

General Agriculture

A Holiday Tradition: Which Christmas Tree Will You Choose?

Social Studies, Math

Materials

Computers

Book Resources

Student Worksheet A: Recording Data

Student Worksheet B: Map Plotting

Student Worksheet C: Comparing Data

Class map and small individual maps (optional)

If preferred, to make trees use the following supplies:

Construction paper

Scissors

Tape or Glue (Based on preference for constructing trees)

Markers or Crayons

Any other supplies desired

Overview

Students will learn to gather data about types of trees used for Christmas trees. They will compare the data and use the information to put necessary math skills to work.

Objectives

1. Students will learn to use research tools online.
2. Students will use books and other materials for gathering data.
3. Students will put together a table of data.
4. Students will use the data to work on needed math skills.
5. Students will make an informed decision on what tree they would use based on tree height, circumference, and preference of variety traits.

Instant Expert

Exploring Kansas Natural Resources Educator's Guide. Unit 5 – Forests (85-100). Kansas Foundation for Agriculture in the Classroom. To order, visit www.ksagclassroom.org.

Grade Level: 3-4

Time: 35 minutes, 2 days

Standards:

Literacy in History/Social Studies: Integration of Knowledge and Ideas,

Math: Number and Operations in Base Ten

For Kansas standards, visit www.ksde.org



A Holiday Tradition

Background Information

Christmas Trees are named a specialty crop by the United States Department of Agriculture (USDA). Currently, there is legislation pending that will allow these agriculture producers to collect dollars from Christmas tree farmers to fund marketing and promotion for evergreens.

Christmas trees have been around for many years. They connect many of us with cultural practices of our past. Many countries and religions use the evergreen tree as a symbol for new life and the promise of green plants in the spring. Some believed the evergreens offered protection against evil and sickness. Evergreen trees have long been connected to celebrations of the winter solstice. The winter solstice is the longest night and the shortest day of the year. Greenery helped provide promise of more light to come. This was not only important to citizens, it was also important to farmers who were waiting to plant their crops in the spring.

Evergreen Facts:

An evergreen tree does not drop all its leaves (needles) in the fall like a deciduous tree does. Its needles or leaves are narrow and coated with a waxy layer that protects them from drying out in the winter. The narrow leaves also protect the tree from the elements of cold, wind and snow.

Evergreens do not go dormant in winter. They are able to continue to make plant food using photosynthesis even through the cold winter. Evergreens, whose seeds develop inside cones, are called conifers. Conifers include: pine, spruce and firs. Junipers, including eastern red cedar trees have seeds in their berries instead of in cones. Evergreens are considered a soft wood tree.

Have you ever smelled the scent of an evergreen when the needles are brushed? The chemicals that make the strong scent are also the chemical that act a bit like antifreeze to protect the leaves or needles from freezing.

Decorating an evergreen for the Holidays

Decorating the trees over the centuries creates a tradition among families and cultures. Depending on what was available over the years, decorations have included food such as apples, cranberries, popcorn strings, cookies, wafers, candles, eggshells, glass ornaments, tin ornaments, tinsel made from silver, hand-made ornaments, angels and decorative lights. Now, many trees have a decorative theme with colored ornaments, ribbons, and flocking to simulate frost on the trees. Many children are delighted when the tree is chosen and set up and the decorative ornaments come out of storage. Children may have a tradition of making ornaments with special meaning for their family Christmas tree.

The Christmas tree also became the guardian of the gifts in many households with gift giving and peacefulness being emphasized among countries and families.

To learn more about past cultures and the history of evergreen and Christmas trees go to the Ontario Tree Farmers website at:
<http://www.christmastrees.on.ca/index.php?action=display&cat=14>.

In the New World, Germans, English and others brought their Christmas traditions and adapted them to their new country. Documented evidence of the Christmas tree in America began showing



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up in the early 1800's and continued to grow steadily. Most of the information is from the personal accounts of German settlers. The earliest illustration of a Christmas tree in America was from a book titled *The Stranger's Gift* by Herman Bodum, printed in 1836. The Christmas tree began to spread rapidly throughout America. By the year 1850, the Christmas tree had become the fashionable thing for the holiday season.

Today, many families have a Christmas tree in their home during the holiday season. They have their own special traditions involving the cutting and decorating of the tree. Many people view the Christmas tree as the most glorious and best-loved symbol of the Christmas season.

Preparation

Find the websites that you want to use and have them ready and easily available to your students. Get computers ready for class use. Prepare students on the math concepts that will be used to complete part of this assignment and the map skills necessary as well. Conduct a survey to see who has Christmas trees at Christmas time; take a survey or poll to see how many students have real trees and how many have artificial trees.

Instructional Format

1. Share information on the history of the Christmas tree.
2. Conduct the survey on Christmas Trees provided. (A list of heights and locations has been included if research time becomes an issue.)
3. Students will do the activity and complete Student Worksheet C: Comparing Data.

Procedures

Day 1--

1. Watch the video "*Bringing Green to the Season*" found on KFAC website and KFAC You Tube website. www.ksagclassroom.org; [youtube.com/Ksfac](https://www.youtube.com/Ksfac).
2. Discuss the Facts About Evergreen trees.
3. Discuss the history of the Christmas tree.
4. Reveal the most popular tree varieties in the United States and Kansas for Christmas trees.
5. Divide students into small groups and have each group research 5 of the tree varieties to find the original location and maximum height of each tree.
6. Have the groups report findings and have everyone record results onto a data table.
7. Map the result locations for trees on the classroom map. Go further and have students do this on a small map at their desks as well.

Day 2--

1. Have students complete the math questions that follow the table they completed with the research.
2. Create a tree, either from paper or a real tree (if able to get some from a tree farm); decorate them. Encourage students to show some details that indicate one of the 10 tree varieties.
3. Go outside and use math and students' shadows to determine the height of an evergreen tree. Worksheet D.



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Conclusion Questions (Assessments)

Students will answer the assessment questions found on Student Worksheet C: Comparing Data. Students will practice math skills completing Worksheet D: Determining Height and Circumference of a Christmas tree.

Students will create a Christmas tree with characteristics of one of the varieties of Christmas trees.

Resources

Bodum, Herman (1836). *The Stranger's Gift*. Boston.

Foley, Daniel J. (1960). *The Christmas Tree*. Philadelphia: Chilton Company.

Pauli, Hertha (1944). *The Story of the Christmas Tree*. Boston: Houghton Mifflin.

Kansas Foundation for Ag in the Classroom (2008) *Exploring Kansas Natural Resources*. pp. 86-97.

"National Christmas Tree Association: Tree Types." *National Christmas Tree Association: Home Page*. Drake & Company. Web. 26 July 2011. <<http://www.christmastree.org/types.cfm>>.

"List of Evergreen Christmas Tree Types." *History of the Christmas Tree*. Web. <<http://www.historyofthechristmastree.com/list-of-evergreen-christmas-tree-types/>>.

Want More? Extensions

If funds are available, plan a trip to a Christmas tree farm. Work with a tree farm and get really small trees for the class to decorate. Research how different places around the US or World decorate their trees and recreate those. Have students do extended work on characteristics of trees or their needles, cones, seeds, etc...

Check to see what kind of Christmas Tree is at the White House and where it was grown.

Discover what it takes to manage a real Christmas Tree Farm: Visit a virtual Christmas tree farm in Ontario; <http://www.christmastrees.on.ca/index.php?action=display&cat=13>.

Read about a real Christmas Tree Farmer, Pg. 97 *Exploring Kansas Natural Resources*, Kansas Foundation for Agriculture in the Classroom. Available free + postage. Order at www.ksagclassroom.org.

Read about a real tree farmer: Leavell, Chuck and Cravotta, Nicholas. Illustrations by Rebecca Bleau (2006). *The Tree Farmer*.



Common Christmas Tree Varieties in U.S.

Fraser fir

Named for John Fraser a Scottish Botanist -

The Fraser fir may be the perfect holiday tree. Its attractive 1-inch needles are dark-green and soft to the touch. Because there is space between the branches, the Fraser is easier to decorate than some trees. The firm branches hold heavier ornaments. The trees grow to almost perfect shapes, and as long as the cut tree is kept properly watered, the Fraser Fir has excellent needle retention. It also emits a nice aroma.

Noble fir

The Noble fir is deep green in color and has an unusually lovely branch shape. Boughs of this tree are often made into fresh wreaths. Its branches are sturdy yet the needles are not too sharp to decorate easily. Like the Fraser fir, the Noble's branches have good spacing between branches so it's easy to hang ornaments on them.

Colorado blue spruce

A Colorado blue spruce has a nice pyramidal shape with strong limbs that can hold heavy ornaments. The blue spruce is known for its lovely blue foliage, which can also appear silvery. If a person's decorating scheme does not include this bluish tint, this tree may not be right for his or her home.

Grand fir

The grand fir has a glossy dark green color with needles that are 1 to 1 1/2 inches long. This tree is soft to the touch and may not be able to hold heavier ornaments. It's a pretty tree that grows as high as 300 feet and it's becoming more popular for homes.

Balsam fir

Was named for the blisters of resin found on the bark.

The short, flat needles are 3 to 1.5" long.

The balsam fir is a beautiful dark-green color with airy, flexible branches that may not be able to hold heavy ornaments. It has an attractive form, it holds its needles well, and gives off a pleasant fragrance for the home.

White fir (or concolor fir)

The National Christmas Tree Association notes that "Needles are usually 1/2 to 1 1/2 inches long, pointed or notched at the tip, bluish-green when young, turning dull green with age.... As a Christmas tree, white fir has good foliage color, a pleasing natural shape and aroma, and good needle retention."

Douglas Fir

The Douglas fir is not really a fir tree at all. It has its own classification, *Pseudotsuga menziesii*. It has two varieties; The coast Douglas fir and the blue Douglas fir or Rocky Mountain Douglas fir.



Top Christmas Tree Varieties

A Douglas fir is a popular Christmas tree with 1' - 1.5" soft shiny green needles. It may be difficult to decorate if the branches have been sheared into a perfect conical shape, leaving too little space between branches to hang decorations. If this variety of tree is available, a person might want to take an unbreakable ornament with him or her when the tree is bought to see if decorations will hold. Choose a Douglas Fir that is freshly cut and keep it well watered.

Norway spruce

The Norway Spruce is a beautiful tree but does not hold its needles well, and should be purchased just a week or so before December 25th. The National Christmas Tree Association notes that the "overall color of Norway spruce is fair to excellent, but needle retention is considered poor unless the trees are cut fresh and kept properly watered."

Main varieties of Christmas trees grown in Kansas

Scotch pine

One will want to wear gloves when decorating a Scotch Pine, since its needles can be sharp. Also, due to heavy shearing, there may be little space between branches for ornaments. The National Christmas Tree Association notes "the Scotch Pine is known for its excellent needle retention. It resists drying and if permitted to become dry, does not drop its needles."

Virginia pine

Virginia pines have soft needles that range in length from 1 and 1/2 to 3 inches in length. This tree has dense foliage with a pleasant pine fragrance and good needle retention.

Eastern white pine

Branches from the white pine are often used in garlands, wreaths, and centerpieces due to their long, feathery, soft needles. Though it is a beautiful tree, branches can be a bit too flexible to support heavier decorations. Its fullness makes it difficult to find a place to hang ornaments. The white pine needles last a long time when properly watered.

Austrian pine

Austrian pines have 4-6" dark green needles. They have a moderate fragrance and retain needles well,

Eastern red cedar

Leaves are a dark, shiny, green color; sticky to the touch; good scent; can dry out quickly; may last just 2-3 weeks; a southern Christmas tree. While its grown as a Christmas tree.

Grows east of the 100th meridian. Prior to Christmas tree farms it was the most popular Christmas tree in the south due to it's availability on the land. It is found in windbreaks in Kansas.

Eastern red cedar is now considered an invasive species in Kansas as it takes over the prairie.

Birds spread the seed cones across the prairie as they eat and digest the "blue berries".



Top Christmas Tree Varieties in U.S.

Tree	Max Height	Location	Main Characteristics
Fraser fir	80 ft.	Appalachian Mts	needles are silvery-green and soft to the touch; space between branches holds heavier ornaments; excellent needle retention
Noble fir	200 ft.	Oregon Washington	bluish green - silver in color sturdy branches needles are not too sharp space between branches
Colorado blue spruce	115 ft.	Colorado W Wyoming E Idaho central Utah	1-1.5" very sharp needles strong limbs known for lovely blue foliage can have bluish tint
Grand fir	300 ft.	Idaho Montana N California	glossy dark green color 1 to 1 1/2 inch needles soft to the touch may not hold heavier ornaments Strong fragrance
Balsam fir	60 ft.	New England	short, flat .75 - 1.5" needles dark-green color with airy flexible branches attractive form holds needles well gives off a pleasant fragrance
White fir OR concolor fir	150 ft.	Western US	1/2 to 1 1/2 inch needles pointed or notched at the tip bluish-green when young turning dull green with age pleasing natural shape and aroma, good needle retention
Coast Douglas fir & Blue Douglas fir (Rocky Mountain)	250 ft.	Western US Rocky Mountain foothills	soft shiny green needles may be difficult to decorate if sheared into a perfect conical shape may want to see if decorations will hold select one freshly cut and keep it well watered
Norway Spruce	180 ft.	Europe	does not hold its needles well purchase a week before overall color is fair to excellent needle retention is considered poor unless properly maintained



Top Christmas Tree Varieties in Kansas

• Eastern white pine	80 ft.	Eastern US	2.5 - 5" soft bluish grey needles branches are often used in garlands, wreaths, and centerpieces due to their long, feathery, soft needles. flexible fullness makes it difficult to find space to hang ornaments needles last when properly watered
• Scotch pine	125 ft.	native of Europe Grown across U.S. on Christmas tree farms.	needles are sharp may have little space between branches Sturdy branches on which to hang ornaments known for its excellent needle retention and good keep ability
• Virginia pine	114 ft.	Virginia	soft needles that range in length from 1.5 to 3 inches in length. This tree has dense foliage with a pleasant pine fragrance and good needle retention.
Eastern red cedar	50 ft.	east of 100th Meridian	the deep green foliage is super dense limiting the ornaments mostly to the outer edges. This tree does not have needles per se; the tree has small leaves that can be sticky branch strength and foliage thickness is excellent for holding larger ornaments excellent conical shape strong cedar-like fragrance
• Austrian pine	60 ft.	U.S. except deep south	dark green needles, 4 to 6 inches long; retains needles well; moderate fragrance.

• = conifer



Top Christmas Tree Varieties

Name: _____

Tree	Max Height (ft.)	Location	Main Characteristics
Fraser fir			
Noble fir			
Colorado blue spruce			
Grand fir			
Balsam fir			
White fir			
Eastern white pine			
Douglas fir			
Scotch pine			
Norway spruce			
Austrian pine			
Virginia pine			
Eastern red cedar			



Map Matching

Directions: Identify locations of the top ten tree varieties. Write the number in the table below. A number may be used more than once.



Tree	Map Number
Fraser fir	
Noble fir	
Colorado blue spruce	
Grand fir	
Balsam fir	
White fir	
Eastern white pine	
Douglas fir	
Scotch pine	
Norway spruce	

Maps taken from <http://maps.google.com/>



Comparing Data

Name:

1. Take the heights and arrange them greatest to least. List them here:
2. Take the heights and arrange them least to greatest. List them here:
3. Which tree is the tallest?
4. Which is the shortest?
5. Make a comparison statement between two trees on the chart.
6. How much taller is the grand fir than the Colorado blue spruce?
7. How tall would the Fraser fir, balsam fir and the Scotch pine be total?



math ratios to determine the height of a tree

Name:

On a sunny day, make a trip outside. Pick an evergreen tree to measure!

To find the tree height

Measure your height.

Measure the length of your shadow.

Measure the length of the tree's shadow.

Fill in the following formula. Solve for X

$$\frac{\text{Tree's Height or } X}{\text{Tree's Shadow}} = \frac{\text{Student's height}}{\text{Students Shadow}}$$

$$\text{Tree height or } X = \frac{\text{Student's Height} \times \text{Tree's Shadow}}{\text{Student's Shadow}}$$

Compare with other student's to see if you arrived at the same number on each tree measured.

To find the circumference of the tree:

Work with a partner and encircle the tree at the widest point with string or yarn until beginning end meets the string again. Cut the string to that length. Use a standard unit of measurement such as a ruler or yardstick to measure the string. This will determine the circumference of the tree at its widest point.

Why would you need to know the height and circumference of a tree?

If selecting a real tree for the holiday, you would need to know if you can get it into the house and if it will fit in the space where the tree will be displayed.

As you landscape, you need to allow a tree enough space for height and circumference as well as root space. Using math to measure the planting space will ensure you don't plant trees too close to buildings, roads, sidewalks, overhead wires or too close to other trees that may compete for sunlight, water, and branch space and root space.

VOCABULARY

broad-leaf trees	trees with flat, broad leaves. Example oak, maple, cottonwood
Christmas tree	A USDA specialty crop that is an evergreen tree primarily used during the winter holiday season as a display tree or to produce decorative greenery.
conifer	An evergreen tree that has it's seeds contained in a cone
deciduous	A tree that loses <i>all</i> its leaves in the fall and goes dormant in the winter. Many are considered hardwood trees.
evergreen	A tree that keeps most of it's leaves (needles) and a green color through the winter. Many are considered soft-wood trees.
hardwood tree	broad-leaved trees
softwood tree	conifers and other needle-leaved trees
circumference	The distance around an object

Examples of deciduous trees in Kansas:

ash
cottonwood
elm
maple
oak

Examples of evergreen trees in Kansas:

Eastern Red Cedar is listed as the only native evergreen in Kansas. It is found in many windbreaks or shelterbelts in the state. It is considered an invasive species in Kansas as it is taking over pastureland when not controlled by fire or mechanical removal.

Christmas trees grown in Kansas:

Scotch pine
Austrian pine
Virginia pine
white pine