W 1055

1-2 YEARS IN PROJECT

Forestry, Wildlife and Fisheries Project Area Guide

Beginner Level

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Forestry, Wildlife and Fisheries Activities

Ctrl+click on each unit/activity number below to be taken to where it appears in the document.

Unit 1: Forestry

Activity 1.1
Let's Define Forestry

Project Outcomes

Identify the parts of a tree: limb, branch, root, leaf and trunk.
Define the following terms: conifer, deciduous and fragmentation.
Compare and contrast a growing tree and a dormant tree.

When you hear the word **forestry**, what do you think of?

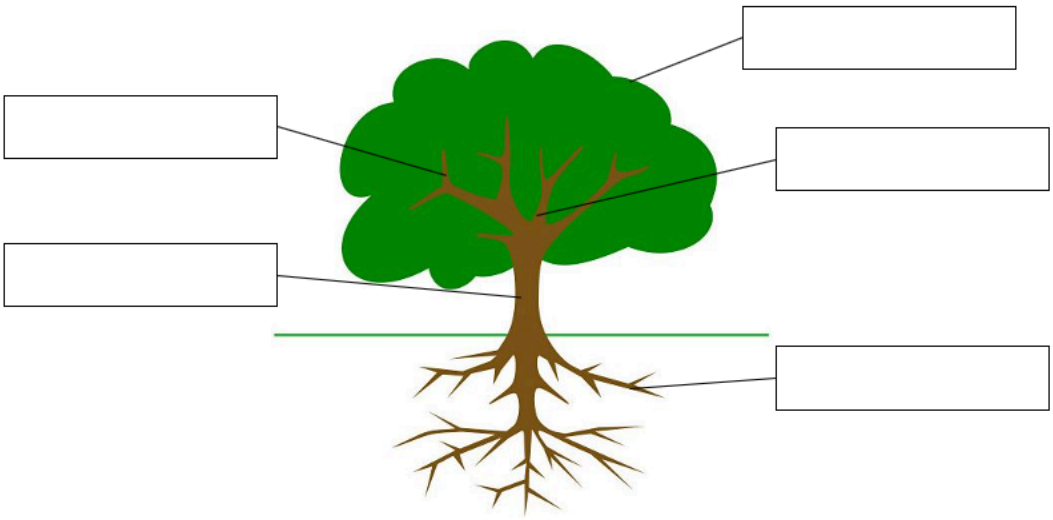
_____

_____

Did your answer mention trees? If so, you are off to a great start!

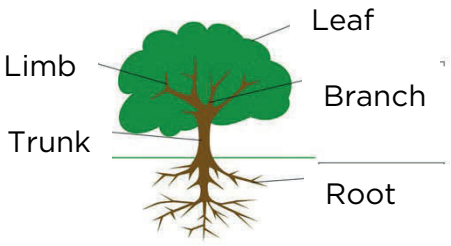
Forestry is the science or practice of planting, managing and caring for forests. A **forest** is a large area covered chiefly with trees and undergrowth. There are five basic parts of a tree. Can you think of them?

Give it your best and label the tree diagram below.



Word Bank

Leaf Trunk Limb Root Branch



The words we were looking for in the previous tree diagram (moving clockwise) were leaf, branch, root, trunk and limb. Using the space below, explain what each part is and the role it plays to a tree's life. If you need a resource, go to Google.com and search.

Branch: _____

_____

Leaf: _____

_____

Limb: _____

_____

Root: _____

_____

Trunk: _____

_____

These are all crucial parts of a tree whether they are categorized as **conifers** or **deciduous**. Throughout this activity you will learn more about conifers and deciduous trees. Have you heard of either of these tree types?

Did you know that nine out of ten Tennessee trees are hardwood, including the state tree? Hardwood trees are deciduous, which means they lose their leaves in the fall.

What is the state tree? _____

Hopefully you wrote tulip poplar (*Liriodendron tulipifera)*, which has been the state tree since 1947.

Deciduous trees, like the tulip poplar, go through **dormancy** in the fall and become what we call dormant.

Let's now define the new term: **dormant**. Go to Google.com and search the term.

_____

_____

Use the empty space below to provide a picture of a dormant tree. You can draw the picture or find one using a search engine or book.

Using the pictures below and information that you know, identify the differences between a dormant tree and a growing tree. Open the camera on a device and center the following QR code in the middle. This will take you to an article about dormant trees.

SCAN ME

1.

2.

3.

4.

5.

6.

7.

8.

When looking at trees in Tennessee, you will find trees that are **conifers**, which means they produce cones containing seeds, such as pines and red cedar. Below are images of an Eastern red cedar (*Juniperus virginiana*). Throughout this project area, you will see the common name of trees and fish followed by a scientific name, which will look like this (*Scientific name*).



A large forest can be divided or parted into smaller patches or pockets of forest, which results in **forest fragmentation**. Use a search engine or forestry book to define forest fragmentation in the space below.

_____

_____

Now, take a walk outside or look around the next time you go for a ride around town. Do you see patches of forest in your neighborhood or town? This would be considered forest fragmentation.

Explain what that looked like.

_____

_____

_____

If you'd like, you can upload any pictures that show forest fragmentation to your digital 4-H portfolio.

Activity 1.2

Tree Growth

Project Outcomes

Describe the life cycle of both conifers and deciduous trees across all four seasons.

When you think of the life cycle of a coniferous tree you may think of the four images below.

This is a great place to start. In this activity, we will learn about the average years it takes to get to each phase above.

Before we get started, it is important to know that trees can grow for over 100 years! Can you think of a historical event that happened 100 years ago? Research a historical event you relate to or find impactful. Write about the event below. Make sure to include details about the event, who was involved and how it impacted everyday lives.

_____

_____

_____

Depending on the purpose for growing a tree, it could live as little as 30 years, but most likely the person who planted a tree as a seed or seedling will not see the tree become a mature, adult tree.

Whether a tree is a conifer or deciduous, it is considered a perennial plant. The plant is either **gymnosperms** or **angiosperms**.

Gymnosperms – seed plants that have evolved cones to carry their reproductive structures. Can you give an example of a tree that would be a gymnosperm?

_____

Angiosperms – seed-producing plants that generate male and female gametophytes, which allows them to carry out double fertilization. Can you give an example of a tree that would be an angiosperm?

_____

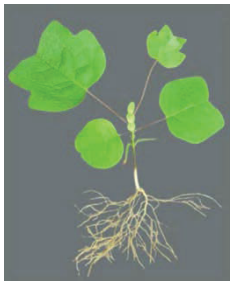
Now, let's learn about the life phases of the tulip poplar. In Activity 1, we talked about the tulip poplar. Recall it is the state tree of Tennessee and classified as a deciduous tree.

Tulip Poplar Life Cycle

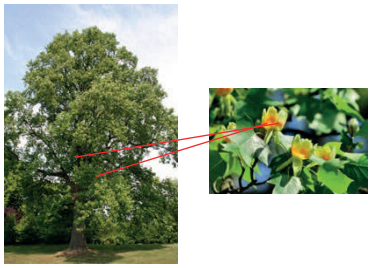
Seed
(0 years)

Young Plant
(1-10 years)

Seedling
(60-95 days)



Adult Plant
(about 25 years)



Height growth during the first-year ranges from a few centimeters to more than 0.3 meters or 1 foot. With full sunlight, rapid height growth begins the second year and at the end of year 5, trees may be 3-5.5 meters or 10-18 feet. For example, during the yellow poplar's seedling and sapling stages it can have extreme growth. An 11-year-old seedling has reached 15.2 meters or 50 feet. Note, a yellow poplar does not produce flowers until years 15 to 20.

Cones (male and female)		Young Plant (1-10 years)	
Seedling (60-95 days)		Adult Plant (about 25 years)	

Read this article about the Eastern white pine. Then compare the life cycle of the tulip poplar to the white pine and you might notice some differences. One has male and female gametophytes while the other does not. Which tree has gametophytes?

_____

Which tree would be categorized based on the parts of its life cycle?

_____

The average white pine lives to be 200 years old! White pines are slower growing in the earlier stages of their development, growing on average 8 inches per year under ideal conditions. However, after about 10 years, the growth rate increases. Between 10-20 years, dominant trees like the white pine can grow as tall as 137 centimeters or 54 inches every year! Annual increments of 91 centimeters or 36 inches are not uncommon, but the average is 41 centimeters or 16 inches.

Let's think more about this. Just like trees, we also have phases in our lives. Can you still wear the first outfit you ever wore? More than likely, no. Just like trees start to get taller and stronger with necessary nutrients, so do you. Think of your life as different phases of growth on a timeline. Take some time to create a timeline of your life, like the trees above. Be creative! You can use pictures either copies or drawn. Use the phases below to guide you. Remember to upload your final timeline to your digital 4-H portfolio.

Phase 1	Phase 2	Phase 3	Phase 4	Phase 5
0-1 year	3-5 years	7-9 years	11-13 years	15-17 years

_____'s Timeline

(Name)

Knowledge Check

SCAN ME

Applying all the new knowledge you have on conifer and deciduous trees and tree life cycles, look around your neighborhood and identify a deciduous hardwood tree and answer the following questions. Use the University of Tennessee Extension article Identifying Common Tennessee Trees by scanning the QR code.

Name of tree: _____

Characteristics of tree: _____

_____

_____

_____

Is the tree dormant? If so, how did you identify that the tree was dormant and not dead?

_____

_____

_____

Activity 1.3

Let's DIG In!

Project Outcomes

List common components of soil.
Describe the role that each of the following plays in soil: carbon, oxygen, nitrogen and phosphorous.

Soil is a crucial part of the success of a tree. So crucial that people test their soil to see what nutrients are missing to better support the growth of fruits, vegetables, flowers and trees.

SCAN ME

Take some time and watch the following video by scanning or clicking on the QR code on your left. Upon watching the video, use your new knowledge about soils and define the following terms.

Weathering: _____

_____

Erosion: _____

_____

Humus: _____

_____

Soil: _____

_____

After watching the video, you learned that soil gives plants the nutrients it needs to grow. What else have you learned from the video? Let's check with a stopwatch challenge!

Stopwatch Challenge

Let's see how many questions you can answer in three minutes. Set a 3-minute timer. You can do this on a smart device, clock, kitchen timer or a timer on your computer.

What is soil made of?

_____

_____

How many layers of soil exist? _____

List all soil layers:

_____

_____

How many types of soil exist? _____

List all types of soil:

_____

_____

What makes these soils different?

_____

_____

The size of the soil's rock particles determines how much _____ soil can hold.

SCAN ME

Wow! You did it. Congratulations on completing the challenge.

Check your answer by scanning or clicking the QR code.

Now, let's label the three types of soil.

1.

2.

3.

Which type of soil can hold the most water? _____

What is the best soil for growing plants? _____

Do you remember why loam is the best? It provides enough nutrients and air, while also being able to absorb enough water.

You now know what soil is and what it is made of. Write a haiku about soil.

Five syllables _____

Seven syllables _____

Five syllables _____

Share your haiku on your digital 4-H portfolio!

Virtual Trees? What's That? An Online Tree?

You have learned so much about tree growth throughout these activities, let's continue the fun! Create a virtual tree in your community. Watch these videos to learn how i-Tree works. Now that you know how i-Tree design works, select from the chart below which tree you would like to plant in your virtual tree activity.

SCAN ME SCAN ME

Step 1: Tree Selection

Common Name	Scientific Name	Conifer or Hardwood
White Oak	*Quercus alba*	Hardwood
Willow Oak	*Quercus phellos*	Hardwood
Scarlet Oak	*Quercus coccinea*	Hardwood
Pin Oak	*Quercus palustris*	Hardwood
Southern Red Oak	*Quercus Falcata*	Hardwood
Sweetgum	*Liquidambar styracifua*	Hardwood
Red Maple	*Acer rubrum*	Hardwood
Sugar Maple	*Acer saccharum*	Hardwood
Silver Maple	*Acer saccharinum*	Hardwood
Dogwood	*Cornus florida*	Hardwood
Eastern White Pine	*Pinus strobus*	Conifer
Shortleaf Pine	*Pinus echinate*	Conifer
Eastern Hemlock	*Tsuga canadensis*	Conifer
Tulip Poplar	*Liriodendron tulipifera*	Hardwood
American Beech	*Fagus grandifolia*	Hardwood

Step 2: Access i-Tree design to begin growing your tree. Use the following guidelines for your tree information.

1. Use an address of a location in your community. For example, your home, your grandparents' home, school, community center, park, etc.
2. You will plant two 1-inch seedlings.
3. You will grow the tree for 30 years. Submit this information under the "Estimate Benefit" tab.
4. Place one tree in a suggested best growth area and one tree in a suggested limited growth area.
5. ompare and contrast the growth rate of both trees.

Step 3: Explain the comparison and contraction of both trees and if the suggested information made sense to you. Why or why not?

Step 4: Upload a screenshot or picture of your trees' crown growth for 30 years. This can be done by clicking "Model Crown Growth" and the overall benefits of your trees in the "Current Year" and the "Future Year." Make sure to upload your screenshot or picture to your digital 4-H portfolio.

Fun Facts about Soil and Worms

Facts on the Tulip Poplar

Tulip Poplar Importance to Wildlife

A Glossary of Common Forestry Terms

If you'd like to learn more about forestry, check out the following resources.

Unit 2: Wildlife

Activity 2.1

Where Do You Live?

Project Outcomes

Define wildlife, species, community, habitat, prey, predator, food chain and species diversity.
Determine which wildlife animal find their food, cover and water in the backyard setting.
Understand common habitats of given species and that all habitats include four basic parts.

When you hear the word wildlife what comes to your mind?

_____

_____

_____

To better understand the importance of wildlife, use Google again and define the following terms. Some definitions have been provided for you.

Wildlife: _____

_____

Species: _____

_____

Species Diversity: Accounts for the number of species present in an area, how those species are distributed and how abundant each species is within that specific area.

Wildlife Community: All the plants and animal populations living in a defined area.

Habitat: _____

_____

Check your answers by scanning or clicking the QR code.

SCAN ME

In your own words, explain the difference between a community and a habitat.

_____

_____

_____

Name all the basic requirements for all habitats:

1. _____ 3. _____

2. _____ 4. _____

Check your answers on page 1 of a University of Tennessee Extension publication by scanning or clicking the QR code.

SCAN ME

List one wildlife animal that you might see in your area of Tennessee:

_____

Use the next few lines to describe that animal's habitat and its requirements.

_____

_____

_____

_____

_____

_____

Activity 2.2

Who Eats Whom?

Project Outcomes

Define wildlife, species, community, habitat, prey, predator, food chain and species diversity.
Determine which wildlife animal find their food, cover and water in the backyard setting.
Understand common habitats of given species and that all habitats include four basic parts.

In your own words, define the following terms and fill-in-the-blanks about its place in the food chain.

Prey: _____

_____

Also known as _____ in a food chain

Predator: _____

_____

Also known as _____ in a food chain

Food Chain: _____

_____

In your own words, explain how these three terms relate to one another.

_____

_____

Check your answers by reviewing this set of terminology from North Carolina State University.

SCAN ME

A plant is a primary producer in a food chain and receives its energy from the

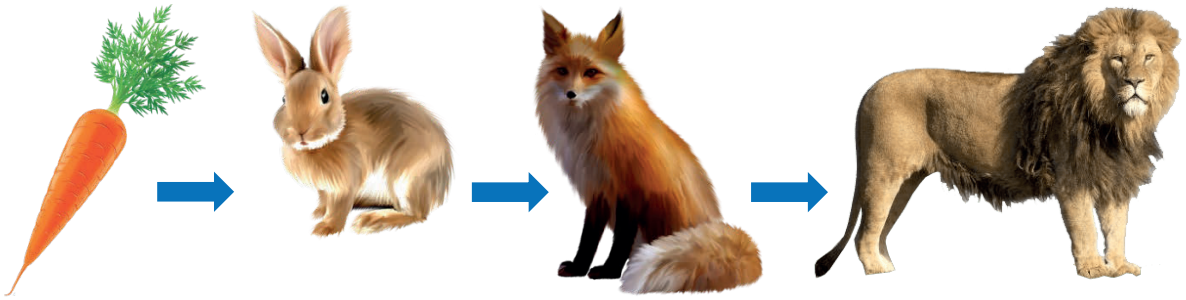
_____, which is known as photosynthesis.

What is needed for a successful food chain?

_____

_____

Using your knowledge from above, label the animals' roles in the graphic below.



Primary Producer			

Using the space below, draw a food chain using three animals that you find in your backyard.

Activity 2.3

Why Are You So Different?

Project Outcomes

Describe the role of species diversity on the ecosystem and habitat for a given species.
List the characteristics of each of the basic groups of animals: mammals, fish, birds, reptiles, insects and amphibians.

For this activity, start by watching the video linked to the provided QR code on biodiversity.

SCAN ME

Now, in your own words, explain the importance of **biodiversity** in ecosystems.

_____

_____

_____

_____

Let's see how many species you can identify in your hometown! Notify an adult that you'd like to go outside and explore the wildlife in your area. You might ask to go to a park, walk around your neighborhood or possibly just your backyard. Maybe see if an adult or friend would like to join you.

1. 2.

3. 4.

5. 6.

7. 8.

9. 10.

SCAN ME

List characteristics of the following terms. Use the link via the QR code if you need assistance.

Amphibians: _____

_____

Birds: _____

_____

Fish: _____

_____

Insects: _____

_____

Mammals: _____

_____

Reptiles: _____

_____

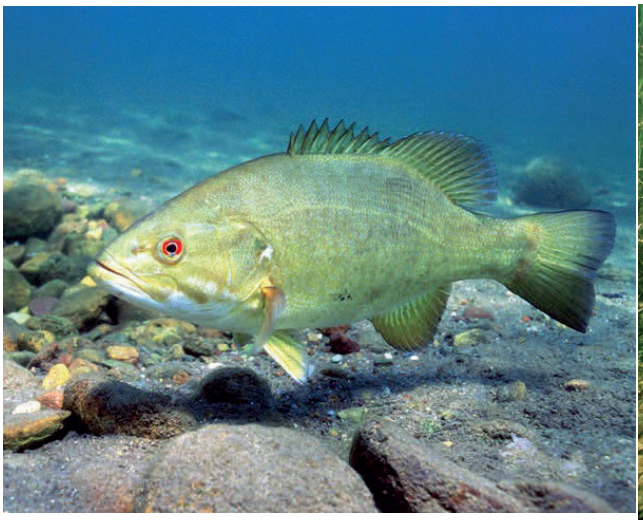
Now, go back to your list of wildlife around your community. Using the table on the next page, categorize the identified wildlife by the type of animal.

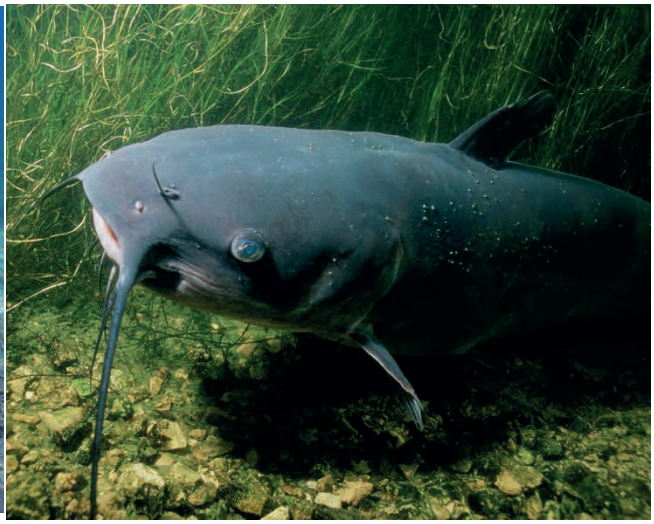
1-2 YEARS IN PROJECT

Amphibians	Birds	Fish	Insects	Mammals	Reptiles

1-2 YEARS IN PROJECT

Unit 3: Fisheries





Activity 3.1

Here Fishy, Fishy!

Project Outcomes

Differentiate between species of fish in your region. Classify various bodies of water as either salt or fresh: oceans, seas, lakes, rivers and canals.

To understand the importance of fisheries and the role it plays in our state, we need to learn some of the basics. Did you know that there are roughly 320 species of fish in Tennessee? Did you know that Tennessee has a state commercial fish and sporting fish?

Let's generate a guess. How many of those 320 species do you think are considered native to the state?

_____

There are numerous bodies of water for fish in Tennessee. Specifically, there are 29 major reservoirs. Look at page 4 in the Tennessee Wildlife Resources Agency's (TWRA) Angler's Guide to identify a major reservoir near you.

SCAN ME

Major Reservoir(s) _____

In your own words, define reservoir below.

Reservoir:

_____

_____

Fish are cold-blooded and can live in either saltwater or freshwater. Describe the difference between the two types of water in your own words.

_____

_____

Using Google.com, look up the definitions for saltwater and freshwater. Do your answers differ? Circle your answer below. If there is a difference, write the difference below.

Yes No

_____

_____

Although there are numerous bodies of water in Tennessee, what body of water type(s) is not found in Tennessee? Circle your answer.

a. Saltwater

b. Freshwater

To better understand the difference between saltwater and freshwater, categorize the following bodies of water as either saltwater or freshwater.

ocean	sea	river
lake	canal	

Freshwater	Saltwater

Use a search engine or book and find an example for each body of water and write it below.

Canal _____

Lake _____

Ocean _____

River _____

Sea _____

Bodies of water can also fall under two categories – **lentic** or **lotic**. Use a search engine or a dictionary to define the terms below.

Lentic: _____

_____

Lotic: _____

_____

Using the information learned from above, provide an example of a lentic and lotic body of water in your region. If there is not one, provide an example closest to you of somewhere you'd like to visit.

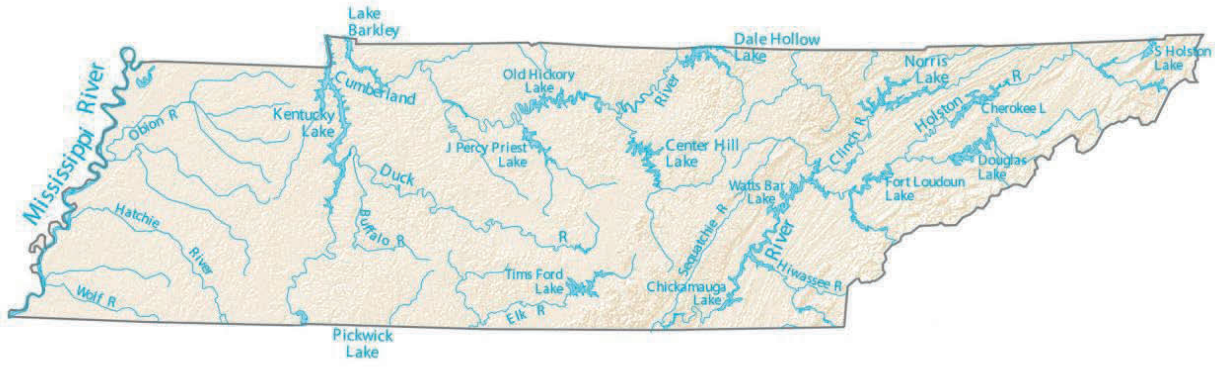
Lentic	Lotic

Using the provided map from the TWRA and identify which reservoir region of Tennessee you live – I, II, III or IV.

Region: _____

SCAN ME

Use the TWRA guide and identify two fish species located in your region. Research these fish and give a presentation to your fellow 4-H club members. Make sure to upload your presentation to your digital 4-H portfolio.



In the map above, you can see thirteen rivers in Tennessee. Are any of these rivers located near you? If so, which ones?

For a bonus question, how many lakes do you think are found in Tennessee?

_____

Can you name the lakes in your region? Visit the site at the QR code to learn about how many lakes are in Tennessee and identify which are in your region.

SCAN ME

Activity 3.2

We Have Different Fish Than Others Do

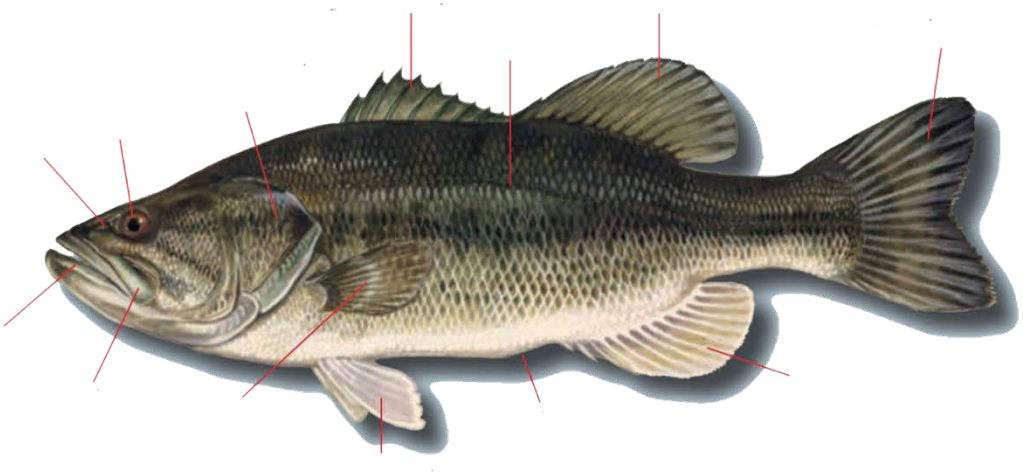
Project Outcomes

Identify the basic parts of a fish (anatomy). Differentiate between species of fish found in your region. Diagram the life cycle of a given fish species.

Fish anatomy is the study of the form of fish. This is a complex way to say parts of a fish. In the previous activity, you identified species of fish found in your region; however, to better identify fish, it is important to know their anatomy.

Visit the TWRA's Angler's Guide and label the 13 parts of the fish below. Then describe how certain parts help fish function.

SCAN ME



Eyes: _____

_____

Fins: _____

_____

Gills: _____

_____

Mouth: _____

_____

Nostrils: _____

_____

1-2 YEARS IN PROJECT

A fish uses their external parts and physical traits to help it survive in the environment.

By knowing the anatomy of a fish, you can recognize the smallest differences among fish species. Let's watch this video by Bass Pro Shops on how to differentiate between three different types of bass.

SCAN ME

Using the lines below, describe the differences between the three bass species you learned about in the video.

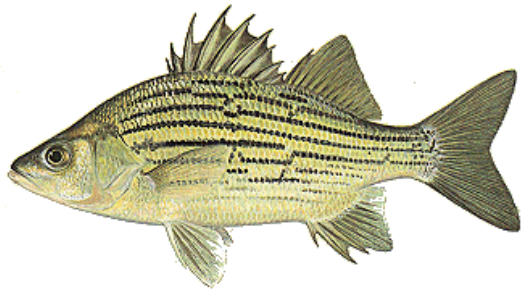
_____

_____

_____

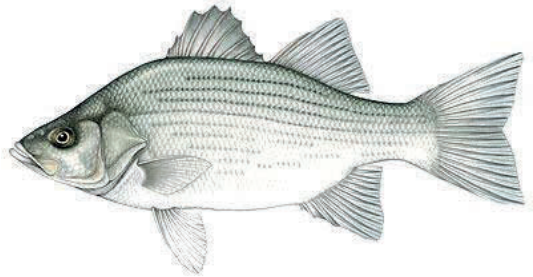
Now, identify these three bass found in the TWRA's Angler Guide.

Fish Name: _____



Scientific Name	Other Name(s)
Morone mississippiensis	Brassy Bass Striped Jack Stripe Yellow Belly Barfish

Fish Name: _____



Scientific Name	Other Name(s)
Morone chrysops	Stripe Stripe Bass Sand Bass Silver Bass

Fish Name: _____

Scientific Name	Other Name(s)
Morone saxatilis	Rockfish Striper Rock Linesides

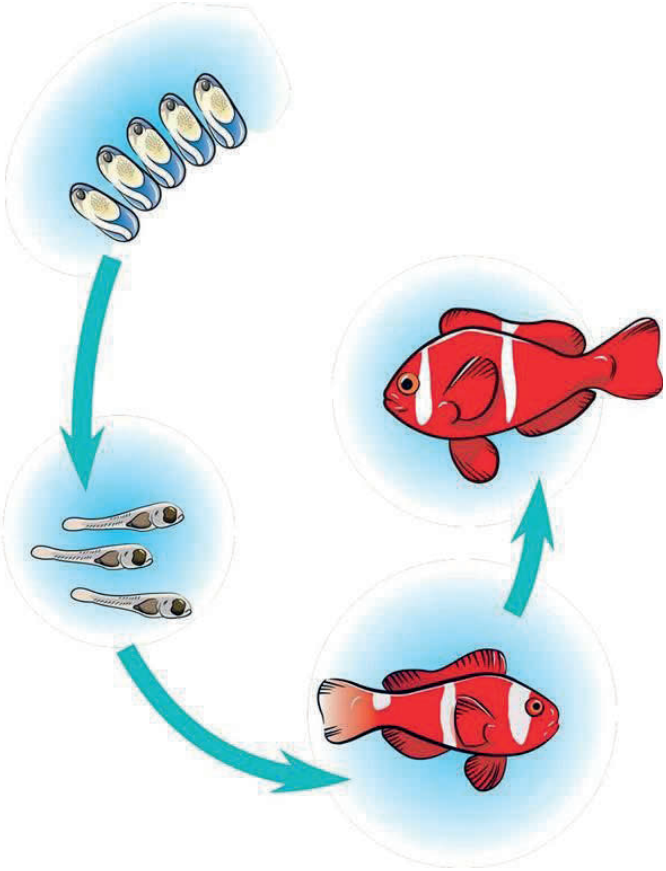
Though these bass are a part of the same fish family, they are their own species. Knowing the anatomy and physical traits will allow you to see the small differences in fish and identify the species.

Describe the differences between the three bass you just learned about – yellow bass, white bass and striped bass.

_____

You can now identify fish using their physical traits and anatomy. Let's learn how a fish grows by learning the basic life cycle of a fish.

Each fish goes through a life cycle. The phases of the life cycle are egg, larval, fry, juvenile and adult fish. The phases begin after spawning. Review the life cycle by following the image below.



To learn more about the steps of a fish life cycle, use the resources linked in this QR code to define the following terms:

SCAN ME

Egg:

_____

_____

Larval: _____

_____

Fry: _____

_____

Juvenile: _____

_____

Adult: _____

_____

Spawning: _____

_____

Some species of fish have additional phases, which allow them to have different physical traits, like weight and length, that can also be used to identify a fish species.

Watch the video linked at the QR code on your right to learn more about the different life cycles of fish species, like a sturgeon and brook trout.

SCAN ME

Describe five differences between sturgeon and brook trout mentioned in the above video.

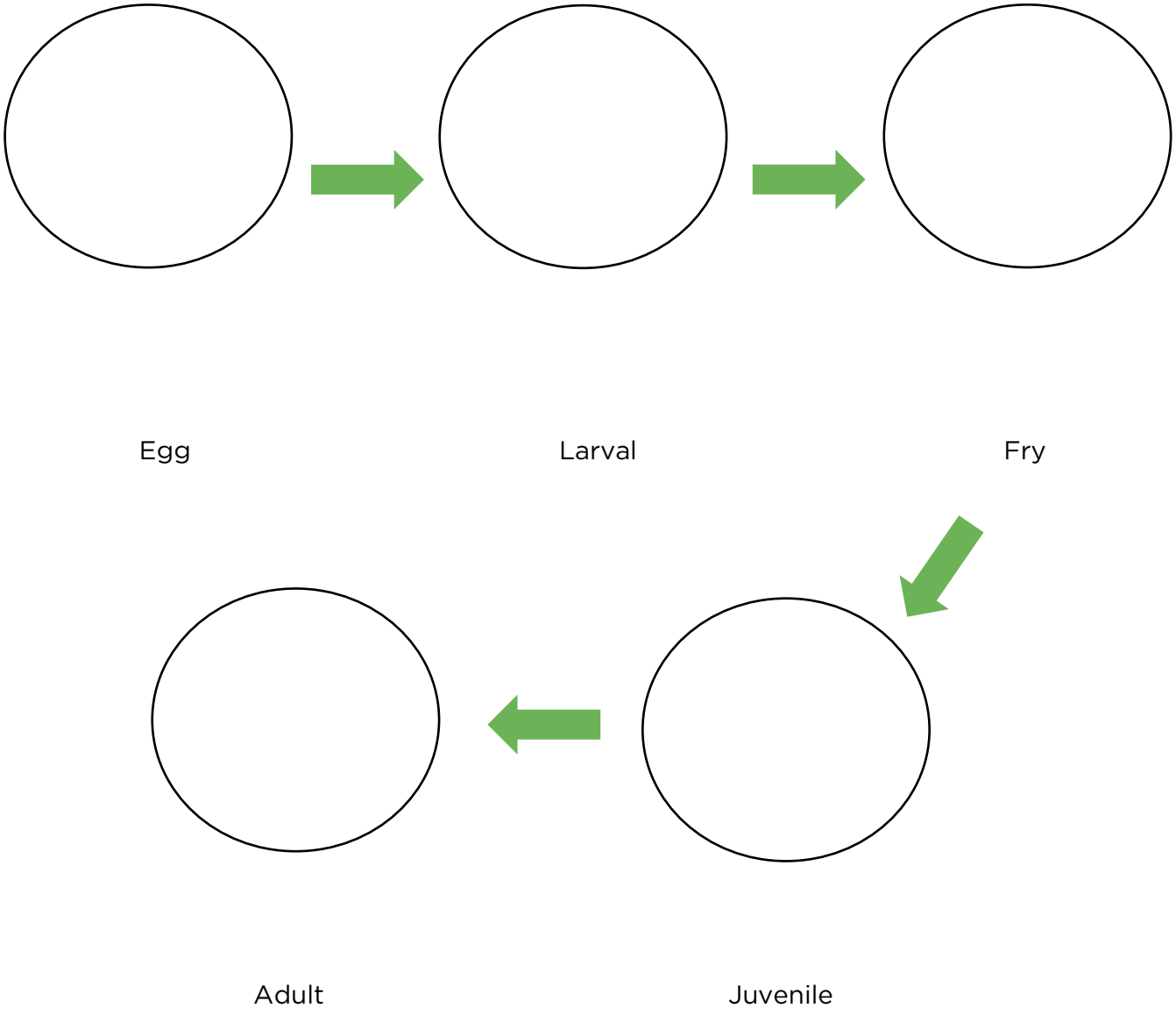
Sturgeon (*Acipenseridae*)	Brook Trout (*Salvelinus fontinalis*)

Thinking about what you've learned so far about the life cycle of fish, why do you think is it important to understand the differences in species' life cycles?

_____

Now, it's time to do some research on your own! Create your own fish life cycle diagram for a species of black bass (*Micropterus salmoides*). Include pictures or drawings of each phase of the fish's life cycle. Make sure to answer the questions pertaining to the fish.

Name of fish (common and scientific)



_____

Name of fish (common and scientific)

Average Weight	
Average Length	
Habitat	
Body of Water	
Freshwater or Saltwater	
Diet	
Average Preferred Water Temperature	
Average Life Span	
Number of eggs they produce	

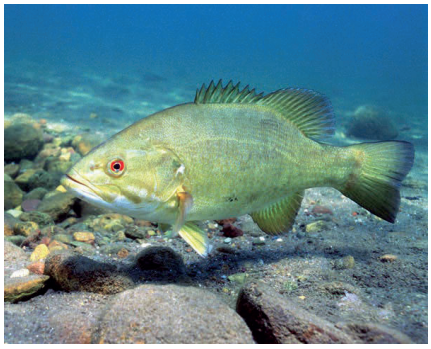
Upload a copy of this table and your life cycle to your digital 4-H portfolio!

Activity 3.3

Let's Go Fishing!

Project Outcomes

Define five common capture methods of fishing.
Identify types of bait used for various fishing techniques.
Label the basic parts of a fishing rod.
Demonstrate safe practices when fishing.



We already told you that Tennessee has an official state sport fish and it is a species of the black bass. It is the smallmouth bass.

We know that fishing can be fun and recreational. You might even already fish with your friends and family. However, fishing can also be done for other purposes, like commercial and artisanal.

Let's go ahead and define these three purposes of fishing to better understand the capture methods.

Recreational Fishing: _____

_____

Commercial Fishing: _____

_____

Artisanal Fishing: _____

_____

There are five common forms of capture methods for fishing. Do you think you could name them? Let's give it a try.

1. _____
2. _____
3. _____
4. _____
5. _____

You might have listed hand-gathering, netting, angling, spearfishing and trapping. It is equally important to understand the common capture methods. Try to define each capture method below.

Angling: _____

_____

Hand-gathering: _____

_____

Netting: _____

_____

Spearfishing: _____

_____

Trapping: _____

_____

Using your new knowledge on the five common fishing techniques, categorize each fishing technique into a fishing method in the table below.

Commercial	Recreational	Artisanal

Before you start fishing, you need to learn fishing safety for those around you while fishing, the fish and yourself. Watch the video via the QR code.

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Name two things you should wear while fishing.

_____

_____

What should you have while fishing in open water? _____

_____

What do you need to do before touching a fish? _____

_____

Describe how you hold a fish. _____

What do you do if you use live bait? _____

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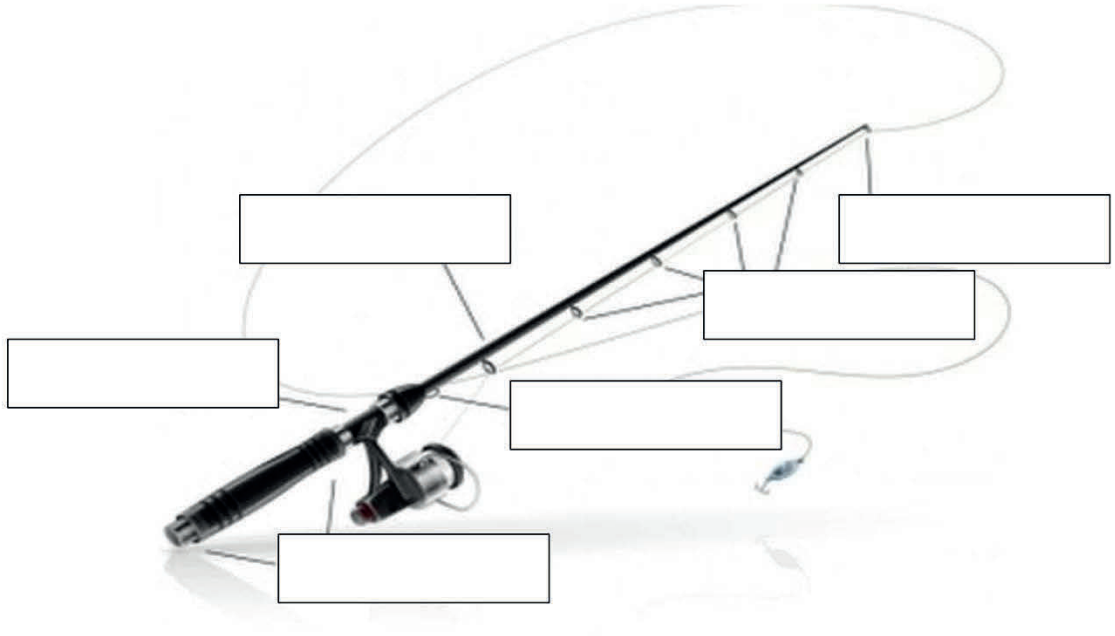
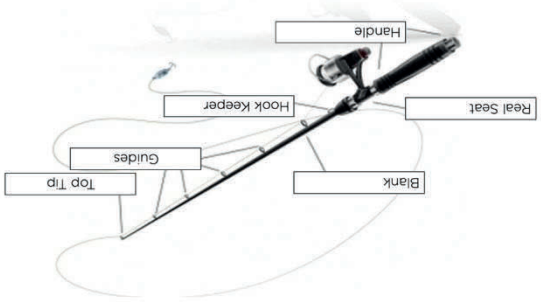
Have you ever used a fishing rod? If not, that's okay! We're going to go over the parts of a fishing rod by watching the video linked to the QR code on the left.

Let's check your newly gained knowledge!



What type of fishing would you use this rod for? _____

That's right, angling. Make sure to check your answers of your fishing rod diagram below.



We now know the methods to capture fish and the basic parts of a fishing rod, but you are probably asking yourself – how do I attract the fish? There are two types of fishing bait: artificial and natural.

Using your prior knowledge, explain what you think the difference is between **artificial** and **natural bait**.

_____

_____

_____

_____

Now, try to give an example of each.

Artificial Bait: _____

Natural Bait: _____

That's right, you might use artificial baits like crank baits, plugs, jigs, spinners or poppers. Natural baits you might use would be worms, insects or frogs. In Tennessee, salamanders, live fish and crayfish cannot be used in waterways.

Like you previously learned, the smallmouth bass is Tennessee's sport fish. Learn about the basic needs for bass fishing by watching the following video.

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List three baits mentioned in the video. If you need help learning the names or spelling them, click "CC" to display closed captioning or subtitles.

_____

_____

_____

Thinking about the video, use the space below to list five new things you learned.

1.

2.

3.

4.

5.

Congratulations!

You have completed the Beginner Forestry, Wildlife and Fisheries Project Curriculum! By completing this project book, you have learned about the forests, wildlife and fish near you and around Tennessee. Continue to seek opportunities to apply what you have learned to your project work so far and learn new things along the way. Make sure to upload any figures to your digital 4-H portfolio.

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You can find more information on the Tennessee 4-H Forestry, Wildlife and Fisheries project page, including the project outcomes and curriculum for the Intermediate level.

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