GEORGIA MIDDLE SCHOOL Instructional Resources

CAREER, TECHNICAL, & AGRICULTURAL EDUCATION

AGRICULTURE

COURSE: Agriculture Education

UNIT 3: Forestry and Natural Resources

INTRODUCTION

Annotation:

In this unit, students will learn about natural resources, conservation and preservation. This unit also contains forestry material including dendrology, identification of trees, and conservation of forest lands.

Grade(s):

	6th
	7th
X	8th

Time:

Ten 50 minute class periods

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Additional Author(s):

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Students with Disabilities:

For students with disabilities, the instructor should refer to the student's IEP to be sure that the accommodations specified are being provided appropriately. Instructors should also familiarize themselves with the provisions of Behavior Intervention Plans that may be part of a student's IEP. Frequent consultation with a student's special education instructor will be beneficial in providing appropriate differentiation. Many students (both with and without disabilities) who struggle with reading may benefit from the use of text reading software or other technological aids to provide access to printed materials. Many of these are available at little or no cost on the internet.

FOCUS STANDARDS

GPS Focus Standards:

MSAGED8-10 **Students will define the forestry & natural resource industry.**
a) Define Forestry and Natural Resources.
b) List and explain the different types of natural resources.
c) Compare/contrast the forestry and natural resource and agriculture industry.
d) Research careers in the forestry/ natural resource industry.

MSAGED8-11 **Students will identify the importance of the forest.**
a. Identify different forest products and their uses.
b. Explain various forest management practices. (Examples include prescribed burns, wild fires, clear cut, thinning, reforestation, etc)

MSAGED8-12 **Students will be able to classify and list examples of trees specific to our region.**
a) Identify the two types of trees. (Evergreen and Deciduous)
b) Identify the major tree parts.
c) Describe the physiological processes of tree growth.
d) Identify Georgia's commercially important trees.

MSAGED8-13 **Students will explain the importance of conservation and preservation of natural resources.**
a) Define conservation and preservation of natural resources.
b) List methods of conservation and preservation of natural resources.
c) Compare and contrast renewable and nonrenewable resources.

MSAGED8-14 **Student will be able to describe wildlife and their habitat.**
a) Identify local wildlife species and their relationship to the forest.
b) Identify Georgia's endangered wildlife species.

GPS Academic Standards:

M8G1 **Students will understand and apply the properties of parallel and perpendicular lines and understand the meaning of congruence.**

S7L1 **Students will investigate the diversity of living organisms and how they can be compared scientifically.**

S7L3 **Students will recognize how biological traits are passed on to successive generations.**

S7L4 **Students will examine the dependence of organisms on one another and their environments**

S7L5 **Students will examine the evolution of living organisms through inherited characteristics that promote survival of organisms and the survival of successive generations of their offspring.**

S8CS1 **Students will explore the importance of curiosity, honesty, openness, and skepticism in science and will exhibit these traits in their own efforts to understand how the world works.**

S8CS2 **Students will use standard safety practices for all classroom laboratory and field investigations.**

S8CS4	**Students will use tools and instruments for observing, measuring, and manipulating equipment and materials in scientific activities utilizing safe laboratory procedures.**
S8CS9	**Students will understand the features of the process of scientific inquiry.**

UNDERSTANDING & GOALS

Enduring Understandings:

Students will have an understanding of the forestry industry, renewable and non-renewable natural resources, and how to conserve and preserve natural resources.

Essential Questions:

- Why are forestry and its processes important to know?
- What benefits do forests provide to the public?
- What are the functional parts of a tree?
- What kinds of trees are important to Georgia?
- Why should people be concerned about conservation of natural resources?

Knowledge from this Unit:

Students will be able to:

- Explain the importance of forestry to Georgia agriculture
- Identify Georgia wildlife
- Identify Georgia trees
- Discuss the careers associated with the forestry industry

Skills from this Unit:

Students will:

- Create a leaf collection
- Use a Biltmore stick

ASSESSMENTS

Assessment Method Type:

_____ Pre-test
_X_ Objective assessment - multiple-choice, true- false, etc.
_X Quizzes/Tests
__ Unit test
_____ Group project
_____ Individual project
_____ Self-assessment - May include practice quizzes, games, simulations, checklists, etc.
__ Self-check rubrics
__ Self-check during writing/planning process
__ Journal reflections on concepts, personal experiences and impact on one's life
__ Reflect on evaluations of work from teachers, business partners, and competition judges
__ Academic prompts
__ Practice quizzes/tests
_____ Subjective assessment/Informal observations
__ Essay tests
__ Observe students working with partners
__ Observe students role playing
_____ Peer-assessment
__ Peer editing and commentary of products/projects/presentations using rubrics
__ Peer editing and/or critiquing
_____ Dialogue and Discussion
__ Student/teacher conferences
__ Partner and small group discussions
__ Whole group discussions
__ Interaction with/feedback from community members/speakers and business partners
_____ Constructed Responses
__ Chart good reading/writing/listening/speaking habits
__ Application of skills to real-life situations/scenarios
_____ Post-test

Attachments for Assessment(s):

LESSON PLANS

LESSON 1: FORESTRY AND NATURAL RESOURCES

1. Identify the Standards. Standards should be posted in the classroom for each lesson.

MSAGED8-10- Students will define the forestry & natural resource industry.

a) Define Forestry and Natural Resources.
b) List and explain the different types of natural resources.
c) Compare/contrast the forestry and natural resource and agriculture industry.
d) Research careers in the forestry/ natural resource industry.

2. Review Essential Questions.

Why is forestry and its processes important to know?

3. Identify and review the unit vocabulary.

forestry	silviculture
natural resource	forest products
forest management	native forest
commercial forest	urban forestry
arborculturist	forester
logger	silviculturist
soils specialist	tree nursery worker

forestry: The science and art of growing trees and making them into products.
forest management: the care of forests to achieve maximum production and other benefits.
Native Forest: Areas that were seeded naturally
Commercial forest: Areas where the trees were intentionally planted
Urban forestry: Planting of trees in towns and cities
Arborculturist: The scientific care of shrubs and trees in cities and towns, as opposed to a silviculturist which works tree stands in forest and tree farms
Forester: Studies plants, trees, and wildlife. May establish forests, assess tree growth, investigates pest problems and selectively harvest trees. College degree required
Logger: a person who harvest trees as logs. Involves using power and hand equipment to cut and trim logs, and skid them through the woods and loads them on a truck to be delivered to a mill
Silviculturist: Studies and manages tree stands to increase production. Controls forest establishment, composition, and growth. College degree required
Soils Specialist: Studies soils and creates soil maps for the forestry industry, farmers, and others. College degree required
Tree nursery worker: Grows seedlings, conducts research manages tree nursery. College degree required

Introduction and Mental Set

Give students the pre-test on forestry products that is located on the Georgia Forests Forever CD. Have students write down their answers on a piece of paper.

Discussion

4. Discuss with your students the pretest and the uses of forest products. If possible invite someone with the forestry industry into your classroom to talk about the forestry industry in Georgia and how important the forestry industry is to our economy. Discuss with you students the following forestry terms and careers

5. How have trees been used to help human development?
   What are Natural Resources? Name them.
   Name some of the vital careers in the Forestry and Natural Resource fields.
6. There are approximately 24 million acres of privately and commercially owned forest lands in the state of Georgia. There are over 10,000 products that are made of and from wood.
7. Trees are one of the most important natural resources in our state, country and world.
8. What are some of the direct benefits of trees?
9. What are some of the benefits of trees that are commonly overlooked?
   - environmental
   - economic
   - health
   - social

   Environmental:
   - Cleaner, Cooler Air: Trees absorb carbon dioxide produced by the combustion of various fuels and trap lung damaging dust, ash, pollen and smoke from the air. In addition, they provide shade for people and conserve energy.

- Trees provide shade which reduces temperatures and helps keep pollutants already in the air from becoming even more volatile, while also intercepting many of the solid particulates that are airborne.
- One acre of trees produces enough oxygen for 18 people every day.
- Trees act as natural water filters and help to significantly slow the movement of storm water, which lowers total runoff volume, soil erosion and flooding.
- Forested areas being cooler in summer and warmer in the winter.
- The air is moister in the forest resulting in less evaporation from forest soils.
- Forest soils are less subject to frost and freezing because of the forest litter.
- Forests help control runoff of rain water. The ground litter and humus allows seepage of water into the substratum where nature stores water. Forest act as a natural filter and help regulate stream flow.
- Forests shade along streams and lakes help regulate water temperatures and keep water cool enough to support fish. The filter effect of the forest also keeps the water clear and more conducive to fish life.
- Forests provide wildlife habitat. Some kinds of wildlife disappear when forest trees are removed.
- Forests are one of our best ways to prevent soil erosion. Trees are also effective in preventing wind erosion.

Economic:

- Trees enhance community economic stability by attracting businesses and tourists. Customers are willing to pay as much as 10 percent more for certain goods and services if businesses are located on tree-lined streets.
- Neighborhood green spaces typically increase the value of properties located nearby. Healthy trees can add up to 15 percent to residential property value.
- Strategically placed trees around a home can reduce summer cooling costs by as much as 30%, while winter heating costs can be reduced by a similar percentage by the use of trees as windbreaks.

Health:

- People are more inclined to get outdoors and exercise when their surroundings are greener. Greater physical activity leads to fewer cases of obesity, which in turn may help reduce other health problems such as heart disease and diabetes.
- Children who spend more time outside pay better attention inside. Attention deficit/hyperactivity disorder (ADHD) children, in particular, are better able to concentrate, complete tasks, and follow directions after playing in natural settings.
- Trees filter airborne pollutants and can reduce the conditions that cause asthma; asthma incidents increase in urban communities where trees are eliminated in favor of new roads, homes or commercial developments.

Social:

- Trees make communities livable for people and soften the outline of masonry, metal and glass.
- Trees can be associated with specific places, such as memories of past events or times, or a favorite tree climbed as a youth.
- Trees provide opportunity for physical fitness. Urban forests, parks, and open spaces have become increasingly popular as places to walk, run, bike, and hike.

10. Discuss the history of forests in the United States.
    -both hindrance and help to new settlers
    -lumber production peaked in 1909 with 50,000 mills, 500,000 workers, producing about 46 billion board feet of lumber
11. We should all be aware of some of the important facts about America's abundant forests (According to Forest Resources of the United States, USDA Forest Service):

- Total U.S. land area is 2,257,619,000 acres, of this total approximately 749 million acres are forested. (About 33%) Increased from 747 to 749 million acres (0.3 percent) between 1997 and 2002.
- U.S. forests contain over 800 species of trees of which 82 are non-native.
- Of the 749 million acres of forested land in the U.S., 504 million acres are available and suitable for timber management.
    a. Capable of producing in excess of 20 cubic feet per acre per year.
    b. 94% of Eastern Forests are classed as timberland, 80% of the Pacific Northwest, about 50% of the interior West and Southwest, and 10% of Alaska.
- 71% of timberland is privately owned (including forest industry).
    a. Non-industrial private ownership made up 58% of U.S. timberland.
    b. Industrial private forests accounted for 13% of U.S. timberland.
- Public forests comprise 29% of timberland.
    a. National forests are the largest Federal ownership, making up 19% of U.S. timberland.
- In 1989 about 2.1 billion seedlings were planted in the U.S.
    a. This amounts to about nine trees planted for every American.
    b. More than 3 million acres were planted in 1989, with 41% of that amount on forest industry land.
    c. Individual tree farmers planted 43% of the acreage, and the remaining 16% was planted on public lands.
- The top five states in planting and seeding:
    a. Georgia 484,791 Acres
    b. Alabama 301,135 Acres
    c. Florida 266,082 Acres
    d. Mississippi 256,967 Acres
    e. South Carolina 218,453 Acres
- Growth exceeds harvest nationally by more than 37%.
    a. Net growth in the southeast is approximately 40,382,812 cords per year. We harvest approximately 32,554,687 cords per year. This means we have a net annual gain in growth of approximately 7,828,125 cords in the southeast per year.
- The U.S. forest industry, comprising those who grow, manage and harvest trees and produce manufactured wood and paper products, has annual sales of more than $195 billion.
- The U.S. Forest Industry employs about 1.3 million people.
- The paper industry alone employs about 620,000 workers with annual sales topping $122 billion.
- In hundreds of rural communities, the forest products industry is the leading or only employer, and is the major source of revenues which support schools, roads, and other local government services.

12. What are some of the careers associated with the forestry industry? (logger, cutter, truck driver, foresters, forest technicians, etc.)
13. What are some of the careers you would be interested in doing? What might this job entail?

Possible Activities:

Georgia Forests Forever CD
Plan-It3: Lesson 4, Volume II – Uses of Wood
Plan-It3: Lesson 12, Volume II – The Forest Comes Back
Plan-It3: Lesson 11, Volume III – Forest Products Business
Plan-It3: Lesson 12, Volume III – Careers in Forestry
Project Learning Tree: Activity # 12 – Tree Treasures
Project Learning Tree: Activity # 13 – We All Need Trees
Project Learning Tree: Activity # 32 – A Forest of Many Uses
Project Learning Tree: Activity # 34 – Who Works in This Forest
Project Learning Tree: Activity # 40 – Then and Now
Project Learning Tree: Activity # 51 – Make Your Own Paper
Project Learning Tree: Activity # 89 – Trees for Many Reasons
Project Learning Tree: Activity # 91 – In the Good Old Days

Assessment Activity

Have students research at least one of the overlooked benefits of trees and tell the class the most important factor to them. Make lists on poster board and place around the room for the remainder of the unit.
Power Point Assessment
Group Project Presentation
Quiz

Attachments:

Introduction to Forestry
Forest Facts
Employment Opportunities
What do we get from Trees
Georgia Forest Facts

QUIZ Answers

1. **d**. Georgia
2. **d**. white-tail deer
3. **b**. 2.3 billion
4. **b**. 731 million
5. **a**. Jamestown
6. **T**
7. **T**
8. **F**
9. **F**
10. **T**

LESSON 2: FOREST PRODUCTS AND CULTURE

1. Identify the Standards. Standards should be posted in the classroom for each lesson.

MSAGED8-11- Students will identify the importance of the forest.
a. Identify different forest products and their uses.
b. Explain various forest management practices. (Examples include prescribed burns, wild fires, clear cut, thinning, reforestation, etc)

2. Review Essential Questions.

What benefits do forests provide to the public?

3. Identify and review the unit vocabulary.

forest products	forest management
prescribed burn	clear cut
thinning	reforestation

Introduction and Mental Set

Discuss the fact that Georgia is a state adorned with forests that cover more than 24 million acres of privately and commercially owned lands while emphasizing the importance of the forest products to the economy of the State of Georgia.

Discussion

4. What are some of the products trees provide to modern humans?
5. Name some forest products and their uses.
6. What are some of the management practices used in forestry?
7. **The importance of trees and forests as a natural resource.** In every land, and in all ages, trees have had an influence on the progress and welfare of humans. Trees provided early inhabitants with food, medicines, fuel, shelter, protection, shade, tools and other needs. Today, over 10,000 products are reportedly made of and from wood. It is one of the most important renewable resources on our planet. In addition to these direct benefits provided by forests we sometimes overlook other values derived from trees.

8. Have students close their eyes. "Let's take a tour of the local Wal-Mart. As you are walking up and down the aisle ways, look at items on the shelves and write down items that have anything to do with forestry, trees, or tree products." Reward the person with the most and on down. Make sure that students list the more obscure products like medicines, DVDs (paper listing the movie), etc. Discuss the answers with the students.
9. Explain the following by using power points or video of:
    a. prescribed burn
    b. wild fires
    c. clear cutting
    d. thinning
    e. reforestation
10. So how important is the forestry industry to our modern way of life?
11. Who is Smokey the Bear? What does he stand for?
12. Discuss students' opinions about management practices and which practices are the best to prevent forest fires.

Attachments:

Economic Importance of Forests
Products and Benefits of the Forest
Forest Facts and Myths
Forestry
Georgia Forestry BMP- Basic Management Principles
Prescribed Burning
Prevention and Control of Wildfires-forestry Science

LESSON 3: TREE PARTS AND FUNCTIONS (100 MIN)

1. Identify the Standards. Standards should be posted in the classroom for each lesson.

MSAGED8-12- Students will be able to classify and list examples of trees specific to our region.

a) Identify the two types of trees. (Evergreen and Deciduous)
b) Identify the major tree parts.
c) Describe the physiological processes of tree growth.

2. Review Essential Questions.

What are the functioning parts of a tree?

3. Identify and review the unit vocabulary.

xylem	phloem
rootlets	heartwood
cambium layer	stomata
photosynthesis	chloroplasts
tree	evergreen
deciduous	phellogen
mycorrhizae	root hairs

Introduction and Mental Set

Have the students imagine what the Earth would be like without plants and trees. Share with the students what it would be like to live on Earth without plants and trees. Our source of oxygen is based upon having living plants and trees to produce the air we breathe.

Discussion: Student notes can be found at the end of the unit. The following are teacher note sheets.

1. What is a tree?

A tree is a woody plant having one well-defined stem and a formed crown, usually 8 feet. Shrubs are usually smaller than trees and have several stems growing from the base.

2. **What are the three main parts of a tree and what are their functions?** The three main parts of a tree are **Crown**, **Trunk**, and **Roots**. Display and discuss handout/transparency I

A. Crown – This is the "manufacturing plant" of the tree. It is composed of leaves, branches, twigs and flowers. The wood structure is similar to that of the trunk. Conducting cells extend to the leaves from the smaller twigs.

1. The leaf area of the tree, including the branches, supports the leaves and flowers. Size and shape are affected by environment and genetics.

(a) Leaves

(1) Inside each leaf, millions of green **chloroplasts** are found. With the aid of sunlight (radiant energy), carbon dioxide from the air, and water from the soil, carbohydrates (starches and sugars) are produced. Oxygen is also produced as a by-product in this process called **photosynthesis**. The chemical formula for photosynthesis is
$12H2O + 6CO2 \longrightarrow C6H12O6 + 6O2 + 6H20$.

(2) Leaves are the most important chemical factories in the world. Their manufacturing process is called photosynthesis.

(3) Much of the water brought to the crown is transpired as water vapor into the atmosphere. Most of this occurs though pores, **stomata,** on the underside of the leaves. It is through the stomata that air passes in and out of the leaves.

Note: Look at leaves under microscopes.

(b) Branches

(1) Anchorage for leaves and flowers

(2) Conduction of fluids

(c) Flowers

(1) The reproductive organs of the tree, site of reproduction, production of fruit and seed.

B. Trunk - The trunk of the tree serves to conduct nutrients and water from the roots to the manufacturing portion of the tree represented by the crown. The trunk also produces the bulk of the useful wood in a tree. A cross section of the tree trunk will show a series of rings called annual rings. Under normal conditions, one ring is produced each spring and summer each year and this is why counting either all the dark rings or all the light rings will give us the age of the tree. Wood produced in the summer will be darker in color than wood produced in the spring.

In larger, older trees, the center portion is darker colored and is known as **heartwood**. The cells have ceased to function; the wood is dead and now only serves to give strength to the tree.

The lighter-colored wood next to the heartwood is the **xylem** or sapwood of the tree. This is a living portion of the tree and functions as the means whereby raw nutrients and water are carried from the roots to the crown. The sapwood or xylem also serves for storage of food synthesized in the leaves.

The layer of cells outside the sapwood and inside the bark is called the **cambium layer**. It is this layer of cells that are responsible for the growth of the tree and forms the annual rings.

Immediately outward from the cambium are the living cells called the inner bark, or **phloem**. This living tissue serves to carry food made in the leaves down to the branches, trunk, and roots. This is protected by dead, non-functioning outer bark. Division of the cambium forms both the phloem and sapwood.

The bark is developed from so-called **phellogen**, or cork cambium. It protects the trunk of the tree.

C. Roots – Extend deep into the ground and serve to anchor the tree against winds and other forces of nature. Large roots branch into smaller roots, **rootlets**, which in many species have fine hair-like roots called **root hairs.** These root hairs extract nutrients and water from the soil. Pines do not have these and depend on **mycorrhizae** attached to the rootlets to take up nutrients and water.

Assessment Activity:

Open Note Test

Attachments:

Open Note Test
Forest Info Sheet
Forestry 1 Unit 3, Lesson 1
Forestry 1 Unit 3, Lesson 2
Forestry 1 Unit 3, Lesson 3
Quiz Game-Tree ID Quiz
Georgia Forest Facts

LESSON 4: TREE IDENTIFICATION (100 Min)

1. Identify the Standards. Standards should be posted in the classroom for each lesson.

MSAGED8-12- Students will be able to classify and list examples of trees specific to our region.

d) Identify Georgia's commercially important trees.

2. Review Essential Questions.

What kinds of trees are important to Georgia?

3. Identify and review the unit vocabulary.

primary vein	margin	secondary veins
simple leaf	compound leaf	oval shaped leaf
broadleaf shape	entire margin	serrate margin
lobed margin	needle-like leaf shape	oblong leaf shape
alternate leaf arrangement	opposite leaf arrangement	whorled leaf arrangement
parallel leaf venation	pinnate leaf venation	

4. Introduction and Mind Set

Have students bring in from home different leaves from trees in their yards, or have students pick leaves off the trees on school grounds. As they pick the leaves ask and see if anyone knows the name of the tree.

Discussion

5. Why should we know the kind of trees in our yards, either home or school yards?
6. Which of the leaves we picked are the most commercially important to Georgia?
7. Tree identification is important to everyone that owns land or works in jobs that relate to trees. Trees are members of the **Plant** kingdom and are divided into:

Classes – Angiospermae (Hardwoods) or **Gymnospermae** (Conifers)

Orders – end in *ales*

Families – end in *aceae*

Genera

Species

8. The most important characteristics in the identification of trees are the leaves, twigs, bark, and reproductive structures *(fruit in angiosperms, cones in gymnosperms)*.

9. Leaves - generally, most trees can be identified by type, size, shape, color, texture, and arrangement of the leaves.

LEAF PARTS

Margin - the edge of the leaf

Primary vein - main vein of the leaf that contains the vascular bundles that carries food from the leaf and water and nutrients to the leaf

Secondary veins - veins branching off from the primary vein throughout the blade

Petiole-stalk of the leaf that attaches the leaf to the stem

LEAF TYPES

Simple - only one blade per leaf

Compound - three or more leaflets per leaf

LEAF ARRANGEMENTS

Alternate - only one leaf per node.

Opposite - leaves are paired at the same node.

Whorled - more than two leaves grow from the same mode.

COMMON LEAF SHAPES

needle-like - shaped like a needle; pine leaves

oblong - deviating from a square or circular form through elongation

oval - broadly elliptical

COMMON LEAF MARGINS

entire -having a smooth margin, free of indentations

serrate -with marginal, sharp teeth pointing toward the apex

lobed -a curved or rounded projection

Common leaf venation

parallel -equidistant from each other at all points and having the same direction or curvature

pinnate -divided in a feathery manner with lateral processes

Assessment Activity

Leaf Collection-Have students collect leaves from as many different trees as they can find. Students should attach leaves to a sheet of paper. Students should keep their collection together in a notebook. Pages should be labeled with the following information: date of collection, place of collection, common name of tree, scientific name of tree, 2 or 3 facts about the tree, this can include historical facts, etc.

Attachments:

Tree ID 1
Tree ID 2
Tree ID 3
Tree ID 4
Tree ID 5
Tree ID-Corbett
Tree ID-Jr. Natural Resources
Tree ID-Quiz game2
Tree Identification-Forestry CDE
Trees ID-Environmental Nat Resources CDE 8 of 9
Tree Study Quiz Game-Corbett
Quiz-Tree ID

LESSON 6: CONSERVATION AND PRESERVATION OF NATURAL RESOURCES (100 MIN)

1. Identify the Standards. Standards should be posted in the classroom for each lesson.

MSAGED8-13- Students will explain the importance of conservation and preservation of natural resources.

a) Define conservation and preservation of natural resources.
b) List methods of conservation and preservation of natural resources.
c) Compare and contrast renewable and nonrenewable resources

2. Review Essential Questions.

Why should people be concerned about conservation of natural resources?

3. Identify and review the unit vocabulary.

conservation	preservation
renewable resources	non-renewable resources
exhaustible resources	non-exhaustible resources

Introduction and Mental Set

People rely on natural resources to survive and to improve lives, but they often forget that taking resources from the earth has an impact on the environment. Whether these resources are renewable, exhaustible, or non-exhaustible, the stress placed on the ecosystem must be carefully monitored. Ecology and conservation emphasize the importance of managing resources and balancing the positive and negative aspects of technology.

Ask students to reflect on the results of running out of some natural resource such as air, soil, water, or wildlife.

Supervised Study

Divide the class into groups and assign each group a natural resource. Have groups visit the library to gather information on their resources. (It is suggested that each group member be assigned an individual responsibility within the group.) A handout for research (6GA 5.3.1) is provided. After researching their topic, have each group present its answers in oral or written form. Suggest that students use examples and visuals to support their information.

*Note:*Groups should be supervised to ensure that each student makes a contribution. The text *Agriscience: Fundamentals and Applications* is an excellent reference for this assignment.

4. Discussion:

1. *Question: What are some characteristics and uses of natural resources?*

Answer:

X They occur naturally on the earth.
X They are part of the environment.
X They are part of the food chain.
X They are used to improve human life.
X They are a source of recreation.

2. *Question:* *What are seven natural resources and how is each important to the environment?*
Answer:

- X **Forests/Plants:** provide food for animals and humans; add organic matter to soil when they decay; part of the air exchange process; help cool the earth
- X **Soil:** all plant life comes from soil; all growth comes from topsoil. Acreage topsoil thickness is 8". It takes 100 years to replace 1".
- X **Air:** essential for life; part of the photo synthetic process; oxygen in air is used by animals to convert food to energy
- X **Water:** (streams, lakes, oceans, rivers): covers approximately 70% of the earth's surface; provides recreation; provides food, minerals, etc.; necessary for all life
- X **Wildlife/Fish:** part of the food chain; provides recreation
- X **Minerals:** used to make hundreds of products; examples: iron, gold, salt, lead, silver
- X **Energy:** some forms come from plant and animal remains; provided by natural gas, coal, oil, wind and water

5. Assessment Activity

1. Videotape the oral group presentations and play them back to the class.
2. Divide the class into groups and play *The Resource Game:* before class, develop a set of flash cards listing various resources, e.g., lion, white pine, topsoil, deer, oxygen, sand, lake, oak. In class, hand out the cards and have students find the rest of their resource group, e.g., wildlife: lion, deer, etc.; plants: white pine, oak, etc.
3. Play Oh Deer activity from *Project Wild*. (*Project Wild* P.O. Box 18060 Boulder, CO 80308-8060. Phone # 303-444-2390.)

LESSON 7: WILDLIFE IN GEORGIA (100 MIN)

1. Identify the Standards. Standards should be posted in the classroom for each lesson.

MSAGED8-14- Student will be able to describe wildlife and their habitat.

a) Identify local wildlife species and their relationship to the forest.

2. Review Essential Questions.

3. Identify and review the unit vocabulary.

DNR	domestication
wildlife	wildlife management
habitat	

4. Introduction and Mental Set

Ask the students to draw what the ideal living conditions for them would be. Make sure to tell them to include: Physical location (where on earth they would want to live Alaska, Georgia, Florida, etc.) living area, sleeping area, food, and activities they would need. Based on their drawings have the students guess how large of an area they would need in order to live comfortably and would they want to have other students living close by or would they want to be alone.

5. Discussion

Discuss with your students their living conditions. Have the students share their living conditions with their neighbor and have them write down five things that are similar and five things that they see that are different between their living conditions and their neighbors'.
All students should have listed at least these four items: food, water, cover, and space. These four items are the requirements for any habitat. The students' habitats will probably have more similarities than differences. These similarities are because the habitats are for the same species. Humans however have a major advantage over all other species in that we can change our surroundings drastically

Suggested Activities:
Georgia Forests Forever CD
Plan-It3: Lesson 6, Volume III Wildlife
Project Learning Tree: Activity #22 – Trees as Habitat
Project Wild Activity Guide – Turkey Trouble

6. Assessment Activity

Georgia Forest Forever CD
Plan-It3: Lesson 15, Volume 1- Animals
Project Wild Activity Guide- Who Lives Here?

Attachments:

Reptiles and Amphibians of Eastern Ga
Reptile Amphibian ID-Environmental & Nat. Resources CDE
Mammals of Georgia
Snakes of Georgia-P.Gentry
Snakes of Georgia-Flanders
Wildlife Identification

LESSON 8: ENDANGERED WILDLIFE

1. Identify the Standards. Standards should be posted in the classroom for each lesson.

MSAGED8-14- Student will be able to describe wildlife and their habitat.
b) Identify Georgia's endangered wildlife species.

2. Review Essential Questions.

3. Identify and review the unit vocabulary.

extinction	endangered species
Endangered Species Act	National Park Service
threatened species	rare species

Introduction and Mental Set

Begin by showing your students a picture of a Dodo Bird or Passenger Pigeon or another extinct species and ask you students if they have ever seen one in real life. Inform the students that they will not be able to see one because these animals have gone extinct. The main reason for their extinction has been mismanagement of their habitats by humans in the past. Discuss with your students the terms below and the importance of wildlife management. If possible have a state DNR officer come visit the classroom and discuss Georgia's endangered species and DNR's purpose and function.

4. Discussion

Extinction: The species is no longer in existence with no hope of recovering them. (Ex: Passenger Pigeon, Dodo Bird.)
Endangered Species: This is a species that will become extinct if something isn't done to help. Very few if any in this category are still in the wild, most are in zoos or wildlife management centers. (EX: Greater Panda, Galapagos Giant Tortoise, California Condor.)
Endangered Species Act: Passed by congress in 1966, allows animals that have a declining population to be placed on a threatened or endangered list. Animals and habitat on this list will be protected so that their populations can be increased to a point where they may be taken off the threatened or endangered species list.
National Park Service: The department in the federal government that is in change of the National Park System (ex: Yosemite National Park, Great Smokey Mountain National Park, etc)
Threatened species: This is a species that will become endangered if not managed properly. There are currently more than 100 species that are threatened in the US.
Rare Species: These species are protected in an attempt to prevent them from becoming threatened. (EX: Chimpanzees):

5. Assessment Activity

Plan-It3: Lesson 7, Volume III Endangered Species
Extinction List: Have students research other animals that are extinct, endangered, rare, and threatened. Have students draw pictures of these animals, or get pictures off the internet. Students should list where the animals should live and why they are on the list as being endangered, rare, threatened.

6. Attachments:

LESSON 9: Using a Biltmore Stick (Optional)

1. Identify the Standards. Standards should be posted in the classroom for each lesson.

MSAGED8-10- Students will define the forestry & natural resource industry.
d) Research careers in the forestry/ natural resource industry.

2. Review Essential Questions.

3. Identify and review the unit vocabulary.

extinction	endangered species
Endangered Species Act	National Park Service
threatened species	rare species

Introduction and Mental Set

Begin by showing students a Biltmore stick. Ask them what it is used for and how it is used. Students can even create their own Biltmore sticks if time permits (attached website given has instructions on how to do this). The teacher can show students the YouTube video given which describes how to use a Biltmore stick to make tree measurements in forestry. Then there is an attached worksheet, **Parallel and Perpendicular Lines**, which emphasizes the math used with Biltmore sticks.

4. Discussion

Biltmore Stick: A tool used to measure various tree dimensions.
Parallel Lines: Lines that are equidistant apart at all times, lines that never intersect.
Perpendicular Lines: Lines that intersect or meet at a 90 degree angle.

5. Assessment Activity

Parallel and Perpendicular Lines worksheet

6. Attachments:

Parallel and Perpendicular Lines

Website on how to make your own Biltmore stick (also includes how to use one):
http://www.ont-woodlot-assoc.org/sw_biltmorestick.html

YouTube video on how to use a Biltmore stick:
http://www.youtube.com/watch?v=oX6YSebzZp4

Attachments for Learning Experiences: Please list.

Notes & Reflections: May include notes to the teacher, pre-requisite knowledge & skills, suggestions, etc.

CULMINATING PERFORMANCE TASK

Culminating Unit Performance Task Title:

Culminating Unit Performance Task Description/Directions/Differentiated Instruction:

Attachments for Culminating Performance Task:

UNIT RESOURCES

Web Resources:

www.gaaged.org
www.gactaern.org

Attachment(s):

Materials & Equipment:

Books:

Aquatic Project Wild. 1992. Bethesda, MD. Project Wild

Exploring the Forest Adventure. 1996. Montgomery, AL Plan-It 3

Lee, Jasper S.; Patrick, Amanda R.; Vaughn, Rosco; Vaughn-Randel, Shelly; and Murphy, Erin. *AgriScience Discovery.* Danville, IL: Interstate Publishers, Inc.

Morgan, Elizabeth M.; Lee, Jasper S.; and Wilson, Elizabeth. *AgriScience Explorations.* Upper Saddle River, NJ: Prentice Hall Interstate.

Project Learning Tree. 1987. Washington, DC. The American Forest Council

Project Wild. 1992. Bethesdia MD. Project Wild

Holland, I. I. & Rolfe, G.L. *Forests and Forestry.* Interstate Publishers, Inc. Danville, IL.
Irwin, Kris *Science of Forestry Management* AAVIM, 220 Smithonia Road, Winterville, GA 30683
Symonds, W.D. *The Tree Identification Book* Quill 1350 Ave. of the Americas New York, NY 10019
Georgia Ag Ed power point: Forestry_I_Unit_3 _Lesson_1_Tree_Parts.ppt

EQUIPMENT, SUPPLIES, MATERIALS

Georgia Forests Forever CD
AG Ed CD Set
Overhead projector
Handout/Transparencies
Increment Borer
Microscope
Slides

What 21st Century Technology was used in this unit:

x	Slide Show Software		Graphing Software		Audio File(s)
	Interactive Whiteboard		Calculator		Graphic Organizer
	Student Response System		Desktop Publishing		Image File(s)
	Web Design Software		Blog	x	Video
	Animation Software		Wiki		Electronic Game or Puzzle Maker
	Email	x	Website		