Title: Traveling the Path to Mt. Rogers

Abstract/Vignette: To explore with students the ecology, geology, and history of the Appalachian Trail and its link to our community, and to foster an understanding and appreciation of the Trail.

Grade level(s): Please check all that apply.
- ☑ K-2
- ☑ 3-5
- ☑ 6-8
- ☑ 9-12
- ☐ College and Lifelong Learning

Discipline: Please check all that apply.
- ☑ Literature and Language Arts
- ☑ Mathematics
- ☑ Science
- ☑ History
- ☐ Foreign Language
- ☐ Art and Music
- ☐ Health and PE
- ☐ Social Studies and Geography
- ☐ Technology

Year Developed: 2009

Period (month, week, year): 3 weeks

Teaching environment:
- ☑ In the Classroom (indoors)
- ☑ On the Trail
- ☑ In the Community
- ☐ Online/Virtual
**A Trail to Place-Based Service-Learning Curriculum**

**Project Name:** Traveling the path to Mt. Rogers

**Teachers:** Andrea Overbay, Leslie Peterson, and Julie Reimer

**Grade Level:** Middle and high school

**Time Frame:** 3 weeks

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**Start Here!**

**Big Idea**
What is the main idea you want your students to come away from the unit knowing? To explore with students the ecology, geology, and history of the Appalachian Trail and its link to our community, and to foster an understanding and appreciation of the trail.

**State Standards**
(Objectives/Anchors/Outcomes)

Which elements of the state framework of standards does this unit address? What are the skills and outcomes you are working towards? Please see the detailed list of standards attached to our lesson plans. Our project covers the following Virginia Standards of Learning: Earth Science 1abc, 2ab, 3bed, 5ab, 6abc, 7abde, 8abc, 10bcd Biology 1adih, 3a, 5ad, 7bce, 9abce, 9bde Virginia History 1c, 2, 6b United States History 1b, 2, 4d, 6a Limited English Proficiency 1.1, 1.4, 1.5, 1.7, 1.8, 2.2-2.4, 2.6-2.12, 3.1, 3.2, 3.6-3.9, 4.1, 4.4-4.7, 4.9

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**Skills and Habits of Mind**

What are the academic or life skills students will gain from this unit? What habits of mind do you expect them to demonstrate? Think all disciplines.

- The student will gain knowledge and appreciation of natural history, outdoor-living skills, and aesthetics of nature.
- Students will gain confidence to go on future outdoor adventures.
- High school students will learn how to mentor English language learners.
- Students will develop writing and photography skills.

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**Service Project**

What project(s) could your class undertake that would actively engage your students in learning about this theme? What could the final product be?

- Students volunteer wherever needed at the 2011 ATC biennial meeting at Emory and Henry College.
- Students lead an interpretive hike during the Mt. Rogers Naturalist Rally.
- Students provide trail magic to thru-hikers during Damascus Trail Days.
- Students volunteer with a local trail maintaining club.

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**Partnerships & Benefit(s)**

Who are potential community partners that could assist you in this project? What are the potential benefits for your class and your partners of working together?

- Mary Alice Hardin: local naturalist who will assist with natural history education.
- Department of Conservation and Recreation will provide resources for natural history education.
- Dan Kegley: reporter at local newspaper who will teach students journalism skills.
- Friends of Mt. Rogers Club: will provide information about the Mt. Rogers trails and history of the region.
- Mt. Rogers AT Club: members will be invited to hike with students.
- Kimberly Wright: owner of outdoor store who will provide examples of proper hiking equipment.
- Sara Williams: geologist who will give a presentation on the geology of the Mt. Rogers area.

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**Essential Questions**
(Objectives)

What are the essential questions that will help guide students toward understanding the Big Idea?

- What do you need to know before you go on a hike?
- What do you need to take with you on your hike?
- What will you see along the way?
- What is the Appalachian Trail?
- What is significant about the ecology, geology, and history of the Mt. Rogers region?

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**Student Role**
(Youth Voice)

How will you guide your students to express ideas, be involved in project decisions, and evaluate outcomes?

- Students will select a topic for their newspaper article.
- Students will design a lesson to teach outdoor skills to middle school ESL students.
- Students will design a board game to teach Mt. Rogers geology, history, and ecology to middle school ESL students.
- ESL students will design photography presentations for the county tourism center.

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**Community Connections**

What opportunities or needs exist in your school or community that could be addressed by a student project related to your big idea for learning?

- Students’ reflections on their Appalachian Trail experience published as a series in the local newspaper.
- Student photography inspired by their trail experience displayed at the county tourism center.
- Postcards developed from student art work printed and sold at local businesses.

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**Resources**

Describe resources (books, articles, materials, supplies) you will use to support this unit?

- Leave-No-Trace 101 activity book
- ATC’s Planning a Hike book
- Mt. Rogers area maps
- Plant and animal guide books
- Notebooks, first-aid kits, cameras, compass, and art supplies.

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**Models & Examples**

How will students understand the expectations for their project? What examples of student work will they see? What opportunities will there be for them to critique each other’s work?

- Students will play the games that other students have created and give them feedback.
- Students will play the games that other students have created and give them feedback.
- Students will design a board game to teach Mt. Rogers geology, history, and ecology to middle school ESL students.
- ESL students will design photography presentations for the county tourism center.

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**Reflection**

How will reflection be built into your curriculum? Brief Head/Hands/Heart and Graffiti assessments will give students a chance to reflect after activities and presentations.

- Students will draw, write, and take pictures to put in a nature journal during the hike.
- Students will write a newspaper article reflecting on their trail experience.

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**Final Celebration**

How will you celebrate the success of your unit and share its results with the school and community?

- A community reception will be given for the students at the county tourism center. Community leaders, school officials, guest presenters, and trail enthusiasts will be invited to participate.
- A cookout at the town park will follow, giving the students the opportunity to mingle and demonstrate their outdoor knowledge.

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**Your Evaluation of the Unit**

How will you evaluate the unit and make note of what worked well and what could be improved? How will you analyze and interpret project outcomes?

- Student assessments
- Teacher reflections
- Students’ apparent level of interest on a daily basis
- Mastery of state standards
- Quality of newspaper articles and artwork.
- Students’ continued interest in the outdoors: will they ask us to plan more activities like this for them?

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**Student Assessment**

How will you assess student learning? How will you know if they have met the goals for the established outcomes?

- Have students use rubrics to focus their work while creating games, lessons, artwork, and writing articles.
- Pre-test students' knowledge using an interactive student activity.
- Periodically assess retention of individual elements of the curriculum with Graffiti and Head/Hands/Heart reflections.
- Post-test students' knowledge: see lessons 5 and 9.
- Gauge increased interest in the Appalachian Trail by offering additional volunteer activities (see the Service Project box for possibilities.)
Program Theme: To explore with students the ecology, geology, and history of the Appalachian Trail and its link to our community, and to foster an understanding and appreciation of the Trail.

Program facilitators: High school biology and ecology teachers collaborating with the English as a Second Language (ESL) coordinator.

Student grade levels: High school juniors and seniors mentoring middle school ESL students.

Program goals: Chilhowie High School lies within view of Mt. Rogers, the highest mountain in Virginia. A thirty-minute drive from Chilhowie puts us on the Appalachian Trail heading toward the peak of Mt. Rogers. Few students take the opportunity to explore the Mt. Rogers high country. We plan to lead our students on a hike to Mt. Rogers. Prior to the hike, we must create a framework of outdoor-living skills and natural-history knowledge to build students’ confidence and ensure a successful trek.

This program will be presented via a high school Ecology course. Over a three-week period, students will learn about outdoor-living skills and natural history, present this information to middle school ESL students, and conclude with a hike to Mt. Rogers. After the trip, students will connect with their community by publishing articles in the local newspaper, displaying art work at the county tourism center, and creating postcards for sale in local businesses.

Program details: Please see attached lesson plans for a breakdown of daily activities, and correlations to the state standards of learning. We have also attached the TTEC curriculum map.
Lesson Plans

Week 1: What do you need to know before you go on a hike?

Lesson 1: Direction of Travel

1. Warm-up activity: Ask for a student volunteer and blindfold them. Lead them around the room, changing direction often as you go forward, backward, and turning in circles. Next, ask them to describe where they are. Following this, lead a brief discussion about how it feels to be lost. (5 minutes.)

2. Place a topographic map of the Mt. Rogers area on the overhead projector. Teach students about topo lines and how they show elevation. Go over the other symbols on the map: how trails and roads are marked, the map’s scale, etc. Trace the trails from Elk Garden parking area to Mt. Rogers and discuss the elevation change based on the topo lines. Have students describe what they think the vegetation would be like based on the colors on the map. Also ask them where they would be likely to find water. (15 minutes)

3. Divide the students into groups with laminated topo maps. Give them overhead-projector markers, and ask them to trace a route that would be steep and a route that would be flat. Circulate between the groups to check their work, and ask them which direction their routes are going (north, south, east, west). (This will give you an idea of how much they know about reading direction from a map!) (15 minutes)

4. Gather the group back together and show them a compass: its parts, how to adjust it, and how to read it. Briefly mention the difference between true north and magnetic north, using the topo map. Demonstrate how to use the compass by walking in a square around the room: point the compass parallel to one wall and take 10 steps, then turn 90 degrees and take 10 more steps, turn 90 degrees and take 10 more steps, turn 90 degrees and take 10 more steps—which should put you back in your starting spot. (15 minutes)

5. Head outside with the students and compasses.
   a. Have the students line up shoulder to shoulder and adjust their compasses so they are pointing straight ahead. Play “Simon Says” with the compass. Example: “Simon says turn 30 degrees west!” Continue until they all get the hang of using their compasses.
   b. Give them a penny and a piece of paper with directions that say: “Place your penny on the ground at your feet. Orient your compass so that it is directing you straight ahead. Walk 20 steps straight ahead. Use your compass to turn 45 degrees east. Walk 20 steps. Turn 45 degrees east. Walk 20 steps. You should be close to your penny! Find your penny and bring it to the teacher.” (30 minutes)

6. Go back to the classroom and hand students a short reflection “exit ticket” asking them what they learned.

7. Optional homework assignment: give students a handout describing GPS. Have them read it, then list the pros and cons of taking a GPS versus a compass hiking.
Lesson 2: Plan Ahead and Prepare

1. Warm-up activity: Ahead of time, pack a daypack filled with necessary and unnecessary items like a flashlight, map, first-aid kit, can of chili, toys, books, etc. Tell the students that you are going for a day hike and you have your daypack ready. Pass the pack around so the students can feel how heavy it is. Pass it around again, and have each student pull out one item. Have the student tell everyone why the item would be necessary or unnecessary to take. After they have sorted through all the items, have the students feel the weight of the pack again (Activity #42 from Leave No Trace 101). (15 minutes)

2. Give each student a Leave No Trace hang tag and read over the seven principles. Play “Will You Make Your Destination?” (Activity #21 from Leave No Trace 101): Line the students up and tell them they are about to go on an adventure. Depending on how well they plan ahead and prepare and leave-no-trace, they will either take steps forward, backward, or end up out of the game. Each student draws a scenario card and reads it out loud. The class then links the scenario to a LNT principle and decides if they have practiced or ignored the principle. (20 minutes)

3. Hand out, read, and discuss the Hiker Responsibility Code, the ten essentials, and the use of technology from the Hike Safe website. Read the Mt. Washington hiking scenario, and discuss the mistakes the hikers made. (25 minutes)

4. Discuss first aid: (20 minutes)
   - Briefly describe first aid and CPR certifications and where students would go if they were interesting in getting that training.
   - Look through a first-aid kit packed for a day hike.
   - Go over the basic things a rescuer should do if they are the first person to the scene of an accident:
     1. The rescuer must not become a victim! Check the scene to see if it is safe for you to enter. If it is not safe, find a phone and call 911. Keep others from being hurt by moving them away from the scene.
     2. If it is safe to enter the scene, check the victim for the 3 B’s:
       1. Not breathing? Start it!
       2. Severe bleeding? Stop it!
       3. Bumped head? Unconscious? If the victim is breathing, do not allow anyone to move him/her. Call for adult reinforcement and outside assistance immediately.

5. Students complete a Head, Heart, Hands assessment of today’s lesson (10 minutes)
   - Head: List 1 thing you learned today that stands out in your memory.
   - Hands: Describe one way you will use the Leave No Trace principles when you go hiking.
   - Heart: Now that you have learned how to prepare for a trip, would you feel comfortable going on a day hike with 3 of your friends?
Lesson 3: Leave No Trace Hiking

1. Discuss the principle “Travel and camp on durable surfaces.” (10 minutes)
   a. Describe the difference between durable and nondurable surfaces.
   b. Briefly describe trail features like switchbacks and water bars that help prevent erosion.
2. Play “Surface Hopscotch” (Activity #47 from Leave No Trace 101). (20 minutes)
3. Discuss the principle “Dispose of waste properly.” (20 minutes)
   a. Teach the concept of “Pack it in, pack it out.”
      i. Reduce litter at the source by removing any excess packaging from the food you pack for your trip. Use candy wrappers as an example.
      ii. Pack out all trash, even if it appears burnable.
   b. Teach techniques for properly disposing of what you can’t pack out.
      i. Cat holes should be located 200 feet from water, trails, and camp. Dig 6-8 inches deep and 4-6 inches in diameter. Demonstrate with tub of dirt, trowel, and a Mounds bar!
      ii. Toilet paper must be either buried in a cat hole or packed out in a plastic bag.
4. Discuss the principle “Leave what you find.” (15 minutes)
   a. Teach students the saying “Take only pictures, leave only footprints.”
   b. Minimize alterations to picnic spots and campsites: don’t move rocks, build fire rings, cut down tree branches. Remind them about durable surfaces.
   c. Leave natural objects and cultural artifacts. Natural objects of beauty or interest like fossils should be left for others to discover and enjoy. In national parks and some other areas, it is illegal to remove natural objects.
5. Discuss the principle “Be considerate of other visitors.” (15 minutes)
   a. Review the above principles and how they relate to this one.
   b. Give students some scenarios that would adversely affect other people’s wilderness experience. Have students discuss how they would feel and respond in these situations.
6. “Exit ticket” assessment: hand students a paper with the 4 LNT principles discussed so far, and have them jot down one thing they learned about each principle. (10 minutes)
Lesson 4: Leave No Trace Camping

1. Review the first five LNT principles, and tell students that today they will learn camping techniques that teach the last 2 LNT principles: “Minimize campfire impacts” and “Respect wildlife.” Briefly discuss these principles so the students can keep them in mind during their activities. (10 minutes)

2. Head outside, where students will rotate between stations to learn different camping skills: (15 minutes at each station)
   a. Safe water: down by the river students will learn the 3 methods to purify drinking water (filter, boil, iodine). They will also discuss protecting water sources from human pollution by staying 200 feet away while cooking, washing, going to the bathroom, etc. Also discuss how things like lotions and bug spray can harm water when you go swimming.
   b. “Mice and raccoons and bears, oh, my!”: Students will learn to respect wildlife by keeping their camping supplies out of reach of critters. They will learn how to hang a bear bag and what they shouldn’t keep in their tent.
   c. The right stuff: Students will look at examples of gear that makes overnight adventures more comfortable: tents, sleeping bags and pads, frame backpacks, and headlamps. While showing the equipment, discuss how selecting an appropriate campsite is showing consideration for others by not disturbing their outdoor experience.
   d. Disappearing fire: Show students how to build a mound fire. Discuss when this would be an appropriate choice, and other alternatives to creating a permanent fire ring (metal fire pits, candles, etc.)
   e. “What’s for dinner?”: Students learn how to set up a backpacking stove, light it, and boil water. During the demonstration, discuss the advantages of stoves over campfires in backcountry areas.
Lesson 5: Put Your Knowledge to Work

1. Review the information covered this week by having students organize their handouts. Tell them that this information is a tool they can keep and use in the future anytime they are planning an outdoor activity. (10 minutes)

2. Assessment: Students will plan an overnight backpacking trip. If the students’ behavior allows, they should work in pairs. Give them a topographical map of an area, and have them plan their trip using all of the information they learned this week. They will be graded on completion of a trip-planning worksheet where they outline everything that they need to do to have a fun, safe, and successful trip. (80 minutes)

3. If students finish their assessment early, ask them to write thank-you notes to the volunteers that taught them about LNT camping.
Week 2: Why Is the Mt. Rogers High Country Unique?

Lesson 6: Geology That Rocks!

1. Guest presentation by geologist Sara Williams about the geology of the Mt. Rogers area. (1 hour +)
2. Graffiti reflection: students move around the room and write what they learned about various geology topics on large pieces of paper. (10 minutes +)

Lesson 7: Who Am I? Appreciating Nature Along the Trail

1. Guest presentation by Virginia Master Naturalist Mary Alice Hardin about the common plants, trees, and animals native to the Mt. Rogers area. Students will get a chance to look at guide books and learn how to use them as a tool to identify things they see while hiking. (1 hour +)
2. Graffiti reflection: students move around the room and write what they learned about various nature topics on large pieces of paper. (10 minutes +)

Lesson 8: Who Was William Barton Rogers?

1. Teach students the history of the Mt. Rogers High Country, bringing it to life with stories of people who have lived near the mountain.
   a. Mention the evolution of trails, how the “trail” through our community has evolved from a buffalo trail to a major interstate corridor. Relate that to the importance of protecting wilderness trails and natural areas.
   b. Guest presentation by a member of the Friends of Mt. Rogers trail club, teaching history of:
      i. The Scales
      ii. Old logging roads
      iii. Grayson Highlands State Park
      iv. Wilburn Ridge (higher than Katahdin and the AT’s highest point between Hump Mtn. in TN and Mt. Washington in NH)
      v. Massie Gap
      vi. 2 herds of ponies, one living in the state park, the other living in the national recreation area
      vii. Thomas Knob Shelter
      viii. William Barton Rogers
      ix. Susan Spillane
      x. Lewis Fork Wilderness Area
      xi. Elk Garden
Lesson 9: Show Us What You Have Learned!

1. Give students a summary of the information taught by this week’s guests.
2. Divide the students into pairs and have them create a board game titled “Hiking to Mt. Rogers!” Give them a rubric for their game so that they know specifically what needs to be included. The game should incorporate information about the geology, ecology, and history of the Mt. Rogers area.
3. Remind them that the game must be finished by the end of class because their classmates will be playing the games with other students the following day.

Lesson 10: Share the Fun

1. Students play their “Hiking to Mt. Rogers!” board games with middle school English language learners (ELLs).
2. If time allows, ELLs can rotate and play different games.
Week Three: Let’s Get Ready and Go to the Mountain!

Lesson 11: Create a Hiking Lesson

1. Briefly review the LNT principles, hiker responsibility code, and 10 essentials.
2. Divide the students into 9 groups and assign each group one of the LNT principles, the hiker responsibility code, or the 10 essentials.
3. Give the groups a rubric specific to their topic, and have them plan a lesson to teach their topic to middle school ELLs. Remind them of the day they learned about camping supplies, how they rotated from station to station. Tell them they will be leading a lesson like that. They will have 10 minutes to teach their topic.
4. Groups must complete their lesson this period and turn their plan in to the teachers to be approved.

Lesson 12: Teach Your Topic!

1. Students teach their LNT and hiker preparedness topics to middle school ELLs as a station-rotation activity. Students stay at each station for 10 minutes.
2. Homework assignment: Give students a list of supplies they need to bring tomorrow to show you they are ready to go hiking:
   a. Backpack or waist pack
   b. Water bottle
   c. Rain coat or large trash bag
   d. Warm sweatshirt or jacket
   e. LNT card
   f. Socks
   g. Sneakers or boots to hike in
Lesson 13: You Have Reviewed. Now, Are You Ready?

1. Reflect on yesterday’s teaching activity by briefly discussing how it went as a class. Hand out a Head, Hands, Heart reflection paper: (15 minutes)
   a. Head: What did you learn about your topic as you were preparing and teaching your lesson?
   b. Hands: What information did you teach the middle school students that they can use when they go on the hike?

2. Check students’ “homework” hiking supplies—compare them to the ten essentials. Tell students that the hike leaders will have the other essentials; it is not necessary for everyone to carry them. (15 minutes)

3. Review hiker safety and how everyone will hike together, staying in between the hike leader and the sweep. (5 minutes)

4. Take a practice “hike” around the school, discussing hike etiquette along the way. (30 minutes)

5. Go over what students need to bring on the hike tomorrow, the time to meet and be picked up, etc. Hand out a list of supplies to each student: (20 minutes)
   a. Backpack or waist pack
   b. At least 1 liter of water
   c. Rain coat or large trash bag
   d. Warm sweatshirt or jacket
   e. LNT card
   f. Socks
   g. Sneakers or boots to hike in
   h. Lunch and snacks

Lesson 14: Hike to Mt. Rogers

1. The hike leaders will be the teachers, guest presenters, and trail enthusiasts.

2. Check everyone’s supplies to see if any students need food, water, etc.

3. Double-check emergency forms for all students.

4. Load up and drive to destination.

5. Hike from Elk Garden to Mt. Rogers, taking several rest breaks along the way. Point out things along the hike that relate to what we have learned. Stop several times to take pictures, journal, do activities. Keep it fun so the students don’t think they are getting tired.

6. Eat lunch at Mt. Rogers—or, if the kids are too tired, at Thomas Knob. There is also a latrine at Thomas Knob.

7. Head back down the mountain, staying together as a group and stopping periodically along the way. (round trip approximately 8 hours)
Lesson 15: Report on Your Adventure

1. Brainstorm a list of topics that the students want to write about for the local newspaper.
2. Alternately, students can create a captioned photo display for the tourism center.
3. Assign topics to students and have them begin outlining their article.
4. Presentation by local news reporter Dan Kegley on components of a good newspaper article.
5. Students continue to revise their projects until they have a quality finished product.
6. Newspaper staff will select the best submissions to be published in the local paper.

Final Celebration
A community reception will be given for the students at the county tourism center. Community leaders, school officials, guest presenters, and trail enthusiasts will be invited to participate. A cookout at the town park will follow, giving the students the opportunity to mingle and demonstrate their outdoor knowledge.
Virginia Standards of Learning Correlated to each Lesson

Lesson 1

Earth Science 1 The student will plan and conduct investigations in which
a) Volume, area, mass elapsed time, direction temperature, pressure, distance, density, and changes in elevation/depth are calculated utilizing the most appropriate tools;
b) Technologies including computers, probeware, and global positioning systems (GPS) are used to collect, analyze, and report data and to demonstrate concepts and simulate experimental conditions;
c) Scales, diagrams, maps, charts, graphs, tables, and profiles are constructed and interpreted

ES 3 The student will investigate and understand how to read and interpret maps, globes, models, charts, and imagery. Key concepts include
a) Maps (bathymetric, geologic, topographic, and weather) and star charts;
b) Imagery (aerial photography and satellite images);
c) Direction and measurement of distance on any map or globe; and
d) Location by latitude and longitude and topographic profiles

US History II 1 The student will demonstrate skills for historical and geographical analysis and responsible citizenship, including the ability to
f) analyze and interpret maps that include major physical features;
g) use parallels of latitude and meridians of longitude to describe hemispheric location

Lesson 2

ES 1 The student will plan and conduct investigations in which
b) Volume, area, mass elapsed time, direction temperature, pressure, distance, density, and changes in elevation/depth are calculated utilizing the most appropriate tools;
c) Technologies including computers, probeware, and global positioning systems (GPS), are used to collect, analyze, and report data and to demonstrate concepts and simulate experimental conditions;

Biology 1 The student will plan and conduct investigations in which
d) Graphing and arithmetic calculations are used as tools in data analysis
i) Appropriate technology including computers, graphing calculators, and probeware is used for gathering and analyzing data and communicating results
Lesson 3
BIO 1 The student will plan and conduct investigations in which
   a) Observations of living organisms are recorded in the lab and in the field
ES 2 The student will demonstrate scientific reasoning and logic by
   a) Analyzing how science explains and predicts the interactions and dynamics of
      complex Earth systems
   b) Recognize that evidence is required to evaluate hypotheses and explanations
ES 7 The student will investigate and understand the differences between renewable and
      nonrenewable resources. Key concepts include
      c) Resources found in Virginia
      d) Making informed judgments related to resource use and its effects on Earth
         systems; and
      e) Environmental costs and benefits

Lesson 4
BIO 3 The student will investigate and understand the chemical and biochemical
      principles essential for life. Key concepts include
      a) Water chemistry and its impact on life processes
BIO 9 The student will investigate and understand dynamic equilibria within populations,
      communities, and ecosystems. Key concepts include
      d) The effects of natural and human activities on ecosystems; and
      e) Analysis of the flora, fauna and microorganisms of Virginia ecosystems
         including the Chesapeake Bay and its tributaries
ES 7 The student will investigate and understand the differences between renewable and
      nonrenewable resources. Key concepts include
      a) Fossil fuels, minerals, rocks, water, and vegetation
      b) Advantages and disadvantages of various energy sources
      c) Resources found in Virginia
      d) Making informed judgments related to resource use and its effects on Earth
         systems; and
      e) Environmental costs and benefits
BIO 5 The student will investigate and understand life functions of archaebacteria,
      monerans (eubacteria), protists, fungi, plants, and animals including humans. Key
      concepts include
      d) Maintenance of homeostasis
Lesson 5

BIO 1 The student will plan and conduct investigations in which
h) Chemicals and equipment are used in a safe manner
  i) Appropriate technology including computers, graphing calculators, and
     probware, is used for gathering and analyzing data and communicating results

ES 3 The student will investigate and understand how to read and interpret maps, globes,
models, charts, and imagery. Key concepts include
a) Maps (bathymetric, geologic, topographic, and weather) and star charts;
  c) Direction and measurement of distance on any map or globe; and
  d) Location by latitude and longitude and topographic profiles

ES 1 The student will plan and conduct investigations in which
b) Technologies including computers, probeware, and global positioning systems
   (GPS), are used to collect, analyze, and report data and to demonstrate concepts
   and simulate experimental conditions;
  c) Scales, diagrams, maps, charts, graphs tables, and demonstrate concepts and
     simulate experimental conditions

US II 1 The student will demonstrate skills for historical and geographical analysis and
responsible citizenship, including the ability to
f) analyze and interpret maps that include major physical features;
g) use parallels of latitude and meridians of longitude to describe hemispheric
   location

Lesson 6

ES 5 The student will investigate and understand how to identify major rock-forming and
ore minerals based on physical and chemical properties. Key concepts include
  a) Hardness, color and streak, luster, cleavage, fracture, and unique properties;
     and
  b) Uses of minerals

ES 6 The student will investigate and understand the rock cycle as it relates to the origin
and transformation of rock types and how to identify common rock types based on
mineral composition and textures. Key concepts include
  a) Igneous (intrusive and extrusive rocks);
  b) Sedimentary (clastic and chemical) rocks; and
  c) Metamorphic (foliated and unfoliated) rocks

ES 8 The student will investigate and understand geologic processes including plate
tectonics. Key concepts include
  a) How geologic processes are evidenced in the physiographic provinces of
     Virginia including the Coastal Plain, Piedmont, Blue Ridge, Valley and Ridge,
     and Appalachian Plateau;
b) Processes (faulting, folding, volcanism, metamorphism, weathering, erosion, deposition, and sedimentation) and their resulting features; and
c) Tectonic processes (seduction, rifting and sea floor spreading and continental collision).

**ES 10** The student will investigate and understand that many aspects of history and evolution of the Earth and life can be inferred by studying rocks and fossils. Key concepts include
a) Traces and remains of ancient, often extinct, life are preserved by various means in many sedimentary rocks;
b) Superposition, cross-cutting relationships, index fossils, and radioactive decay are methods of dating bodies of rocks;
c) Absolute and relative dating have different applications but can be used together to determine the age of rocks and structures; and
d) Rocks and fossils from many different geologic periods and epochs are found in Virginia.

**BIO 7** The student will investigate and understand bases for modern classification systems. Key concepts include
b) Fossil record interpretation

**BIO 8** The student will investigate and understand how populations change through time. Key concepts include
a) Evidence found in fossil records

**Lesson 7**

**BIO 5** The student will investigate and understand life functions of archaebacteria, monerans (eubacteria), protists, fungi, plants, and animals including humans. Key concepts include
a) How their structures and functions vary between and within kingdoms

**BIO 9** The student will investigate and understand dynamic equilibria within populations, communities, and ecosystems. Key concepts include
a) Interactions within and among populations including carrying capacities, limiting factors, and growth curves;
b) Nutrient cycling with energy flow through ecosystems;
c) Succession patterns ecosystems;
d) The effects of natural and human activities on ecosystems; and
e) Analysis of the flora, fauna and microorganisms of Virginia ecosystems including the Chesapeake Bay and its tributaries

**Lesson 8**

**BIO 8** The student will investigate and understand how populations change through time. Key concepts include
b) How genetic variation, reproduction strategies, and environmental pressures impact the survival of populations;
c) How natural selection leads to adaptations;
d) Emergence of new species;
e) Scientific explanations for biological evolution

**US II 1** The student will demonstrate skills for historical and geographical analysis and responsible citizenship, including the ability to

b) make connections between the past and the present;

c) sequence events in United States history from 1865 to the present;

d) interpret ideas and events from different historical perspectives;

e) evaluate and debate issues orally and in writing;

**US II 2** The student will use maps, globes, photographs, pictures, or tables for

a) explaining how physical features and climate influenced the movement of people westward.

**US II 4** The student will demonstrate knowledge of how life changed after the Civil War by

b) explaining the reasons for the increase in immigration, growth of cities, and challenges arising from this expansion.

d) explaining the impact of new inventions, the rise of big business, the growth of industry, and life on American farms.

**US II 6** The student will demonstrate knowledge of the social, economic, and technological changes of the early twentieth century by

a) explaining how developments in factory and labor productivity, transportation (including the use of the automobile), communication, and rural electrification changed American life and standard of living.

**Virginia and US History 1** The student will demonstrate skills for historical and geographical analysis and responsible citizenship, including the ability to

 c) formulate historical questions and defend findings, based on inquiry and interpretation;

d) develop perspectives of time and place, including the construction of maps and various timelines of events, periods, and personalities in American history;

f) develop skills in discussion, debate, and persuasive writing with respect to enduring issues and determine how divergent viewpoints have been addressed and reconciled;

g) apply geographic skills and reference sources to understand how relationships between humans and their environment have changed over time;

i) identify the costs and benefits of specific choices made, including the consequences, both intended and unintended, of the decisions and how people and nations responded to positive and negative incentives.

**VUS 2** The student will describe how early European exploration and colonization resulted in cultural interactions among Europeans, Africans, and American Indians.

**VUS 6** The student will demonstrate knowledge of the major events from the last decade of the eighteenth century through the first half of the nineteenth century by

b) identifying the economic, political, and geographic factors that led to territorial expansion and its impact on the American Indians.
Lesson 9

**BIO 5** The student will investigate and understand life functions of archaebacteria, monerans (eubacteria), protists, fungi, plants, and animals including humans. Key concepts include
   a) How their structures and functions vary between and within kingdoms

**BIO 9** The student will investigate and understand dynamic equilibria within populations, communities, and ecosystems. Key concepts include
   a) Interactions within and among populations including carrying capacities, limiting factors, and growth curves;
   b) Nutrient cycling with energy flow through ecosystems;
   c) Succession patterns ecosystems;
   d) The effects of natural and human activities on ecosystems; and
   e) Analysis of the flora, fauna and microorganisms of Virginia ecosystems including the Chesapeake Bay and its tributaries

**BIO 8** The student will investigate and understand how populations change through time. Key concepts include
   a) Evidence found in fossil records;
   b) How genetic variation, reproduction strategies, and environmental pressures impact the survival of populations;
   c) How natural selection leads to adaptations;
   d) Emergence of new species;
   e) Scientific explanations for biological evolution

**ES 5** The student will investigate and understand how to identify major rock-forming and ore minerals based on physical and chemical properties. Key concepts include
   a) Hardness, color and streak, luster, cleavage, fracture, and unique properties; and
   b) Uses of minerals

**ES 6** The student will investigate and understand the rock cycle as it relates to the origin and transformation of rock types and how to identify common rock types based on mineral composition and textures. Key concepts include
   a) Igneous (intrusive and extrusive rocks);
   b) Sedimentary (clastic and chemical) rocks; and
   c) Metamorphic (foliated and unfoliated) rocks

**ES 8** The student will investigate and understand geologic processes including plate tectonics. Key concepts include
   a) How geologic processes are evidenced in the physiographic provinces of Virginia including the Coastal Plain, Piedmont, Blue Ridge, Valley and Ridge, and Appalachian Plateau;
   b) Processes (faulting, folding, volcanism, metamorphism, weathering, erosion, deposition, and sedimentation) and their resulting features; and
   c) Tectonic processes (seduction, rifting and sea floor spreading and continental collision).
ES 10 The student will investigate and understand that many aspects of history and evolution of the Earth and life can be inferred by studying rocks and fossils. Key concepts include
   a) Traces and remains of ancient, often extinct, life are preserved by various means in many sedimentary rocks;
   b) Superposition, cross-cutting relationships, index fossils, and radioactive decay are methods of dating bodies of rocks;
   c) Absolute and relative dating have different applications but can be used together to determine the age of rocks and structures; and
   d) Rocks and fossils from many different geologic periods and epochs are found in Virginia.

BIO 7 The student will investigate and understand bases for modern classification systems. Key concepts include
   c) Fossil record interpretation

USII 1 The student will demonstrate skills for historical and geographical analysis and responsible citizenship, including the ability to
   b) make connections between the past and the present;
   c) sequence events in United States history from 1865 to the present;
   d) interpret ideas and events from different historical perspectives;
   e) evaluate and debate issues orally and in writing;
US II 2 The student will use maps, globes, photographs, pictures, or tables for
   d) explaining how physical features and climate influenced the movement of people westward.
US II 4 The student will demonstrate knowledge of how life changed after the Civil War by
   e) explaining the reasons for the increase in immigration, growth of cities, and challenges arising from this expansion.
US II 4 The student will demonstrate knowledge of how life changed after the Civil War by
   e) Explaining the impact of new inventions, the rise of big business, the growth of industry, and life on American farms.
US II 6 The student will demonstrate knowledge of the social, economic, and technological changes of the early twentieth century by
   a) explaining how developments in factory and labor productivity, transportation (including the use of the automobile), communication, and rural electrification changed American life and standard of living.

VUS 1 The student will demonstrate skills for historical and geographical analysis and responsible citizenship, including the ability to
   c) formulate historical questions and defend findings, based on inquiry and interpretation;
   d) develop perspectives of time and place, including the construction of maps and various timelines of events, periods, and personalities in American history;
f) develop skills in discussion, debate, and persuasive writing with respect to enduring issues and determine how divergent viewpoints have been addressed and reconciled;
g) apply geographic skills and reference sources to understand how relationships between humans and their environment have changed over time;
i) identify the costs and benefits of specific choices made, including the consequences, both intended and unintended, of the decisions and how people and nations responded to positive and negative incentives.

VUS 2 The student will describe how early European exploration and colonization resulted in cultural interactions among Europeans, Africans, and American Indians.

VUS 6 The student will demonstrate knowledge of the major events from the last decade of the eighteenth century through the first half of the nineteenth century by
   b) identifying the economic, political, and geographic factors that led to territorial expansion and its impact on the American Indians.

Lesson 10

Limited English Proficiency 1.1 The student will demonstrate growth in the understanding and use of oral language.

LEP 1.4 The student will demonstrate an understanding that print and signs convey meaning.

LEP 1.7 The student will use English grammatical constructions.

LEP 2.2 The student will develop oral communication skills.

LEP 2.3 The student will apply knowledge of how print is organized and read.

LEP 2.6 The student will demonstrate interpretation and analysis of literature.

LEP 3.1 The student will demonstrate an understanding and use of oral language structure.

LEP 3.2 The student will use oral communication skills.

LEP 3.7 The student will expand vocabulary and concept development.

LEP 4.1 The student will use effective oral communication skills in a variety of settings.

LEP 4.9 The student will use English mechanics and usage.

US II 1 The student will demonstrate skills for historical and geographical analysis and responsible citizenship, including the ability to
   b) make connections between the past and the present;
   c) sequence events in United States history from 1865 to the present;
   d) interpret ideas and events from different historical perspectives;
   e) evaluate and debate issues orally and in writing;

US II 2 The student will use maps, globes, photographs, pictures, or tables for
   a) explaining how physical features and climate influenced the movement of people westward.

US II 4 The student will demonstrate knowledge of how life changed after the Civil War by
   b) explaining the reasons for the increase in immigration, growth of cities, and challenges arising from this expansion.
d) explaining the impact of new inventions, the rise of big business, the growth of industry, and life on American farms.

**US II 6**
The student will demonstrate knowledge of the social, economic, and technological changes of the early twentieth century by
   a) explaining how developments in factory and labor productivity, transportation (including the use of the automobile), communication, and rural electrification changed American life and standard of living.

**VUS 1** The student will demonstrate skills for historical and geographical analysis and responsible citizenship, including the ability to
   c) formulate historical questions and defend findings, based on inquiry and interpretation;
   d) develop perspectives of time and place, including the construction of maps and various timelines of events, periods, and personalities in American history;
   f) develop skills in discussion, debate, and persuasive writing with respect to enduring issues and determine how divergent viewpoints have been addressed and reconciled;
   g) apply geographic skills and reference sources to understand how relationships between humans and their environment have changed over time;
   i) identify the costs and benefits of specific choices made, including the consequences, both intended and unintended, of the decisions and how people and nations responded to positive and negative incentives.

**VUS 2**
The student will describe how early European exploration and colonization resulted in cultural interactions among Europeans, Africans, and American Indians.

**VUS 6**
The student will demonstrate knowledge of the major events from the last decade of the eighteenth century through the first half of the nineteenth century by
   b) identifying the economic, political, and geographic factors that led to territorial expansion and its impact on the American Indians.

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**Lesson 11**

**Lesson 12**

**LEP 1.1** The student will demonstrate growth in the understanding and use of oral language.

**LEP 1.4** The student will demonstrate an understanding that print and signs convey meaning.

**LEP 1.7** The student will use English grammatical constructions.
LEP 2.2 The student will develop oral communication skills.
LEP 2.3 The student will apply knowledge of how print is organized and read.
LEP 2.6 The student will demonstrate interpretation and analysis of literature.
LEP 3.1 The student will demonstrate an understanding and use of oral language structure.
LEP 3.2 The student will use oral communication skills.
LEP 3.7 The student will expand vocabulary and concept development.
LEP 4.1 The student will use effective oral communication skills in a variety of settings.
LEP 4.9 The student will use English mechanics and usage.

Lesson 13
Reviews all previously mentioned SOLs

Lesson 14
LEP 1.1 The student will demonstrate growth in the understanding and use of oral language.
LEP 1.4 The student will demonstrate an understanding that print and signs convey meaning.
LEP 1.7 The student will use English grammatical constructions.
LEP 2.2 The student will develop oral communication skills.
LEP 2.3 The student will apply knowledge of how print is organized and read.
LEP 2.6 The student will demonstrate interpretation and analysis of literature.
LEP 3.1 The student will demonstrate an understanding and use of oral language structure.
LEP 3.2 The student will use oral communication skills.
LEP 3.7 The student will expand vocabulary and concept development.
LEP 4.1 The student will use effective oral communication skills in a variety of settings.
LEP 4.9 The student will use English mechanics and usage.

Lesson 15
BIO 1 The student will plan and conduct investigations in which m) A scientific viewpoint is constructed and defended (the nature of science).

LEP 1.1 The student will demonstrate growth in the understanding and use of oral language.
LEP 1.4 The student will demonstrate an understanding that print and signs convey meaning.
LEP 1.5 The student will read and demonstrate comprehension of fiction/non-fiction.
LEP 1.6 The student will write to communicate ideas.
LEP 1.7 The student will use English grammatical constructions.
LEP 1.8 The student will use English punctuation and spelling conventions.
LEP 2.2 The student will develop oral communication skills.
LEP 2.3 The student will apply knowledge of how print is organized and read.
LEP 2.4 The student will read, comprehend, and analyze fiction and non-fiction.
LEP 2.6 The student will demonstrate interpretation and analysis of literature.
LEP 2.7 The student will use meaning clues and language structure to expand vocabulary when reading.
LEP 2.8 The student will locate information in reference materials.
LEP 2.9 The student will use simple reference materials.
LEP 2.10 The student will write to communicate ideas.
LEP 2.11 The student will use English punctuation and spelling conventions.
LEP 2.12 The student will print legibly.
LEP 3.1 The student will demonstrate an understanding and use of oral language structure.
LEP 3.2 The student will use oral communication skills.
LEP 3.6 The student will use strategies to read a variety of narrative materials, poetry, and informational text.
LEP 3.7 The student will expand vocabulary and concept development.
LEP 3.8 The student will use information resources to research a topic.
LEP 3.9 The student will write to communicate ideas.
LEP 4.1 The student will use effective oral communication skills in a variety of settings.
LEP 4.4 The student will read and demonstrate comprehension of fiction and non-fiction.
LEP 4.5 The student will use meaning clues and language structure to read words.
LEP 4.6 The student will use strategies to read a variety of materials, fiction and non-fiction.
LEP 4.7 The student will use information resources to research a topic.
LEP 4.9 The student will use English mechanics and usage.
Partnerships and Benefits List

Smyth County Group: Andrea Overbay, Julie Reimer and Leslie Peterson

1. Mary Alice Hardin-Master Naturalist with Natures Powers.
2. DCR- Department of Conservation and Recreation, provide resources for natural history.
3. Dan Kegley- Journalist with the Smyth County News. Provide students with skills needed to prepare articles for publishing in local newspapers.
4. Mt. Rogers Appalachian Trail Club-Assist with hike and serve as a resource to provide knowledge about the trail in our area.
5. Kim Wright-Partner/Owner in outdoor bike shop in Damascus, Virginia. Contact person in Damascus during Trail Days.
6. Mrs. Phyllis McMurray- High school senior English teacher. Literature related to the Appalachian Trail or mountains.
8. Sarah Williams-Professor at Emory and Henry College. Geology Department
9. Bonham House Tourism Center- Place to display visual projects for travelers along Interstate 81 to view.
10. Kelly Spencer-Hill- Town of Chilhowie Parks and Wellness Coordinator. Promote the physical aspects of walking the Appalachian Trail.
11. Tom Rollins-Photographer. Help students with photography skills and displaying their photographs.
14. Dick Ryan-Retired teacher/principal, current school board member. Currently working on establishing a walking trail in close proximity to our school. Resource person to encourage physical activity in the classroom.
15. Virginia Cooperative Extension Service-resource contact. Currently supports a local hiking club in area 4-H program.
16. Virginia Department of Game and Inland Fisheries-Resources for wildlife and plant species in the area.
17. Settlers Museum of Southwest Virginia located in Atkins, Virginia. Appalachian Trail runs through their property.