

TREES

Claiborne County 4-H
5th Grade Lesson

OBJECTIVE:

Students will understand and appreciate the impact that trees have upon the lives of humans.

Students will understand what trees must have in order to grow and the different parts of a tree as well as where and why photosynthesis occurs.

Students will understand and appreciate both the age and size of trees in relation to other living beings.

TREES

*I think that I shall never see
A poem lovely as a tree.*

*A tree whose hungry mouth is prest
Against the earth's sweet flowing breast;*

*A tree that looks at God all day,
And lifts her leafy arms to pray;*

*A tree that man in summer wears
A nest of robins in her hair;*

*Upon whose bosom snow has lain;
Who intimately lives with rain.*

*Poems are made by fools like me,
But only God can make a tree.*

*by Alfred Joyce Kilmer
Dec. 6, 1896
July 30, 1918*

This poem by Joyce Kilmer is the most famous ever written about trees.

Joyce Kilmer (a man, btw) was a famous American poet who served on the front line of World War I. Kilmer was killed in action about three month before the war's end.

You may read the poem to the class if you wish. Most people have heard snippets of it even if they didn't realize what they were hearing.

TREES



Have you ever stopped to consider trees?

Raise your hand if you have used something that comes from a tree today.

Who can name some important things people get from trees?

- oxygen: trees across the globe produce a lot of the oxygen we need
- building material: does anyone here live in a home that does not contain wood?
- food: name some foods we get from trees
- jobs: in East Tennessee, a lot of people make a living from cutting timber, working in sawmills, driving log trucks, etc.
- much, much, more....

Pause at each of the first three questions and give your students a chance to respond to each. Most students will quickly say that they have received nothing from a tree today, but all of them have!

The third question will (hopefully) get the kids to thinking about how trees actually impact all of us. A list will begin to appear of some of the things we get from trees here in East Tennessee.

TREES

Trees have always been a symbol of strength, wisdom and long life.

Why do you think that is?

Lets start by looking at how trees grow.

How does something this small...



...grow into
something this big?



Make sure you ask the question after the first statement and give your students a chance to respond. It is easy to see that trees can be considered the symbols of strength and long life but what about wisdom? Hint: If you had lived as long as a tree you would have seen a lot of history occur.

Then we transition into how trees grow. Point out that a mighty oak starts out as a little acorn.

TREES

A tree can start life in two ways.

First is starting life as a seed such as an acorn or peach seed. All trees produce some type of seed, nut, or fruit in order to reproduce.

Secondly, hardwood trees such as oaks and hickories can sprout from the stump of a mature tree that has been cut down. This is how much of Tennessee's forests are regenerated after logging.



Hickory nuts



Stump regeneration

This slide begins our discussion by pointing out that hardwood trees can grow from seeds but they can also grow from sprouts that come from the stump of a tree that has been cut down.

Most of our hardwood forests in Tennessee are regrown after logging by stump regeneration.

Conifers (evergreens) do not regenerate from stump and must come from seeds or, more probably, from seedlings that are replanted by man.

TREES

The first thing a tree has to do to make its seeds grow is to disperse them. A seedling cannot grow in the shadow of its parent. Trees have different strategies to move seeds away so they have a good chance of surviving.

Can you think of ways that trees use to get their seeds dispersed?



The two most common ways are...

Wrap the seed in tasty fruit so that animals eat them and carry away the seeds.



Make the seeds light and winged so that the wind carries them away.

This slide points out that all trees produce some type of seed in order to reproduce. Make sure the class knows that these seeds have to get out of the parent tree's shadow or shade in order to grow. This is why trees have different strategies to disperse their seeds, i.e., cover them in fruit so animals eat them, make them fly on the wind by giving them a wing, etc.

Be sure to ask the class the question after the first paragraph. Encourage them to think about it (you may need to give them some hints).

TREES



Now that the seed has escaped the shadow of its parent, it has to have certain things in order to sprout and grow.

Can you name some of these things?

1. SOIL – this provides the seed protection and gives the growing tree support so that it doesn't fall over as well as nutrients and minerals and is from here that the tree gets its water.
2. SUNLIGHT – this warms the soil so that the seed sprouts as well as providing the tree with the way it makes food.
3. WATER – this wets the soil so that the seed is in good contact with the soil in order to sprout and it forms the second element in how the tree makes food.

Now we talk about what a tree seed needs in order to sprout and begin to grow. Have the class name what these needs are before you start pulling them up on the screen.

When someone names one of these needs of the seedling, ask them 'Why?'. For example, we all know that living things need water, but what does water do for a seed?

TREES

Now, once our seed becomes a seedling, it is on its way up in the world!

You may not have thought about it, but trees have different parts on the inside, just like humans. Here they are and what they do...

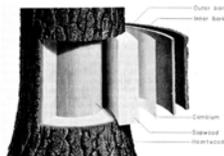
Outer Bark – protects the tree from fire, insects, weather disease and other injuries

Phloem – also called inner bark, it transports food made in the leaves down to the roots

Cambium – a thin layer of cells that produces new sapwood and bark (inner and outer)

Xylem – also called sapwood, it transports water from the roots to the leaves

Heartwood – formed from dead xylem cells, this gives the tree its strength and supports it



Now we talk about the inside of the tree. There are different parts of a tree and this is part of the fifth grade science standards, so the class may know more than you think!

Ask the class to tell you what each of the parts does before pulling up the answer.

TREES

A tree grows from the inside out, just like people. This means that each year the cambium layer adds a new layer of cells. The only thing that doesn't grow from the inside out is the tips of the branches. This is how the tree gets its height.

We can tell how old a tree is by counting its.....

growth rings!

These annual growth rings tell us not only how old the tree is but how much it grew each year. The wider the growth ring, the more the tree grew. Very narrow growth rings mean that the weather or growing conditions were bad during those years.



This slide talks about how a tree grows each year. Be sure to point out that the cambium layer adds new cells each year to make the trunk and the branches bigger around. Only the tips of the branches get longer. This will be important later.

The class will know that that you can tell a tree's age by counting the growth rings. Point that that you can also tell how much the tree grew by looking at the width of each growth ring. So, in effect, we can look back in time see what the weather looked like in the past just by looking at growth rings in a tree. Neat!

TREES

Okay, so hear is a question for you.

If I hang a tire swing from a tree and that tree grows 10 inches taller each year. In eighteen years I return to that tree, how much higher will the tire swing be compared to when I hung it?



It will be no higher off the ground!

Remember that only the ends of the limbs get longer. The trunk and the branches get bigger around from the annual growth rings.



This is just a little sideline question based on a question I had in botany class at ECU. When you read the question, the kids will all start trying to do the math.

You will point out that the tire swing doesn't get any taller because (remember the last slide) only the tips of the branches get longer! The tire swing will be in essentially the same place 18 years later.

The lesson is: Think before you Answer!

TREES

In order to do all this growing, a tree must have....

Food and Water.

How does a tree get its food? How does it get its water?

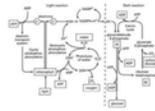
Trees make their own food through a process called....

PHOTOSYNTHESIS

Can anyone tell us how photosynthesis works?

What does a tree need in order for photosynthesis to occur?

Here is a simple diagram to show you what happens during photosynthesis.



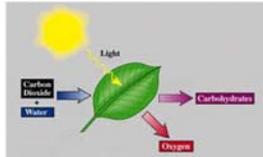
This slide introduces photosynthesis. Most of the class will know about photosynthesis but have limited understanding of it.

Be sure to ask the class what a tree needs in order for photosynthesis to occur.

The diagram that pops up at the end is overly complicated and meant for fun. A simpler diagram is on the next slide.

TREES

Sorry, this diagram may be a bit easier to understand.



Very simply, trees use water, carbon dioxide (CO₂) and sunlight to produce food and oxygen. This takes place in the green part of the leaves or needles.

This green part is made up of many small structures called....

CHLOROPHYLL

Chlorophyll is where the food making process occurs.

Explain the photosynthetic process.

The tree uses water and carbon dioxide combined with sunlight to produce carbohydrates (food) and oxygen (as a by-product). The diagram is very simple.

Make sure that the class knows that this process takes place in the leaves of the tree. Specifically, the chlorophyll (the green stuff in the leaves) is where the food making process occurs.

TREES



So now that we know where and how a tree gets its food, lets talk about water.

We just discussed that a tree needs water and carbon dioxide to make food. The carbon dioxide comes from the air around us.

Where does the water come from? Where does the tree get its water?

From the ground, of course!

So, if water is obtained from the ground, what part of the tree picks it up?

The tree's roots are very important and absorbing water is one of the most important.

This slide transitions from talking how a tree makes food into how a tree gets its water. In effect, we go from talking about leaves to talking about roots.

TREES



Who can tell me some of the things that roots do to help the tree survive?

- Absorb water
- Anchor the tree (hold it in place)
- Absorb nutrients

Just think about how massive trees can be. Don't you think that its pretty amazing that roots can hold an entire tree upright in a storm? And roots can do this for hundreds of years.

Another neat thing about tree roots is they form a symbiotic relationship with fungi called mycorrhizae (my-ko-RYE-zee). These special fungi help the tree absorb nutrients and water in return for feeding on sugar that the roots produce.

These mycorrhizae help trees survive in places where few other plants can grow. Neat!

This slide tells about the important jobs a trees roots do. Be sure to ask your students the first question and give them time to come up with some answers. Remember, we are here to try to get our students to think!

You will have to explain what is meant by a symbiotic relationship. It is when two different organisms help each other in order to insure the survival of both.

TREES



To wrap things up on how trees grow....

How does water and nutrients get from the tree roots to the branches and leaves?

How does food get from the leaves to the tree's roots?

Xylem and Phloem!

Remember that the xylem and phloem cells form hollow tubes up and down the trunk to transport water and nutrients up and food down.

This is just a summary slide of the things we have learned about how trees grow. Ask the questions and let your students answer them.

TREES

We started off saying that trees are a symbol of long life. Trees do live a long time compared to us humans.

How old can trees live?

The trees that we see around Claiborne County are mostly young. Most of our forests have been logged (cut for lumber) in the past. So most of our trees are from 50 to 100 years old.

An eastern white pine cut in Unicoi County in 1948 was 353 years old when it was cut. It started growing in the year 1595, that is 25 years before the Pilgrims landed at Plymouth Rock!

But this tree was young compared to some.



This slide transitions into talking about the age of trees. Point out, in the third paragraph, that all the forested land in Claiborne County has been logged in the last 100-150 years.

While there are people who are opposed to logging, we can see that trees grow back! That means that trees are a renewable resource. In fact, Tennessee is increasing its amount of forested land in recent years. We are growing more acres of trees in Tennessee each year than we are cutting.

TREES

The Bristlecone Pine, native to the American Southwest, can live to be 5,000 to 6,000 years old.

Now, just think about that. A tree that is 5,000 years old would have started growing 3,000 years before the birth of Jesus!

Such a tree a tree would have seen the flowering of Greek civilization, the rise and fall of the Roman empire, the rise and fall of the Aztecs, the rise of European civilization, the birth of science, the discovery of the 'New World' and two world wars. AMAZING!



Now we talk about the extreme age that some trees can reach. In particular, the Bristlecone Pine.

Ask your students to name some of the events in world history that a tree this old would have lived through. Humans find it hard to think about the passage of this much time. Get them to think about.

6,000 years = 2,190,000 days = 52,560,000 hours



TREES

Now that we know how old trees can get, lets talk about how big tree can get.

Someone name the largest tree on Earth.

The tallest trees on Earth are the Redwoods on the Pacific coast of California.

The largest trees on Earth are the Sequoia, also on the Pacific coast of California. The sequoia are the largest living things on Earth. The largest is 'General Sherman.'



We move from talking about the age of trees to their physical size. This slide points out the difference in size between the Sequoia and Redwood.

There are some neat pictures at the end.

TREES

Since we know that the redwood and sequoia are the largest trees on Earth, lets talk about how big they really are....

Thinking about things we can easily understand,

- an African elephant stands about 12 feet tall
- a blue whale, largest animal on Earth, is about 100 feet long
- a Coast Redwood can reach over 325 feet tall



This slide makes some size comparisons between the Coast Redwood and some of our largest animals.

Point out that a Coast Redwood is over three times taller than a blue whale is long. Also, the Coast Redwood is taller than a football field is long. Pretty neat!

TREES

ACROSS
 1. The seeds of pine trees are held in a _____.
 2. Tennessee's state tree is the tulip _____.
 3. Dead forest trees provide homes for many animals and _____.
 4. Railroad _____ are made from hardwood trees.
 5. _____ goes great on pancakes and waffles!
 6. _____ is blocks of partially burned wood that you cook with in a grill.
 7. Wood is a good source of renewable _____.
 8. You can burn wood to _____ your home.
 9. Telephone poles are often made from _____ trees as they are straight and tall.

DOWN
 1. We use balsam firs and pines as _____ trees in December.
 2. This was once the most popular shade tree in America.
 3. Species of this tree can begin with either iron or paper.
 4. Lumberjacks used to yell "_____" when they felled a tree.
 5. Cherry wood is used to make fine _____.
 6. American pioneer John Chapman was famous for planting the seeds of this tree.
 7. The fruit of an oak tree is called an _____.
 8. This is the most useful and valuable tree in our southern forests.
 9. Needles on a pine have the same function as the _____ on a maple.
 10. The wood of the _____ is red and pleasant to smell.



I have created a crossword puzzle about trees. There is a slide without the answers and it is followed by this slide with the answers.

If you are using a SmartBoard, use a SmartBoard pen to fill in the answers as the class answers them. You can turn it into a game. Give some thought beforehand as to how you are going to do this.

January Contests – Bread Baking

BAKING CONTEST

Both the breadbaking and cookie contests will be at your January meeting. (All entries should be baked by the 4-H member making the entry.) *Parents and grandparents may help, but please remember that this is the 4-H members project.*

You may enter as many of the categories as you are eligible. You will receive ribbons for all entries.

BREADBAKING

4th Grade - 3 Cornmeal Muffins

5th - 6th Grades - 3 Biscuits

7th - 8th Grades - Sweet, Quick Bread
(loaf or 3 muffins)

9th - 12th Grades - Yeast Bread
(a loaf or 3 rolls)



COOKIE CONTEST

Division V: Drop Cookies - all grades

Division VI: Bar Cookies - all grades

Division VII: Shaped Cookies - all grades



THREE TYPES OF COOKIES

DROP COOKIES:
The dough is dropped from spoons onto baking sheets. Leave space between the dough for it to spread when baking.



BAR COOKIES:
These cookies have a texture more like cake and are the easiest to bake. The dough is spread in a greased pan and baked for a given length of time. When cooled, the cookies are cut into squares or bars.

ROLLED/SHAPED COOKIES:
This type of cookie dough is rolled and cut using different shaped cutters. Or the cookies are made from stiff dough, and shaped with the hands.



Go over the rules for both the Bread Baking Contest and Model Vehicle Contest with the kids. Explain that each person should label their entries with their name and what category it should be in.

January Contests – Model Vehicles



Building models is a popular activity for many 4-H members. Only enter one model in each class. (All models must be made by the 4-H member entering them in the model contest.) You may use plastic model kits, snap together kits, or wood kits.

CLASSES ARE:

1. Model Car - plastic, wood, or other kits
2. Model Truck - plastic, wood, or other kits
3. Model airplanes, boats, space shuttles or military vehicles

JUDGING CRITERIA

Judges will look for:

Neatness of model. How does it look compared to all other models?

Use of glue. Glue should not be visible on outside. Use a toothpick or liquid glue made especially for model kits. Any glue visible on windshields will result in points deducted.

Use of paint and/or decals. Are all decals neatly applied? Is paint neat and smooth?

Construction. Do all parts fit together properly or does it fall apart when it is picked up to be judged?

Difficulty of model. How difficult was your model compared to others in its class. Remember, snap together models are not as difficult as those requiring glue.

