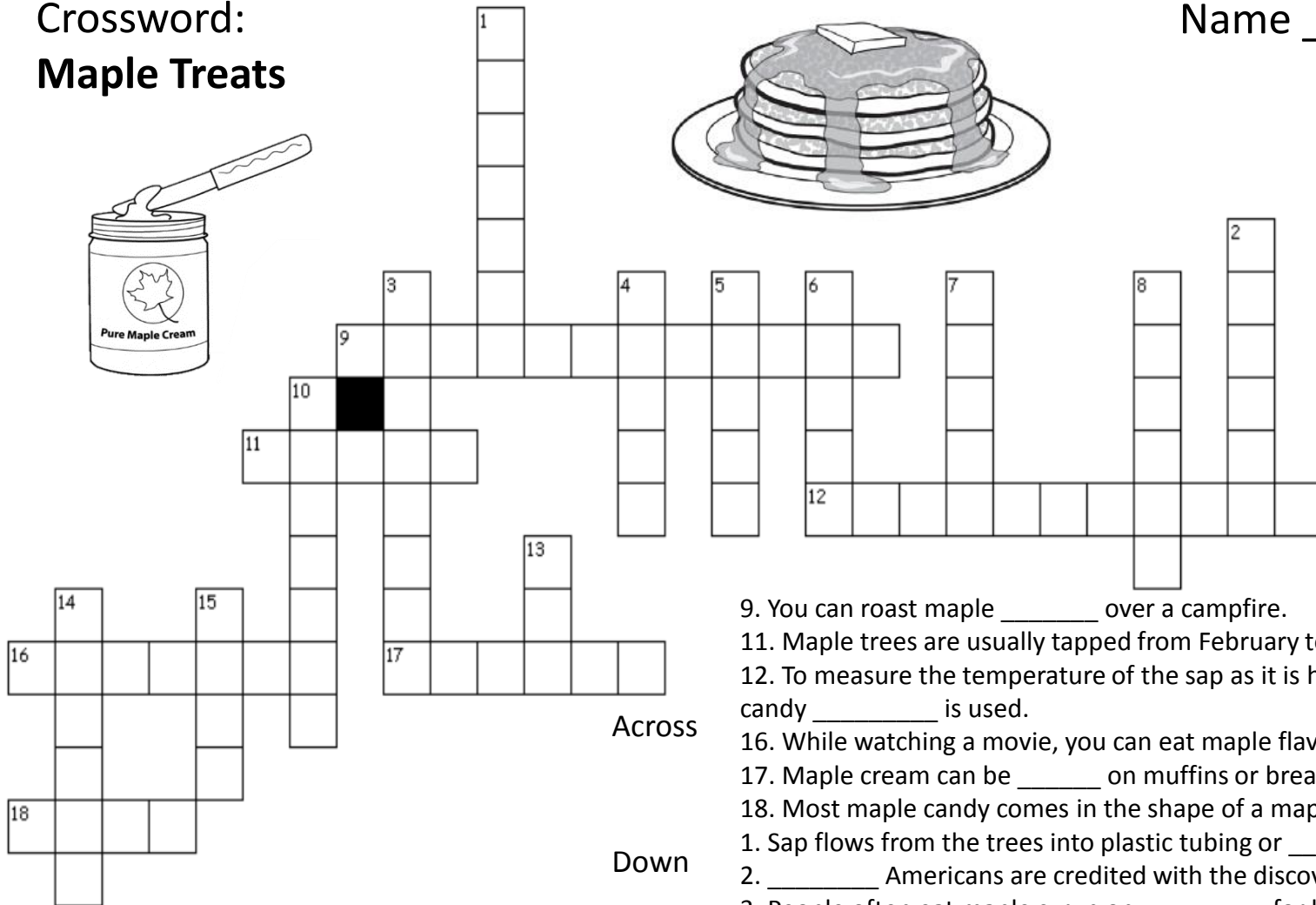
18. Most maple candy comes in the shape of a maple _____.

1. Sap flows from the trees into plastic tubing or _____.

2. _____ Americans are credited with the discovery of maple syrup.

3. People often eat maple syrup on _____ for breakfast.

4. Maple syrup can be further boiled to make _____.

5. Maple syrup is filtered to make sure it is _____.

6. Maple syrup tastes _____.

7. Sap from maple trees contains water and _____.

8. Maple syrup comes in different _____, from light amber to extra dark.

10. _____ is when spiles are drilled into maple trees to allow the sap to flow out.

13. It takes about forty gallons of sap to make _____ gallon(s) of syrup.

14. Sap must be _____ to make maple syrup.

15. _____ is a fuel used to boil sap.

Crossword: Maple Treats
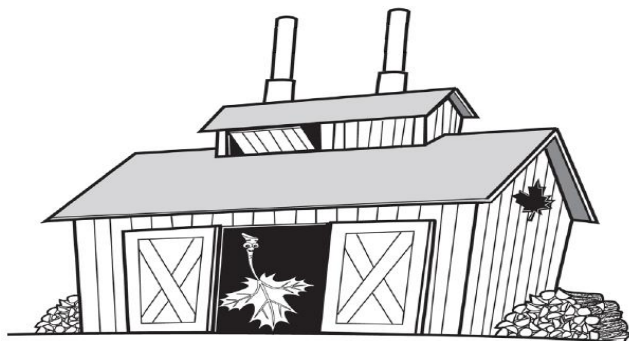
Name **Answers**
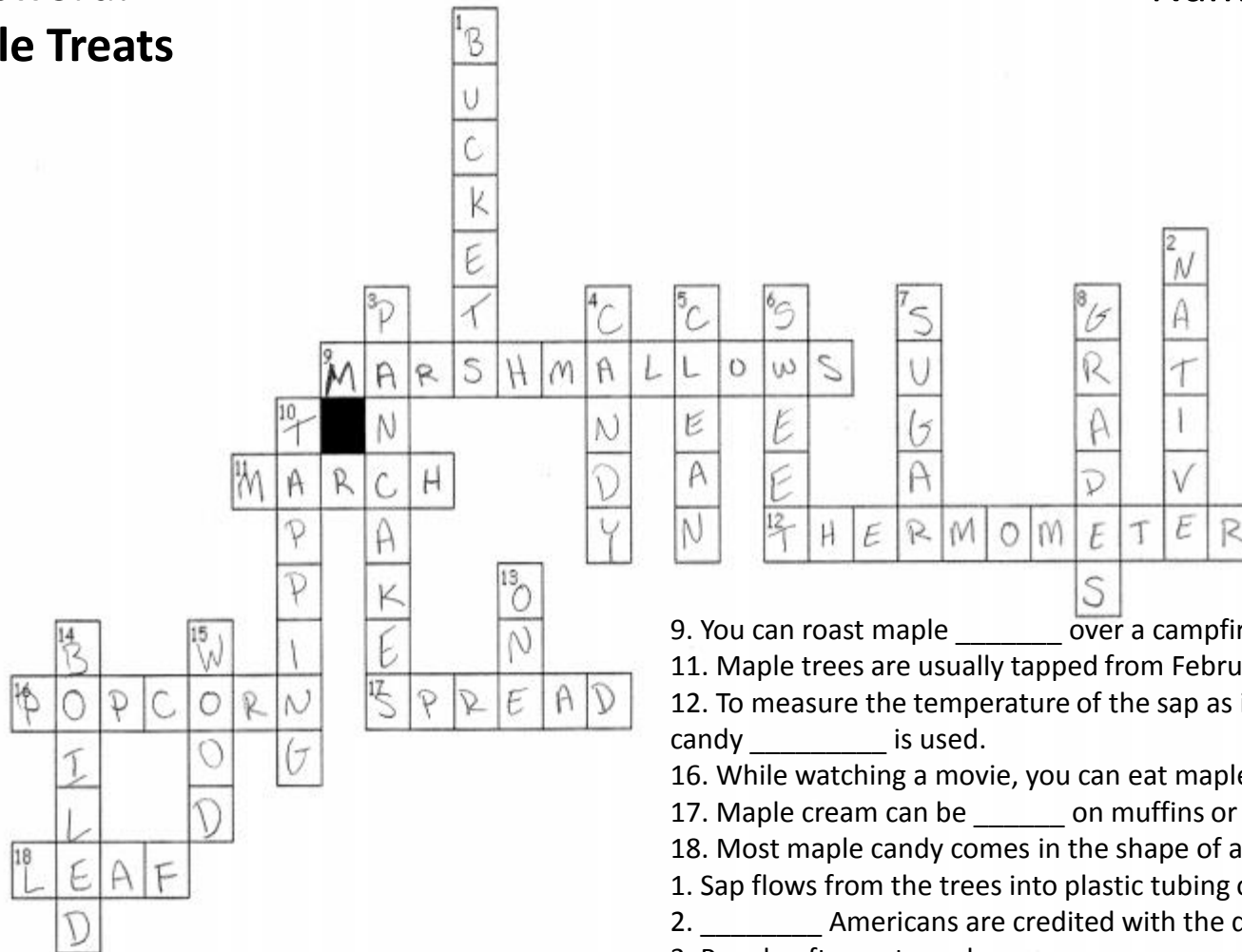
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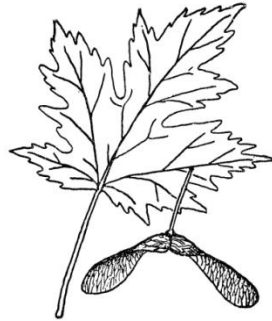14. Sap must be _____ to make maple syrup.
15. _____ is a fuel used to boil sap.

Sap Producing Trees: Using a Dichotomous Key

Name _____

Use the dichotomous key below to identify these three sap —producing species by their leaves .
Definitions and examples of key terms are on the right.

Kind
L: Broadleaf
R: Needle -like

Arrangement
L: Opposite
R: Alternate

Form
L: Simple
R: Compound

Margins
Top
L: Entire
R: Serrate
Bottom
L: Toothed
M: Double-Serrate
R: Lobed

1. Leaves are needle-like or awl-like; usually evergreen
   2. Needles in clusters of 5   (*eastern white pine*)
   2. Needles in clusters of 3   (*pitch pine*)
1. Leaves are broad; Leaves fall before winter
   3. Arrangement of leaves are opposite
      4. Leaves are compound   (*ash*)
      4. Leaves are simple
         5. Leaves pale green on lower surface, clefts
            rounded, lobes entire or with less prominent teeth   (*sugar maple*)
         5. Leaves white/silver/pale on lower surface, clefts
            sharp-angled, margins with many small teeth
            6. Leaves silvery white on lower surface, usually
              5 lobed, clefts deep (particularly the middle two)   (*silver maple*)
            6. Leaves pale on lower surface, usually 3 lobed,
              clefts shallow and sharp-angled   (*red maple*)
   3. Arrangement of leaves are alternate

Cleft
Round cleft

<u>For more practice with dichotomous keys go to</u> :
http://nationalzoo.si.edu/education/conservationcentral/walk/walk4.html

Sap Producing Trees: Using a Dichotomous Key

Name __**Answers**__

Use the dichotomous key below to identify these three sap —producing species by their leaves .
Definitions and examples of key terms are on the right.

Red Maple   **Silver Maple**   **Sugar Maple**

1. Leaves are needle-like or awl-like; usually evergreen
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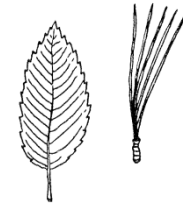
Kind   *L: Broadleaf*
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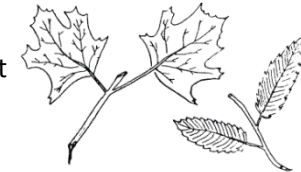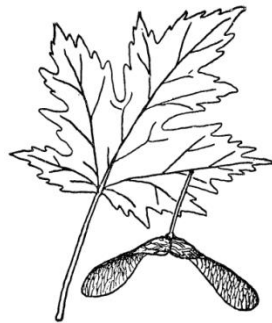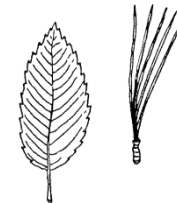
Arrangement   *L: Opposite*
             R: Alternate

Form   *L: Simple*
             R: Compound

Margins   *Top*
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             R: Serrate
             Bottom
             L: Toothed
             M: Double-
              Serrate
             R: Lobed

Cleft   *Round*
             cleft

Understanding Ratios

Name _____

Maple can be made into a lot of different products. The basic method is boiling the sap to evaporate the water to concentrate the sugar. Most maple products are made up of just sugar and water in different forms.

The amount of water in a maple product is given as a percentage (what amount of 100). State this percentage in terms of a ratio adding up to 100 parts. Then simplify the ratio (1:10 instead of 10:100).
Next, calculate how many cups of water would there be in 10 or 16 cups of the product if the water could be separated out.

Item	% Water	Ratio Water:sugar	Simplified ratio	Cups of water in 10 cups of product?	In 16 cups product?
Sap	98%				15.6
Maple Syrup	33.3%	33.3:66.7			
Maple Hard Candy	6%		3:47		
Maple Ice Cream	50%				
Maple Sugar				0.1	
Maple Cream	8%				

Understanding Ratios

Name __**Answers**__

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Sap	98%	98:2	49:1	9.8	15.6
Maple Syrup	33.3%	33.3:66.7	2:3	3.3	5.3
Maple Hard Candy	6%	6:94	3:47	0.6	0.96
Maple Ice Cream	50%	50:50	1:1	5	8
Maple Sugar	1%	1:99	1:99	0.1	0.16
Maple Cream	8%	8:92	2:23	0.8	1.28

Mean, Median, and Variability   Name _____

Different maple trees have different amount of sugar content in their sap. There are 5 trees whose sap can be made into maple syrup: **Sugar, Red, Silver, Black, and Norway. T**he conditions in which the trees grow also can change the level of sugar in the sap, not just the species. Here we will look at three of the species when grown under similar conditions.

Directions: For each species, a data set is given. Look at the data and state the mean, median, interquartile range, and any outliers you see . Make the specified plot for each data set (dot plot, box-plot, or histogram).

First, list 2 statistics related questions that could be answered with a data set such as this?

Sugar Maple

Season	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Sugar Content	2	2.3	1.9	1.7	1.3	0.8	2.2	2.6	2.1	0.5	1.3	3.1	1.8	4.9

Mean: Median: IQR: Outliers?
Draw a Histogram.

Silver Maple

Season	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Sugar Content	1.2	1.7	1.1	1.4	1.3	0.8	2	1.4	2.1	0.3	1.3	2.7	1.5	3.8

Mean: Median: IQR: Outliers?
Draw a Boxplot.

Red Maple

Season	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Sugar Content	1.2	1.3	1.1	1.7	0.9	0.7	2.9	0.2	2	0.3	1.3	1.9	1.2	2

Mean: Median: IQR: Outliers?
Draw a Dotplot.

Can you answer the statistical questions you wrote earlier? If so, give your conclusion.

Mean, Median, and Variability

Name __**Answers**__

Directions: For each species, a data set is given. Look at the data and state the mean, median, interquartile range, and any outliers you see . Make the specified plot for each data set (dot plot, box-plot, or histogram).

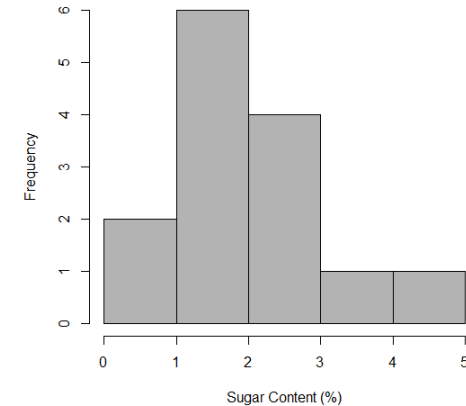First, list 2 statistics related questions that could be answered with a data set such as this?

Example: which of these trees had the most variable sugar content in their sap?

Histogram: Sugar Maple

Sugar Maple

Mean: 2.03   Median: 1.95
IQR: 1.91   Outliers? The 4.9 value seems to be so.
Draw a Histogram.

Boxplot: Red Maple

Silver Maple

Mean: 1.61   Median: 1.4
IQR:: 1.475   Outliers? 3.8
Draw a Boxplot.
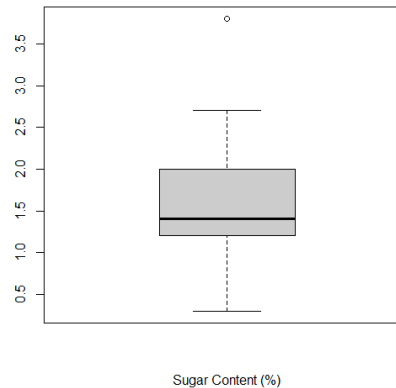
Dotplot: Silver Maple
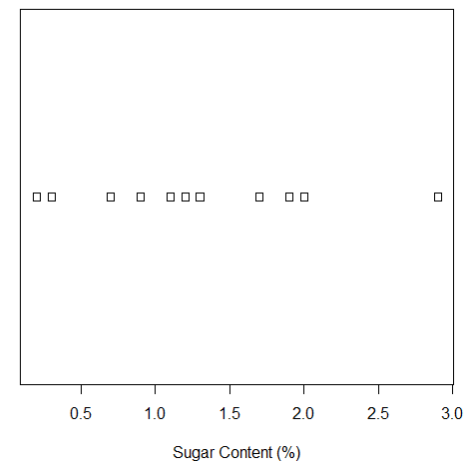
Red Maple

Mean: 1.33   Median: 1.25
IQR: 1.325   Outliers? 3.0
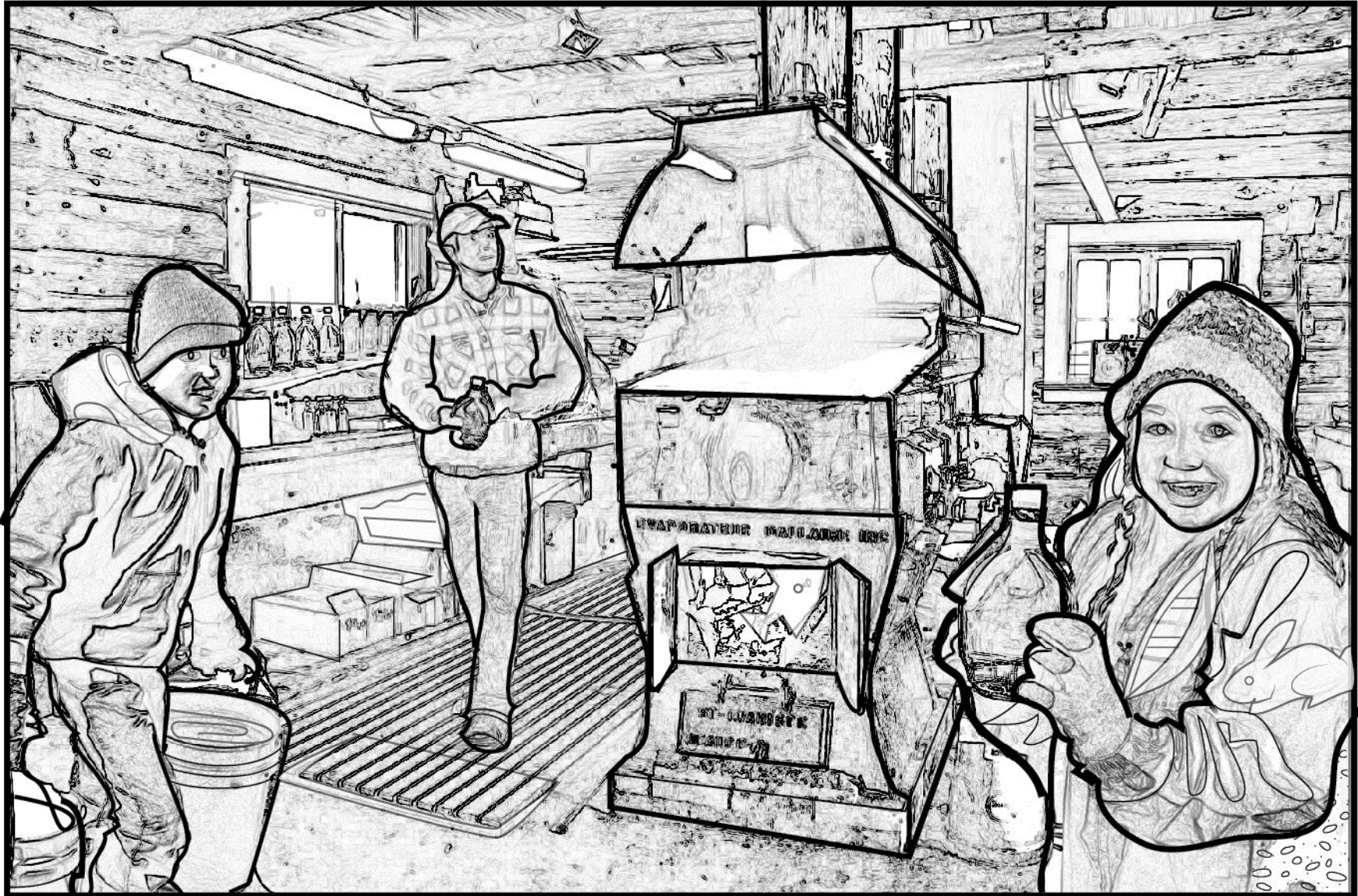Draw a Dotplot.

Can you answer the statistical questions you wrote earlier?
If so, give your conclusion.
Example: the sugar maple had the highest IQR and could be considered the most variable.

Hidden objects: rabbit, needle, flag, comb, boot, artist's brush, fish, piece of pie, toothbrush, canoe, paper clip, candle

Maple Production -
Hidden Objects

Name _____ **Answers** _____

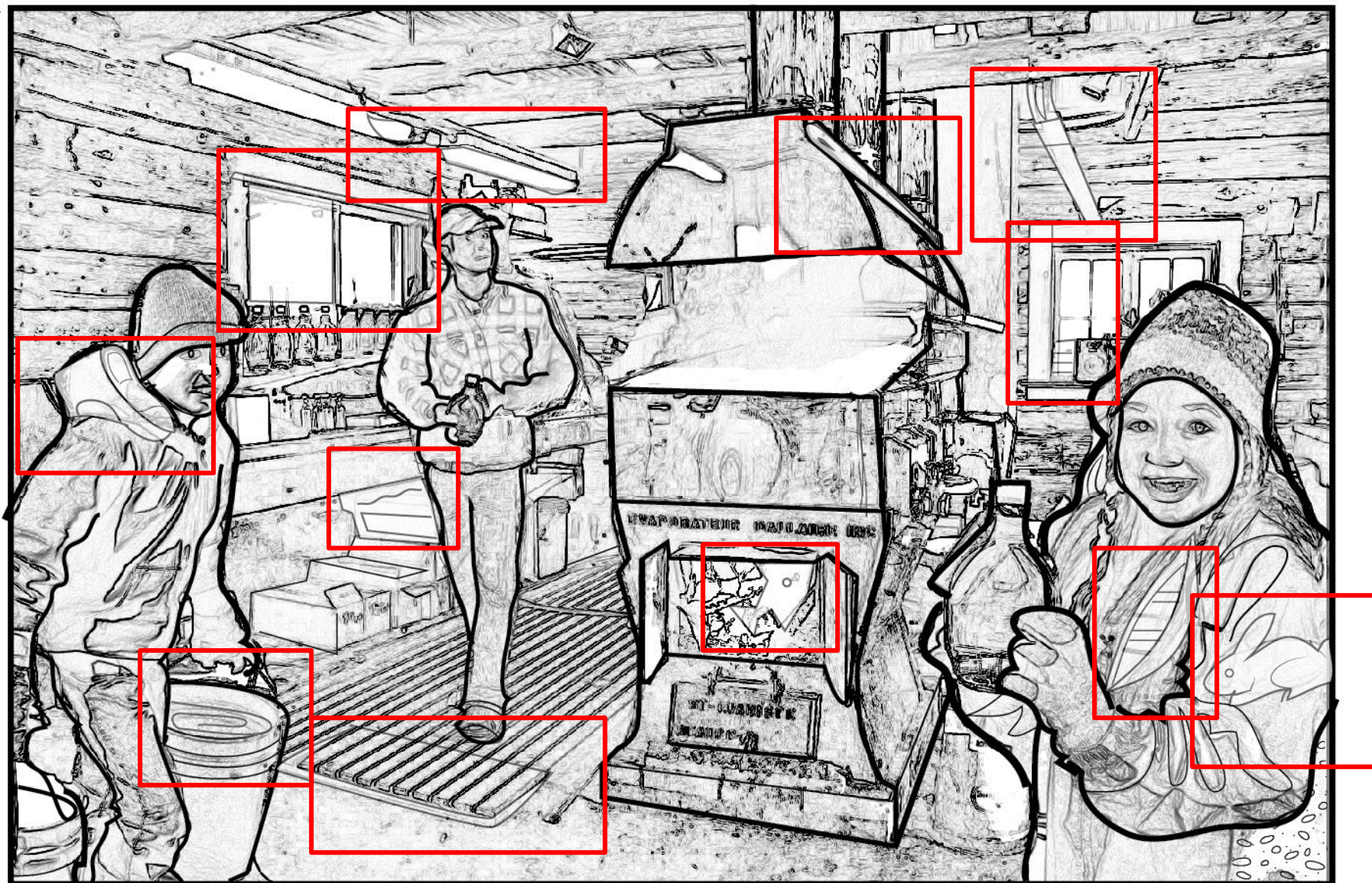**Hidden objects:** rabbit, needle, flag, comb, boot, artist's brush, fish, piece of pie, toothbrush, canoe, paper clip, candle