“Step Up” Goes Into the Forest

Grades: 4-6 Academically Talented and Gifted Group (ATG)-Step Up
Subjects: Science, Math, ELA, Social Studies

UNIT OVERVIEW
This unit will be done with the ATG group (aka “Step Up”) which includes students from 4th through 6th grade in an after school program of 2 hours every other week. The theme of this unit is to become more familiar with the role of the forest in ecosystem succession. In grade 6, science content expectations include several core standards regarding ecosystems. Currently, I teach a unit in which each of my 6th grade students research a Michigan organism in much detail to discover the critical role it plays within its ecosystem. This forest unit that I will complete with ATG will be complimentary to my already existing unit on ecosystems. It will prepare the grades 4 & 5 students for the curriculum they will work with in grade 6. It will also benefit the current 6th graders since it will compliment what they are learning as they spend time with ecosystems studies during class time. My goal is to get the students outside appreciating nature, gaining scientific skills, developing communication skills and having fun.

TEACHING AND LEARNING OBJECTIVES

- Students will understand that concept of drainage and its implications about the soil.
- Students will be able to identify basic species of trees using reference materials.
- Students will be able to identify basic species of bugs using reference materials.
- Student will map out a plot.
- Students will understand the PH of soil and how that relates to the ecosystem.
- Students will know how to read tree cookies.
- Students will be able to collect data of measurements of tree height and circumference.
- Students will be able to identify invasive species and understand their impact on an ecosystem
- Students will be able to describe why trees lose their leaves.
- Students will gain insight of the history of logging and become aware of the impact of logging on our state of Michigan.

CONTENT BENCHMARKS ADDRESSED (6th grade)

Writing-VOICE students will learn to communicate information accurately and effectively and demonstrate their abilities to write creatively, expressively and engagingly.

Math-GEOMETRY & MEASUREMENT II.3
- Use standard tools of measure
- Appropriate units of measure
- Indirect measurement to draw inferences.
- Apply measurement to describe real world illustrations & to solve problems
DATA ANALYSIS II.1.1 Collect and explore data through observation, measurement, surveys, sampling, techniques and simulations.

SOCIAL STUDIES-HISTORICAL PERSPECTIVE I.2.1&2
1. Summarize events from the past relating to local community, state and country.
2. Use narrative and graphic data to compare the past to the present

Science-ECOSYSTEMS III.5
1. Explain how parts of an ecosystem are related and interact.
6. All students will analyze how humans and the environment interact.

REFERENCES


The Greatest Good: A History of Forest Mgt & USFS

ASSESSMENT

Pre-Test given at meeting #1
Field Notebook kept throughout the unit
Shoebox with all samples collected, labeled and kept organized throughout the unit
Powerpoint presentation of findings at meeting #14
Post test given at meeting #16
UNIT PLAN

Meeting #1-Introduction of Unit to students.  

Pre-Test

Materials needed: Story of The Forest of St. Shrew, paper and colored pencils

Forest of St. Shrew (Project Learning Tree page 40). Student’s will describe some of the plants and animals that characterize several microhabitats within the forest. They will begin by describing what they know about forests. Do a reading activity of The Forest of St. Shrew. Hold a discussion with assessment questions and then have students draw scenes from the story. Pre and Post reading activities can be included.

Tree Factory (Project Learning Tree page 269). By acting out the parts of a tree, students will understand the structure of a tree and how the parts function together.

Meeting #2-Group will walk to Clinton River Park

Materials needed: Field Notebook, sandwich bags for soil & leaves, trowel, measuring tape, container for bugs, tweezers, digital camera, reference book to identify trees, shoebox to hold all materials and sample collections, coffee can (with top and bottom removed), jug of water, nail & timer.

Field Notebook Students will keep their field notebook throughout the year and continue to gather information at each trip to the park and complete follow up activities when back at school.

Soil Investigation & Soil Percolation Test (Project Learning Tree page 297-302). Students will collect a small soil sample from the base of their tree. It will be contained in a labeled sandwich bag and students will complete the Soil Investigation (from Project Learning Tree) observations in their field notebook. Teacher will demonstrate the drainage of the stand by using a coffee can with both the top and bottom cut off. Dig the can into the soil. Fill it with water and time how long it takes for the soil to soak or drain the water. Discuss what this means about the soil in this plot. Students will record in seconds how long this took in their field notebook. Next, using a nail the teacher will push the nail into the soil with her thumb as far as it will go without using too much force. Students will record the depth of the nail that went into the earth. Students will then complete the soil percolation test and nail depth near their tree.

Meeting #3

Materials needed: Leaf samples collected at park, reference materials (to identify leaves/trees), microscopes, ph strips, tree cookies, SEE LT BOOK

Name Tree (Project Learning Tree page 289 and 276). Using the background provided about trees in Project Learning Tree’s activity Name that tree I will have students confirm their tree’s name and then we will go outside to complete Mystery Trees. Using the characteristics which help to identify trees, students will match clues given about tree characteristics with tree leaves and names.

Signs of Fall (Project Learning Tree page 338). Using a leaf sample collected at the last visit to the park, students will tear up two of the green leaves collected and place the pieces in a glass container with rubbing alcohol. Repeat this for two more containers. Tape to a pencil a strip of coffee filter paper. Lay the pencil across the container and adjust the strip so that it just touches the alcohol. The strip will absorb the liquid. When the alcohol is half way up the strip (at least an hour) remove the strips and lay
them on clean paper towel to dry. Observe the chlorophyll bands and the carotenoid pigments. Have a
discussion. Repeat this procedure with leaves collected in the late fall.

Soil Ph-Students will use ph strips to test the ph of the soil. Then they will research what their soil’s ph
tells us about the stand that the sample was taken from. Students will describe the soil in their field
notebooks.

**Meeting #4**

**Materials needed:** Paper plates, ruler, writing materials

**Every Tree For Itself** (Project Learning Tree page 117). Students will simulate how trees compete for
essential needs using manipulatives to represent water, sunlight and nutrients. They will stand in
proximity to their peers (other trees) and try to collect the most essentials. Discuss what happens to
each tree as a result of what they did or did not get in the gathering stage.

**Tree cookies** (Project Learning Tree page 327). Students will learn how to read the rings on a tree cookie
and to tell how old a tree is. They will use tree cookies and diagrams of tree cookies during this process.
Students will then look in their field notebooks to get the circumference of their tree from the park.
They will draw this circle on large butcher paper. Then, I will tell them how old the stand that our trees
are located is. Given that, the students will find the diameter. They will then construct rings appropriate
to the tree’s size (about 2-4 rings per inch). Students will then begin to research topics related to the
tree’s history to report back (possible significant events in the tree’s lifetime ie.) drought, fire, flood,
significant world events, state events, events of people related to Dresden or its community throughout
the lifetime of the tree). Students can label the life size diagram with the events and year they took
place. The next phase of this activity would include students making a tree cookie of their lifetime.
Given a paper plate they will construct rings for each year of their life. They will label each ring with a
significant event that took place that year of their life. This personal lifetime cookie can be used
throughout the year to springboard for writing activities.

**Meeting #5-Back to Clinton River Park**

**Materials needed:** Shoebox with Field Notebook, sandwich bags for soil & leaves, trowel, container for
bugs, tweezers, digital camera, coffee can (with top and bottom removed), jug of water, timer.

**Trip to local park**

**Field Notebook:** Map Plot-Students will create a map (in field notebook) of all the trees in our marked
off section of the stand identifying their own tree on the map.

**Bursting Buds** (Project Learning Tree page 277). Students will describe the stages that leaf buds go
through as the leaves develop throughout the year. In late fall students will observe the branches of
their trees for signs of buds. They will examine the branch for different features. They will review a
diagram of a twig and and then take notes in their field notebook about their tree’s buds and sketch the
twig with labels for each part.

Students will collect all information in their field notebook for this trip to the park.
Meeting #6 - Meeting in science lab

Materials needed: Leaf samples, bug samples, reference materials for identifying bugs, pH strips and soil samples

Students will continue with Signs of Fall with the newly collected leaf samples.

Bug Identification - Students will take out their bug samples/collections and use reference materials to learn about the bugs they have found.

Soil pH - Students will test the new sample of the soil for pH and compare it to the last collection they tested.

Meeting #7 - Meeting in DiFalco’s room

Materials needed: Video “The Greater Good”, leaf and needle samples

Conifers vs. Deciduous (Project Learning Tree page 277) - Using sample needles and leaves from conifers and deciduous trees, students will create a definition of conifer and deciduous. After this they will further research the differences between the two types of trees.

The Greater Good

Meeting #8 - Back to Clinton River Park

Materials needed: Yard stick, Shoebox with Field Notebook, sandwich bags for soil & leaves, trowel, container for bugs, tweezers, digital camera, coffee can (with top and bottom removed), jug of water, timer.

Trip to local park

How Big (Project Learning Tree page 284). Students will be measure trees in a systematic and consistent way.

Field Notebook

Continue with Conifers vs. Deciduous - students will identify conifer trees and deciduous trees in the park

Meeting #9

Materials needed: video “The Greater Good”

Finish Greater Good

Who works in this Forest (Project Learning Tree page 145). Students will explore the different jobs that are related to the forest resources.

Meeting #10

Materials needed: Birdhouse kits and tools to build, paint & paint brushes

We all need Trees (Project Learning Tree page 65). Students will learn how many different products we get from trees. Students will be investigating items that are used everyday that come from trees.
Make birdhouses

**Meeting #11-13**

3/7, 3/21, 4/4

Materials needed: computer for each student with power point software, digital cameras and usb cords to upload pictures

Work on PowerPoint Presentation

**Meeting #14**

4/18

Materials needed: Presentation screen (ELMO/projector)

Presentations

**Meeting #15**

5/2

Materials needed: Stepping Stone kits

Invasives (Project Learning Tree page 59) Students will research and identify invasive plants that are a problem to the local area and discover ways to prevent and remove these species.

Make Stepping Stones for school garden

**Meeting #16**

5/16

Materials needed: trowels, garden gloves, scissors, garbage bags, rakes, yard work clothing

Clean school garden

Look for invasives

Post Test
FIELD NOTEBOOK and SAMPLE COLLECTIONS

You are keeping this field notebook throughout the entire season of Step Up this year. I will be assessing your notebooks for;

- Completion of activities /100pts
- Effort and Accuracy /100pts

You will be collecting samples at each park visit and then completing research with them back in the lab. You will be assessed on your sample collections within your shoe box throughout the entire season of Step Up.

- All samples located within shoebox /100pts
- All samples are labeled and organized /100pts

POWER POINT-All About My Tree

You are presenting to your peers, family and Mrs. DiFalco. Your presentation should be formal, visually pleasing (themed backgrounds, photographs, diagrams etc.), organized, creative, informational and well rehearsed. Below are the criteria that will be assessed within your powerpoint presentation. You should have a minimum of 10 slides and 10 images. You will use all information gathered in your field notebook, your photographs and any references available.

- Locate your tree on the map of the stand (diagram of map and picture of you with tree) /3pts
- Identify your tree correctly and give evidence as to how you know that this is the correct identification. /2pts
- Describe using pictures and captions the leaves of your tree (from each of 3 visits to the tree) /6pts
- Describe using pictures and captions the bark of your tree /2pts
- Describe the soil surrounding your tree and your conclusions /2pts
- Discuss the bugs found near/on your tree and your conclusions (share photographs) /2pts
○ Discuss any wildlife observed near/on your tree and your conclusions (share photographs) /2pts

○ Share measurements (height and circumference) taken of your tree /2pts

○ Link measurements to a brief history of your tree (age, origins, csi etc.) /5pts

○ What role does your tree play in this ecosystem? /5pts

Organized /10pts, Creative /10pts, Well rehearsed /10pts
**PRE & POST TEST**

1. Draw an Oak leaf.

2. Draw a tree cookie of a tree that was 12 years old when it was cut AND that experienced trauma in its 6\(^{th}\) year.

3. A Ph of 5 means that soil is
   a. acid
   b. alkaline
   c. mud

4. Trees lose their leaves because
   a. it makes for a pretty fall background
   b. it keeps the tree from losing water in the winter
   c. the tree dies in the winter

5. Forest fires are ALWAYS bad for the health of a forest.  
   **T/F**

6. Invasive plants will allow a forest to become more diverse.  
   **T/F**

7. All trees lose their leaves in the fall  
   **T/F**

8. If the soil does not soak up much water than the forest will die  
   **T/F**

9. Everyone agrees that logging trees is detrimental to our earth  
   **T/F**
FIELD NOTEBOOK

Forester:

Park Visit #1

Make a sketch of your tree. Draw the shape of its trunk, branches, and canopy (treetop). Have someone take a picture of you with your tree.

Find out what kind of tree it is. Does it have any fruits, nuts, or seeds that help identify it? Sketch what you find or collect a sample if able. Use a field guide or other reference to look up its name.

Name of Tree: ___________________________________________

Measure the circumference of your tree’s trunk.

_________________________ inches

Collect a leaf sample. Describe it here and sketch it.
Use a trowel to gather a sample of the soil beneath your tree. Label the bag with today’s date. Describe your soil.

Investigate to see if you can find any signs of life.

Use your magnifying lens to look for any bugs. If you find any, collect them as samples and place in your bug container. Be sure to take photographs of what you find. How many bugs did you collect today? ________

Are any animals on or near your tree? Are there any signs that animals have used your tree in the past? Look for holes, nests, trails, scat and other animal signs and describe what you see. Take pictures of any evidence you find.

As a group we will investigate how long it takes for water to drain in the soil near this stand. Record the time it takes below.

How long did it take for the water to drain in this stand? ____________sec.
Park Visit #2

Describe any changes you notice since the last visit to your tree.

bark:

leaves:

seeds/nuts:

animals/bugs:

Draw a diagram of a twig and buds from your tree. Label the parts (duds, terminal bud (not every tree has one), leaf scars, and ring of terminal bud scars (bud scale scars). You may use the diagram that I provided you with.

Where is your tree within this stand? Draw a map of your tree’s location.
Samples
  - leaf
  - soil
  - bugs

Photographs
  - Tree
    - living organisms on near tree
    - evidence of living organisms

How long did it take for the water to drain in this stand? ____________ min.

Park Visit #3

Draw a diagram of a twig and buds from your tree. Label the parts (duds, terminal bud (not every tree has one), leaf scars, and ring of terminal bud scars (bud scale scars). You may use the diagram that I provided you with.

Using the method we practiced, find the measurement of the height of your tree.

_____________________

Explain why a forester would want to know the height of a tree.
Samples
  o leaf
  o soil
  o bugs
Photographs
  o Tree
  o living organisms on near tree
  o evidence of living organisms

How long did it take for the water to drain in this stand? ___________ min.

Is your tree a conifer or a deciduous tree? How do you know. Find the other type of tree and collect a sample of its leaves/needles.