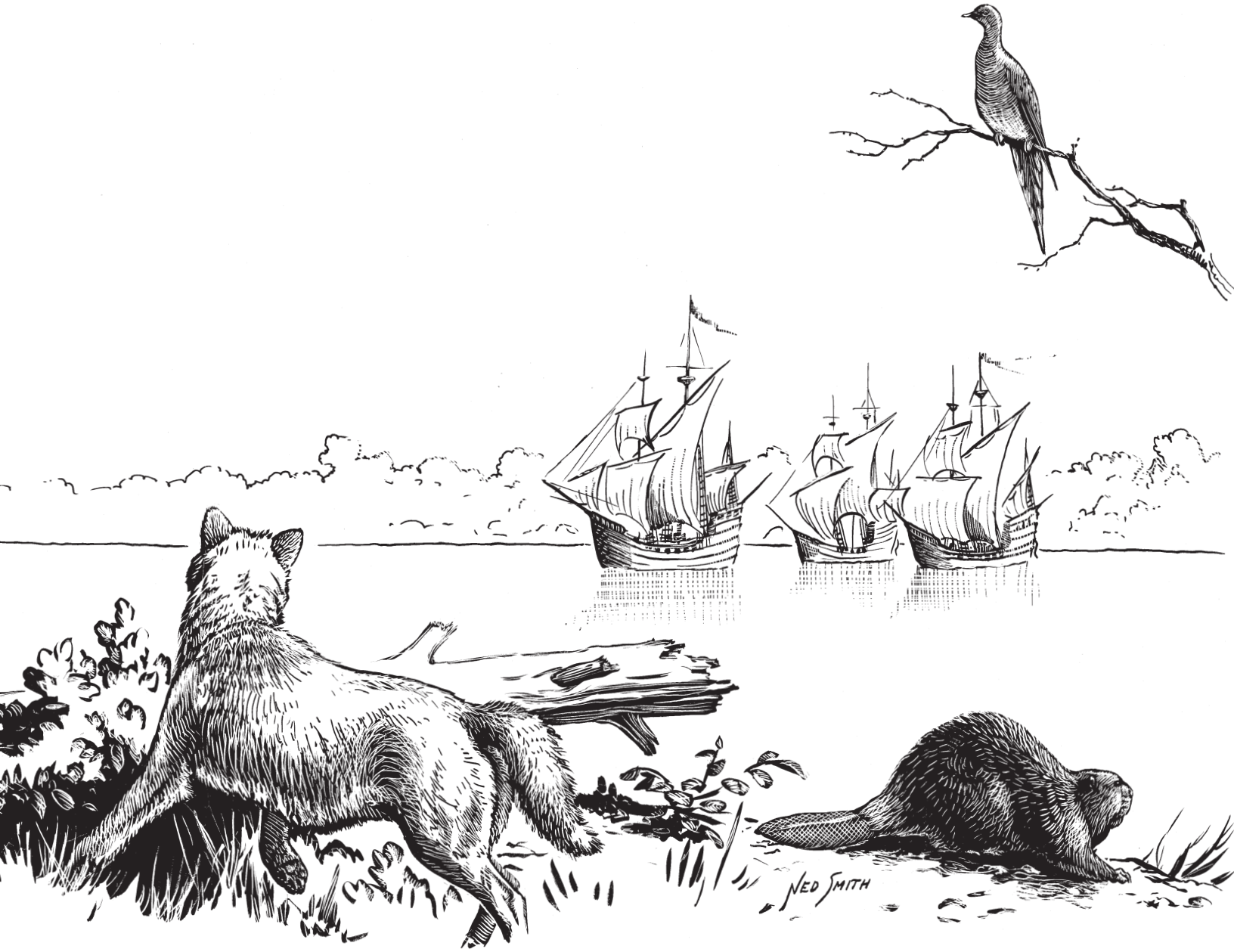
Virginia's Natural Resources:
Then and Now...1607-2007



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INTERNATIONAL PAPER

Cover art courtesy of the Virginia Department of Game and Inland Fisheries. This is an early commissioned piece by Ned Smith, a prominent Pennsylvania artist, now recognized as an eminent nature whose paintings and sketches are highly sought after. More about Ned Smith at http://www.nedsmithcenter.org/.

1 ACTIVITY

Captain John Smith's Chesapeake Bay

(Lessons from the Bay)

What was the Chesapeake Bay like when John Smith explored it, and how has the Bay changed since the early 17th century?

Related Standards of Learning

Science: 3.6; 3.10.b; 4.5.f; 4.8.a; 5.6.b; 5.7.f; 6.7.a; 6.7.d; 6.7.e
Mathematics: 3.24
English: 3.1.a; 3.1.b; 3.1.c; 3.4.d; 3.6.a; 3.6.b; 3.6.c; 3.10.b; 3.11.a; 4.1.b; 4.3.a; 4.5.c; 4.7.a; 4.7.c; 4.8.a; 5.1.a; 5.4.a; 5.6.c; 6.3.c; 6.5.c
History and Social Science: 3.3.b; 3.5.d; 3.6; VS.1.a; VS.1.d; VS.1.h; VS.2.c; USI.1.a; USI.1.e

Time Required

One 30-minute session and two 45-minute sessions

Materials

- Internet access
- John Smith's Virginia map, 1612 (optional, see Resources on page 5)

For each student:

- A copy of an Excerpt from John Smith's *"The Generall Historie of Virginia, New England & the Summer Isles"* (handout, page 117)

For each group:

- River and Place Names (*Virtual Jamestown* handout, page 121)
- modern map, from an atlas or another source, of the Chesapeake Bay region, including Virginia and Maryland

Objectives

Students will:

- compare characteristics of today's Chesapeake Bay with the Bay as it existed in the early 17th century
- read excerpts from Smith's description of his exploration of the Bay and its rivers
- analyze Smith's map of the Chesapeake
- discuss the value of primary source documents and the challenges faced when using them.

Background

Background In the summer of 1608, Captain John Smith made two voyages from Jamestown to explore the Chesapeake Bay and its tributaries. Smith documented the natural environment, features of the land and waterways, and encounters with the native people. From this he wrote *The Generall Historie of Virginia, New England & the Summer Isles;* he also created a reliable and influential map of the Chesapeake Bay and surrounding country. In his account of the first voyage, Smith describes the Bay shoreline, the rivers, and the creeks and provides names for islands and other land features. He writes of his experiences with the natives, and he tells us of woods along the shore "frequented with wolues, Beares, Deere and other wild beasts [sic]." Smith also describes fishing in the Bay. It was relatively easy due to the clarity of the water in those days. The dense forests surrounding the Bay and its rivers slowed sediment and freshwater runoff. Some scientists believe that, because so much freshwater was absorbed by trees, the Bay was saltier in Smith's day than it is today.

Smith relates a story in which, while using his sword to spear fish near the mouth of the Rappahannock, he was stung by a ray's poisonous tail. It was assumed he would die from the wound, and a grave was dug for the Captain. Smith recovered, and the place is still known as Stingray Point.

Aside from the obvious changes to the region brought by four centuries of development, the most significant differences are in the quantity and variety of animals living in the Bay's ecosystem. Though the quantity of oysters have been in sharp decline until very recently, Smith writes that oysters in the early 17th century "lay as thick as stones." The Bay's fish population included "sturgeon, grampus, porpoise, seals, stingrays … brits, mullets, white salmon [rockfish], trouts, soles, perch of three sorts" and a variety of shellfish (*Chesapeake Bay History,* see Resources). In this lesson, students will learn how to use primary source documents when studying history. Primary sources provide the learner with the perspective of one who lived through and observed an historic event. Students will analyze an excerpt from Smith's *Generall Historie* as well as Smith's 1608 map of Virginia. (Note: Smith's map was made in 1608 and published in 1612.) For more information about primary source documents and their use in the classroom, see Resources. (Also see "Using Maps" on page 51 of the Project Action Guide.)

Procedures

Session 1 (30 minutes) Conduct this session in the classroom.

1. Assess students' knowledge of Jamestown and Captain John Smith. If necessary, explain that he was a member of Jamestown's governing council and that Smith explored the Chesapeake Bay region and wrote a history of the early colony. Remind students that Jamestown was the first surviving English colony in America and that it was settled in 1607.

2. Discuss with students the differences between the Chesapeake Bay of 1607 and the Bay as it exists today. Ask students to speculate how the Chesapeake region might have looked to the Jamestown settlers as they sailed into the Bay and up the river that would come to be called the Powhatan, and later the James. *How might the water have looked? What would the settlers have noticed about the shoreline?* Compose a list on the board for use in Session 2.

3. Use information from the Background section of the lesson plan to enlighten students about the dense forests, clear water, and abundance of fish and animals present in the Bay region of the early 17th century. Tell students that it was common for those promoting the Virginia colony to compare the land to the Garden of Eden. Discuss the salinity of the water, informing students that scientists believe the Bay was saltier in Smith's day than it is today. (The topic of salinity offers an opportunity to explain that the Bay is an estuary—a place where fresh water and salt water mix. Some fish live only in salt water, others only in fresh water, and still others can survive in both. See Extensions for Students.)

Session 2 (45 minutes) Conduct this session in the classroom.

1. Explain to students the concept of using primary and secondary source documents to learn about historic events. Ask students to provide examples of each.

2. Provide each student with a copy of the handout "An Excerpt from John Smith's *The Generall Historie of Virginia, New England & the Summer Isles*." Explain that the excerpt is an example of a primary source document. Read the excerpt aloud to the class. Teachers of advanced students may choose to have the students read the excerpt.

3. Ask students what they notice about the excerpt. Discuss the spellings that today's reader finds odd, the dated use of language and phrasing, and the presence of humor. Ask students to identify some challenges facing a researcher who uses a primary source document. Point out that a reader will often face author biases when reading a primary source. Ask students if they can find an example of racial bias in the Smith excerpt. (Native people are referred to as "salvages" [savages].)

4. Ask students to speculate about Smith's reasons for writing this history.
   - *Would he have done it just for the income a published book might bring?*
   - *Or did he write it to benefit others?*
   - *Who might it benefit? Other explorers? Europeans considering a move to the New World?*

5. Finally, have students write a paragraph or two to describe the differences between the Bay in the early 17th century and the Bay as it exists today. Direct them to consult the list composed during Session 1. Also direct them to use the John Smith excerpt to note any differences not listed on the board. Encourage advanced students to support their claims when possible with quotes from Smith's writing.

Session 3 (45 minutes) Conduct this session in the classroom or computer lab.

1. Divide the class into groups of 2–3 students, or a size suitable to the number of available computers. Direct students to access the *Virtual Jamestown* "Original Maps" page (http://jefferson.village.virginia.edu/vcdh/jamestown/maps1.html). Tell students to click the "Large Image" link beneath "John Smith's Map of Virginia, 1608." If possible, share with students the copy of Smith's map in the Library of Virginia's *Virginia in Maps* (see Resources). Explain that this map is another example of a primary source document. Discuss the map's orientation and features. (See "Using Maps" on page 51 of the **Project Action Guide.**)

2. Next, direct students back to the *Virtual Jamestown* "Original Maps" page, and have them click the "Zoomable Image" link beneath "John Smith's Map of Virginia, 1608 (Modified)." Allow time for the students to learn how to use the map tool.

3. Provide students with the "River and Place Names" handout, which includes a map of the Chesapeake region. Explain to students that the names listed in column A of the "River and Place Names" handout are found on the "Chesapeake Bay Region Today" map. Instruct students to use the "zoomable," modified version of John Smith's map to find the names listed in column B and then match them to the corresponding modern name in column A.

   Remind students that on Smith's map, Virginia encompasses the entire Chesapeake region, including what is now Maryland. Also tell students that some of the names on the "River and Place Names" handout do not correspond exactly: a modern river name, like Nansemond for example, may correspond not with Smith's name for that river, but instead with a place or tribe living *close by* that river.

   For teachers of advanced students: Provide students with a modern map of the Chesapeake Bay region (from an atlas or another source) and the list from column B of the "River and Place Names" handout. Instruct students to use the "zoomable," modified version of John Smith's map to locate the rivers and places in the list you provided. Instead of completing the "River and Place Names" matching exercise, have students mark the modern map with markers or tags to indicate Smith's name for each river and place.

4. When students have finished, discuss the modern names of rivers and places. *Which have the same name, or similar names, on both maps?*

5. Discuss the benefits of maps to those who are studying history. Discuss the value of historic maps in providing a more accurate perspective of the time period being studied.

Classroom Assessment Suggestions

- Discussion of differences between the 17th century Bay and today's Bay
- Discussion of the John Smith excerpt and the alternative spellings identified in the text
- Paragraphs describing the differences between John Smith's Bay and our Bay today, including the evidence used to support students' claims
- Students' ability to read maps and use the online "zoomable" map
- River and Place Names exercise

Extensions for Students

- Use the Virtual Jamestown Web site's "John Smith Voyages of Exploration" map (see Resources) to follow the path of Smith's two voyages to explore the Bay region.
- Research estuaries and find how salinity affects organisms in the water. Learn what factors help establish the salinity levels in water and how the salinity varies from season to season. (See "Using the Library Media Center for Project Research" and "Using the World Wide Web for Project Research" on pages 55–58 of the Project Action Guide.)
- Visit one of the places John Smith describes in his *Generall Historie*.

Resources

Barbour, Philip L., ed. *The Complete Works of Captain John Smith (1580–1631)*. Chapel Hill: U of North Carolina P, 1986.

"Captain John Smith." *Chesapeake Bay History.* Chesapeake Bay Program. http://www.chesapeakebay.net/jsmith.htm.

"John Smith: Voyages of Exploration." *Virtual Jamestown.* http://jefferson.village.virginia.edu/vcdh/jamestown/smith_voyages/introduction.html.

John Smith's Voyage of Discovery. National Geographic Service, 2005. http://www.nationalgeographic.com

Kupperman, Karen Ordahl, ed. *Captain John Smith: A Select Edition of His Writings*. Chapel Hill: U of North Carolina P, 1988. ASIN 0807842087.

"Library Research Using Primary Sources." U of California, Berkeley, Library. http://www.lib.berkeley.edu/TeachingLib/. (Click on "Guides," then on "Primary Research Sources.")

"Process Guide #4: Primary Source Documents." San Diego City Schools, Dept. of Educational Technology. http://projects.edtech.sandi.net/staffdev/tpss99/processguides/ HowToPrimaryS.html.

Smith, John. *The Generall Historie of Virginia, New-England, and the Summer Isles: with the names of the Adventurers, Planters, and Governours from their first beginning An: 1584. to this present 1624.* London, 1624.

Smith, John. *The Generall Historie of Virginia, New-England, and the Summer Isles: with the names of the Adventurers, Planters, and Governours from their first beginning An: 1584. to this present 1624. Travels and Works*. 1910. Ed. Edward Arber. Vol. 2. New York: Burt Franklin, 1967. 418–419. 2 vols.

Stephenson, Richard W., and Marianne M. McKee, eds. *Virginia in Maps: Four Centuries of Settlement, Growth, and Development.* Richmond: Library of Virginia, 2000. ISBN 0884901922.

"Using Primary Sources in the Classroom." *The Learning Page.* The Library of Congress. http://memory.loc.gov/ammem/ndlpedu/lessons/primary.html.

"Using the Library Media Center for Project Research." Project Action Guide. *Lessons from the Bay.* 55–56. http://www.pen.k12.va.us/VDOE/LFB/

"Using the World Wide Web for Project Research." Project Action Guide. *Lessons from the Bay.* 57–58. http://www.pen.k12.va.us/VDOE/LFB/

Virginia. Map. Oxford, 1612.

Virtual Jamestown. Crandall Shifflett, 2000. http://jefferson.village.virginia.edu/vcdh/jamestown/.

2

ACTIVITY

Fall Line City

Related Standards of Learning

Science: 4.8, 6.7, 6.9
History and Social Science: VS.1, VS.2

Objective

Students will:

- describe the "Fall Line" and identify it on a map of Virginia
- compare two different attitudes of early explorers concerning the discovery of the fall line.

Method

Take an imaginary trip up the James River in 1607 to the point of the Fall Line using a technique called a "Simulated Fieldtrip"

Background

One week after the English settlement at Jamestown was established, Christopher Newport, John Smith and 20 men took a shallop (a small open boat propelled by oars or sails and used chiefly in shallow water) and ventured farther up the river. They were still hopful of finding the "northwest passage" to the "South Sea" where gold and other riches were supposedly waiting to be claimed.

On May 21,1607, the party came to the Fall Line or more accurately the Fall Zone. This is an area which can be found on any of the tidal rivers along the east coast. It occurs where a river flows over a series of rapids and falls as it moves from the harder rock of the Piedmont Region to the softer sediments of the Atlantic Coastal plain. In Richmond, the Fall Line is a stretch of approximately seven miles over which the elevation of the river drops 105 feet.

Captain Smith was frustrated by the *"great craggy stones in the midst of the river, where the water falleth so rudely, and with such violence, as not any boat can possibly pass."*

Another member of the party, George Percy, described the discovery in a slightly different way: *"Rowing some three miles in shoal water, we came to see an overfall, impassable for boats any further. Here the water falls down, through great main rocks, above, two fathoms high, in which fall it maketh divers little islets, on which might be places a hundred water mills for any uses. Our main river ebbs and flows four feet, even to the skirt of this downfall. Ships of two hundred or three hundred tons may come to within five miles thereof, and the rest deep enough for barges or small vessels that draw not above six feet of water"*

Obviously "beauty is in the eye of the beholder" and also depends upon the hopes and expectations of the explorer. Before leaving the Falls, the party set up a cross and named the river the James for the King of England, thus claiming it for the English.

As it turned out, of course, the fabled South Sea (or the Pacific Ocean) was considerably farther away that the early explorers hoped. Thus, Mr. Percy's attitude toward the Falls was much more insightful that that of Captain Smith. Since larger ships could not travel beyond the Fall Line, towns were quickly established at this spot and on each of the major rivers in Virginia. Alexandria grew up on the Potomac, Fredericksburg on the Rappahannock, Richmond on the James and Petersburg on the Appomattox.

Since roads were few and travel overland was extremely difficult, the rivers were the highways of the time. The Fall Line towns became transportation centers where goods were unloaded from ocean going ships and taken further inland by other means. They also became places where tobacco was stored in warehouses before it was shipped down river for export. Many kinds of mills which used the falling water for power

were built along the rivers creating more commerce for the Fall Line Cities. In viewing a highway map of Virginia, students will notice that Interstate 95 and Highway Route 1 as well as a major rail line connect the Fall Line Cities. The need to move people and goods between Virginia's cities remains true today, 400 years after Jamestown was settled.

Over the years, seven sites in downtown Richmond have been locations for a variety of water powered industries:

- ***Hollywood:*** A flour mill was operating by 1800. Canal water powered a paper mill beginning in 1887 and a 2,100 kilowatt hydroelectric plant from 1940 to 1972. River water powered a city hydroelectric plant until 1986.
- ***Tredegar:*** Canal water powered a flour mill by 1801, the Amory by 1802 and Tredegar iron Works beginning in 1837.
- ***Basin Race:*** Basin water supplies a mill race which powered a paper mill beginning in 1834.
- ***Gallego Mills:*** basin water powered flour mills beginning in 1834.
- ***Haxall Mills:*** River water powered Ross's Mill by 1788, Haxall Canal water supplies power for flour mills from 1809 to 1894, and an 8,800 kilowatt hydroelectric plant from 1901 to 1968.
- ***Belle Isle:*** River water powered an iron works by 1848 and filled a basin which ran a 3,000 kilowatt hydroelectric plant from 1914 to 1965.
- ***Manchester:*** Manchester Mill Canal was open by 1804, and powered a series of mills: in 1895 it supplies two paper mills, a corn mill and a flour mill: and from 1925 to 1965 it fed a 1,000 kilowatt hydroelectric plant.

These examples illustrate the fact that the environment had a direct impact on where people settled and what products and industries were developed. People also had a direct impact on the environment. The construction of dams across the river to help power the mills prevented anadromous (migratory) fishes from swimming up river to spawn. By 1999, all of the Richmond area dams had been breached or made passable with the addition of fish ways. It had been 200 years since shad and other anadromous fish had made their way through the Falls of the James to spawn. To watch the fish swim through the Richmond fish way at Bosher's Dam or to learn more about Virginia's anadromous fish visit http://www.dgif.virginia.gov/fishing/shad/boshers.html.

Activity Before discussing the attitudes of the English explorers who first saw the Falls of the James, have the students participate in the following "Simulated Fieldtrip" or visualization exercise. Brain researchers and learning theorists say that this technique facilitates long term memory and comprehension of concepts by stimulating the right hemisphere of the brain.

Give the students the following directions:

"You are to try and imagine the things you hear me describe. I won't put in all the details – so you must see and feel the scenes for yourself. I want you to imagine that you are a member of Captain Christopher Newport and Captain John Smith's party setting out from Jamestown to explore farther up the James River in May 1607.

Get yourself in a comfortable place. Don't worry about who is sitting next to you. All of you will have your eyes closed. Just be comfortable and do your best to imagine the things I will describe.

"Okay, close your eyes and use your imagination…

"It is early morning on a late spring day… There is a coolness in the air… You and 21 other settlers are getting into a small boat tied up a Jamestown… The river is very wide and flows slowly along in the early morning mist… You row upstream for many miles… The river is full of fish also headed upstream; you can almost walk across the river on the backs of the fish… The only breaks in the trees along the banks are where smaller rivers and streams flow into the great river you are on… You travel for a long time and finally notice the river is much shallower… After rowing a few more miles you begin to hear the sound of falling water… The sound gradually gets louder and louder… Finally you have to stop rowing your boat because you can't go any further… Everyone in the party stares at the river... The water is tumbling down over rocks and smashing into boulders for as far upstream as you can see… The river is not as wide as it was where you began, but there are rocks and islands and white water from bank to bank… Your journey upriver is at an end… You must turn around and go back to Jamestown."

Wait a few seconds and then tell the students to open their eyes.

Allow the students to share their scenes and feelings they had on their imaginary journey. Were any discouraged to run into the Falls and not able to go any further? Ask if others saw any opportunity in the tumbling water. Share the stores of the two different descriptions of the Falls found in the Background section above. Ask why they think Captain Smith and Mr. Percy each felt the way he did about the Falls.

Have the students look at the map of Virginia and identify the cities and rivers along the Fall Line. Ask them to describe some of the possible reasons that these cities grew up in these locations. To what extent did Mr. Percy's vision come true?

Is it still important for cities to be located on rivers? Some still use rivers for transportation of goods and many use rivers as a source of water and /or waste disposal. Is it as important today as in the past? Compare the ways rivers were used in the past with the ways we use them today.

What other means of transportation and power generation do we have now that the early settlers did not have?

What other environmental factors influence development and expansion in America? (Mountains, suitability of land for crops, natural resources such as coal, oil, iron ore, minerals etc.)

Why was it important that the dams were removed from the rivers once they were no longer useful?

Resources

Simulated Fieldtrip portion of activity adapted from Project WILD activity "Stormy Weather" Council for Environmental Education. Activity from River Times 1987, developed by the Mathematics and Science Center, Richmond, Virginia. Used with Permission

Related activities from Project WILD – Aquatic Guide

- To Dam or Not to Dam
- Watered Down History

For more information contact

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From River Times, 1987. Used with permission from Mathematics and Science Center, Richmond, Virginia

3 ACTIVITY

Jamestown Critters

When the English arrived in the new world many species of plants and animals were new to the colonists. The colonists soon began to change the habitat around the Jamestown fort and soon throughout Virginia. Some species weren't adapted to survive the changes in the habitat that came with the European settlements and soon became extinct. The colonists kept journals and from these we have an idea of which species were here, however many small species may have disappeared long before they were named.

On the front cover are a few of the species that "greeted" the English. How many can you name? Which can still be found in Virginia? What species in the sketch are currently plentiful?

Species in Cover Art *Eastern Elk, Beaver, Wild Turkey, Passenger Pigeon, Carolina Parakeet, Eastern Cougar, Timber Wolf*

Who Am I?

_____ I can be found across the Commonwealth today although I completely had disappeared from the state by 1911. Unfortunately, with my disappearance, many other species became threatened. Without the forested wetlands we created by damming streams and small rivers there were fewer dead trees for wood ducks, woodpeckers, flying squirrels and other species to nest in. In the mid 1930s the Department of Game and Inland Fisheries went to Pennsylvania and Ohio and brought us back to Virginia. From these few animals we spread across the state and are busy creating new forested wetlands.

_____ We were large yellow and green birds that could be found along the major rivers in Virginia until the early 1900s when we became extinct. We lived in small flocks and fed on grains and fruit in the fields and orchards of the plantations that were along the rivers. Farmers shot us to protect their crops until we were gone. This happened before there were wildlife laws and agencies to protect us.

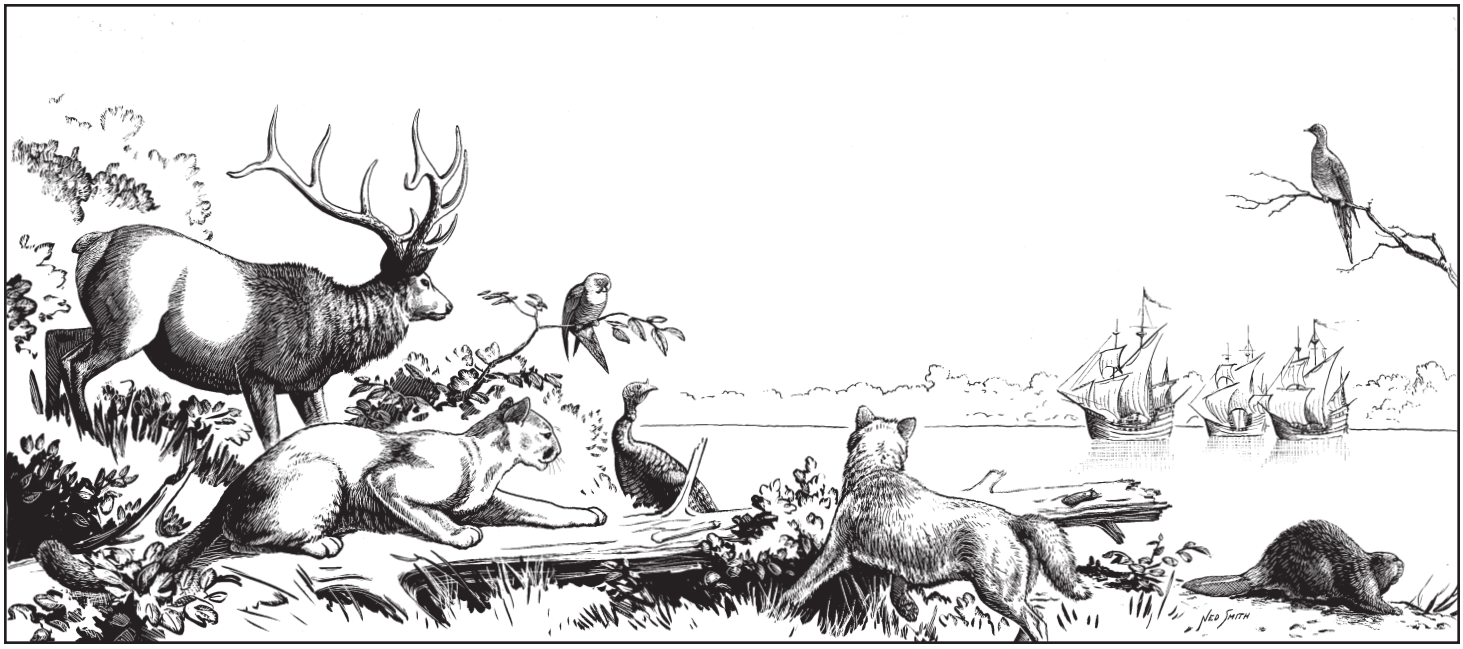
_____ Each spring and fall the sky would be dark for hours as we migrated south in large flocks down the east coast. We disappeared for several reasons; our habitat, the eastern hardwood forests were cut to provide wood for the industrial revolution and homes for the growing population. People in the city needed food and farms couldn't meet all the needs for meat and many of us ended up on dinner table. When our numbers got very low we stopped breeding and became extinct in 1911. Today, hunting wildlife to provide food for the meat markets is illegal and farms now produce most of the protein needs of Americans.

_____ We were never as common as our smaller cousin, the white tail deer, even during the colonial period and had disappeared from the east coast of North American early. We were mentioned in many of the colonial journals. Lewis and Clark use to hunt us for food as they traveled west. Although there are no populations of the _____ left, our Rocky Mountain cousin has been introduced into Kentucky and some of us have migrated into southwestern Virginia.

_____ Young Native American boys practiced their hunting skills catching us for dinner. We are very wary and aren't easy prey for any animal or human. We feed on insects, grains and acorns in Virginia's forests and fields. Our domestic cousin is plain white and not as pretty as we are. Each spring, the males or gobblers can be seen strutting early in the morning. We had almost disappeared but thanks to management efforts can now be seen statewide.

We have been misunderstood for centuries. As a large predator, we have always played an important role in maintaining prey populations. Many humans think we kill livestock and carry off young children, there is even one story about us eating a grandmother! We disappeared from Virginia in the 1800's and are just beginning to make a comeback in the western states.

There are other species that may have "greeted" the English at Jamestown. We will never know. Wildlife need proper habitats to survive. The combination of Food, Water, Shelter and Space in a proper arrangement is called Habitat. Edges around lawns and schoolyards are perfect spaces for creating a little bit of wildlife habitat. Information about creating a school yard habitat can be found at http://www.dgif.virginia.gov/wildlife/ habitat_partners/school_sites.html. Information about Virginia's species can be found at http://www.dgif.virginia.gov.



4
ACTIVITY

Treasured Maps

(Virginia's State Parks – Your Backyard Classrooms)

At about the same time Captain John Smith was exploring and mapping the Chesapeake Bay, Cervantes wrote "Journey all over the universe in a map, without the expense and fatigue of traveling." This activity enables students to travel through a park or natural area preserve, placing and then locating "treasures," using map and map reading skills.

Related Standards of Learning

Level Grades 2-12

Time Required 1 hour at the site; any time of the year; daylight hours

Where This activity is suitable for all estuarine state parks and natural area preserve or any site for which there is an available map.

Materials

For each team:

- map of the site with hiding areas "A" and "B" marked
- clipboard and pencil
- treasure with tag attached

Advanced teams:

- compass
- measuring tape
- protractor
- ruler or drafting compass
- topographic map of site

Objectives Student will:

- investigate topographic variation by *interpreting* and *using* maps.

Background

Maps are essential tools for virtually everyone, whether they are used to document the landscape of a foreign landscape, to trace the migrations of rockfish, to locate a store in a large shopping mall, to find the way to an unfamiliar place, or to explore a state park trail.

The first comprehensive map of the Chesapeake Bay and its ***tributaries*** was made by Virginia's first principal explorer, Captain John Smith. From the time he arrived in the Chesapeake Bay in April 1607, until he was forced to return to England in 1609 because of severe gunpowder burns, Smith dedicated much of his exploration if the Bay and its tributaries to gathering map data.

Lacking the technological advantages of today, such as ***aerial*** and ***satellite photography,*** and plagued by hostile Indians and insect infestations, Smith's view of Virginia was limited primarily to what he could see from the waterways. From his boat deck, Smith recorded compass bearings for each change in the shoreline. For areas he couldn't explore, he relied on interviews with friendly Indians. Back in England, he constructed his map of Virginia with these data, carefully differentiating the features he actually saw from those based on hearsay. For 65 years, this map copied and revised by many, was the basis for nearly all other maps of Virginia used by explorers, settlers and the European press.

Like explorers and settlers long ago who relied on the accuracy of Smith's map to find their way in a strange land, people today rely on and use maps for many reasons. The detail and accuracy of the information contained on a map determines how useful it will be for a particular purpose, and it is important to be able to compare and choose maps properly. Equally important is fostering the ability to interpret a map quickly and accurately, following its symbols, and developing an understanding of relative geography, whether it is of a park, a city, a state, a country, or the world.

Procedure

Before the trip:

1. Split the class in half and designate the halves as groups "A" and "B." Divide each group into teams of about four students each, making sure both groups have the same number of teams.
2. Study the map (included in the park and natural area preserve description section) to locate two general treasure hiding areas that are out of sight of each other, but still within easy walking distance of a central gathering point.
3. Make a copy of the map and draw lines around the two treasure hiding areas on the copy, marking them "A" and "B."
4. Make enough copies of the marked map for each team to have one and distribute them.
5. Review the map with students. Explain basic map reading principles, such as ***orientation*** and interpreting scales and symbols from the legend.
6. Choose a "treasure" for each team to hide, such as small bags of candy coins or any small items that might stimulate student enthusiasm...even lunch!
7. Explain that each of the "A" teams will be hiding their treasures somewhere in the "A" hiding area, and the "B" teams somewhere in the "B" area. Each team will mark on its map the exact location where they hid their treasures and note any helpful landmarks. The "A" teams and the "B" teams will be working out of sight of each other. When all the treasures are hidden, each "A" team will switch its map with one of the "B" teams. Then each team will search for the treasure marked on the map they receive.

At the site:

1. Gather at a designated central area and review the procedure.
2. Distribute a treasure, a map, and a pencil to each team (bring extras).
3. Each team chooses an identification name or number and writes it on both their map and the tag attached to their treasure.
4. Send the "A" and "B" teams to their respective treasure hiding areas, allowing them about 20 minutes to hide their treasures and mark the exact locations on their maps. One or more chaperones should accompany each group of teams to coach the students.
5. When all the treasures are hidden, gather the teams and have the "A" teams trade maps with the "B" teams. Be sure each "A" team gets a map with a treasure marked in the "B" hiding area and vice versa.
6. After the maps are exchanged, each team searches for the treasure by reading the map and determining its location as location as marked. Teams can determine whether they've found the correct treasure by comparing the identification tag on the treasure with the name or number written on their map.
7. Special awards might be given to the team that finds its treasure fastest, and the team that selects the most clever hiding place and most accurately marks its location on the map.

Reflection After the trip, review the National Geographic movie included in this folder and discuss the challenges John Smith faced when exploring the Bay. What were some of the treasures he discovered?

Extensions

1. Students construct maps of the school grounds or their classroom and practice the treasure hunt game at school before going to the site.
2. Students make a map of an imaginary place (marking where a treasure is buried by "X"), designing their own symbols, including a legend explaining each symbol, a compass rose, and a scale to show relative distance. They exchange maps, interpret, and write out directions to the location of the treasure marked on the map they are reading.
3. Students bring in maps from home to study different legends and symbols.

Variations Prepare a map worksheet of the site that asks questions that require map (and/or compass) reading and interpretation, such as: "You are at the front door of the visitor center. Which direction is the river?"

Younger students:

Prepare in advance a special map of a small area of the site, such as a playground or picnic area. Hide treasures yourself, then send students on a treasure hunt, helping them read the map and understand its layout.

Advanced/Gifted students:

1. The activity can be varied according to time available and level of understanding. Groups with more time and skills may use USGS topographic maps and hide the treasure over a large area. (See park and natural area preserve information section for list of the USGS topographic maps.) For treasures hidden close to landmarks, only their relative locations need to be marked accurately on the maps, and the students must use compasses, protractors, measuring tapes and scaled rulers to find them.
2. John Smith used *triangulation* in mapping the Bay. Research the background and methods of triangulation and try it out at the site.

Resources

Atwood, B.S. 1976. *Building a Map Skills Program.* Education Today Co., Inc., Palo Alto, CA.

Orienteering. Boy Scouts of America.

Using Maps and Globes. 1974. Virginia Department of Education, Monroe Bldg., 101 North 14th St., Richmond, VA 23219.

USGS Topographical Maps

Site	*Quadrangle(s)*			
Belle Island	Lively	(3707675)		
Bush Mill Stream	Lancaster	(3707674)	Heathsville	(3707684)
Caledon	King George	(3807732)		
Chippokes	Hog Island	(3707626)		
False Cape	Knotts Island	(3607558)	North Bay	(3605568)
Hughlett Point	Fleets Bay	(3707663)		
First Landing	Cape Henry	(3607681)		
Kiptopeke	Townsend	(3707528)		
Leesylvania	Quantico	(3807753)	Indian Head	(3807752)
Mason Neck	Fort Belvoir	(3807762)		
North Landing River	Pleasant Ridge	(3607661)	Creeds (south half)	(3607651)
Westmoreland	Stratford Hall	(3807627)	Colonial Beach	(3807628)
York River	Gressitt	(3707646)		

Copies may be available for loan from park or natural area preserve staff.

For personal copies or more information write:

Virginia Division of Mineral Resources, P.O. Box 3667, Charlottesville, VA 22903

804-293-5121. $4 each plus tax and shipping.

5 ACTIVITY

History Underfoot/Wastebasket Archaeology

(Virginia Historical Society)

By Vicki Browne (Evergreen Elementary School)
http://www.vahistorical.org/sva2003/lparch3.htm

Related Standards of Learning
Science: 3.1, 4.1, 5.1
History and Social Science: 4.7, 5.9.

Level
Elementary

Time Required
45 minutes to 1 hour

Materials

- 1 trash bag full of waste from a preschooler (examples: page from a paint with water book, fat broken crayon, playdough box, wrapper from kid's meal toy, popsicle stick, juice box, party hat, party favor, small toy)
- 1 trash bag full of waste from a school age child (examples: graded paper, used notebook, pencil sharpened down to tiny size, snack wrapper, used eraser, empty pen, nametag, pen with toothmarks, lunch money)
- 1 trash bag full of kitchen waste (examples: boxes/bags from prepared food, plastic utensils, paper cups, paper towel outer wrapper and inner empty core, old sponge, eggshells, chicken bones)
- 1 trash bag full of teenager's trash (examples: CD wrapper, empty shampoo container, old Seventeen magazine, Clearasil container, soda bottle or can, Nintendo or Gameboy box, a quarter)
- 1 trash bag full of waste from office worker (examples: coffee cup, floppy disc, business card, staples box, loose stapes, paper clip, ledger book, index tabs, legal pad, fancy pen, tape dispenser, coins)
- 1 trash bag full of teacher's trash (no examples necessary!)
- List of questions for wastebasket archaeologists to answer. (examples: Where was most of this trash produced? Who used these things? What did these people eat? What were their health habits? What were their hobbies? What time of year was it when this trash was thrown away? What were these things used for? What was the location like where these things were used? Approximately what time period was this trash from?)

Objectives
Students will:

- classify and categorize items of trash
- draw conclusions about the people who used the items of trash in each wastebasket.

Overview
Much of what we know about the earliest Virginians comes from the work of archaeologists. In order for students to understand the history of our state it is important for them to understand how we know what that history is. Cultures that existed before written history, or cultures such as those of Virginia's Native Americans which are based on oral histories, might be lost to us without the ability of archaeologists to locate and interpret artifacts left behind by these cultures. In addition to providing lessons in history, archaeology is a wonderful way to teach science skills such as classifying, interpreting, observing, and investigating; math skills such as patterns, graphing, preparing and interpreting grids, measuring, and calculating; and language skills such as journal and report writing. Children love hands-on learning, mysteries and puzzles. Using archaeology to teach students in elementary school is a creative way to grab students' attention and hold their interest as they learn SOL's in numerous subject areas.

Background Often artifacts are found grouped together in areas that served as a trash pit for their owners. Disposing of trash and using landfills are 20th century practices. Prior to the 20th century, people usually tossed their trash and debris out the nearest window or door. This practice makes it easier for archaeologists to locate foundations once they have located domestic trash heaps. At the beginning of the new millennium, a good way to learn about people's lives is to inspect their wastebaskets!

Activities

1. Divide class into 6 groups. Give each student a list of questions.
2. Share background with students. Tell them that they will be inspecting 6 different bags of trash, trying to answer as many questions about each bag as possible. They should work together as a group and each student may write down their own answers to the questions.
3. Give each group a bag of trash. Allow 5-8 minutes per bag for groups to examine the contents.
4. Rotate bags until every group has inspected all 6.
5. Call on students to share some of their conclusions about each of the 6 bags of trash.
6. Point out to students the difference between the “artifacts” found in each trash bag and archaeology “artifacts.” The trash artifacts are easier to interpret than artifacts examined in isolation. Also, there were probably familiar to students.
7. Have students write about their results in their archaeology journals. This may be done as morning work the next day.

6
ACTIVITY

Virginia's Agricultural Resources

(Virginia's Natural Resource Education Guide; www.vanaturally.com/guide/agriculture.html)

Agriculture in Virginia

Agriculture is Virginia's largest industry and forms the basis for a number of related enterprises, including food and fiber production, processing, distribution, and marketing. About 20 out of every 100 jobs are held in agriculture. In Virginia, agriculture spans a wide spectrum of activities, from the traditional raising of field crops, vegetables, livestock, and nursery products, to the breeding of commercial horses, the bottling of premium wines, and the growing of fish, or aquaculture.

Agriculture has changed dramatically in the past 200 years. When the country was first settled, most people were farmers and grew their own food. But a fundamental change occurred when farm machines like tractors were invented. Farmers could then produce more crops in less time using fewer laborers and could grow more food than they could eat.

Agriculture is still changing. Biotechnology is leading us to improved plants and animals. As this technology advances, it will be possible to use plants and animals for specific purposes, such as the production of medicines, and improved genes will render crops that rely less upon chemicals and fertilizers. Like other caretakers of the land, farmers have a keen interest in maintaining healthy soil and water resources through careful stewardship.

As the map on page 20 (Illustration A) indicates, a wide assortment of crops and livestock grows throughout the Commonwealth.

Natural Conditions Support Farming

Plants rely upon three ingredients to grow: the sun's energy, water, and nutrient-rich soil. But beyond this,crops have distinct needs. For instance, some need fine soil such as clay while others need coarse, sandysoil to grow. They also require varying amounts of rain and different temperatures to thrive.

Virginia has a mild climate and receives about 40 inches of rain each year, making it an ideal growing location for many kinds of field crops. The Commonwealth is large and endowed with regions of unique natural resources — from the mountains of the west to the sandy soil of the east. Its four major geographic regions (moving from west to east) are the Allegheny Plateau, Ridge and Valley, Piedmont, and Tidewater.

Virginia's Geographic Regions

The Allegheny Plateau in the extreme western part of the state is mountainous. Much of this land is used for pasture, and many farmers raise beef cattle and sheep here. Cooler temperatures in the region of southwest Virginia promote the growing of burley tobacco,some livestock, and Christmas trees.

The Ridge and Valley region refers to Virginia's Blue Ridge Mountains and Shenandoah Valley. In the southern part of this region, the land is very hilly and rocky, similar to the Allegheny Plateau. Like the Allegheny Plateau, this land is used primarily for pasture. Many farmers raise beef cattle, horses, dairy cows, and sheep. Moving northerly, the land becomes flatter and conducive to other livestock and crops, such as apple and peach orchards.

The Shenandoah Valley is home to many important agricultural counties. One is Rockingham County, known as one of the top 100 counties in the United States for agricultural production. It is famous for its poultry output – turkeys, chickens, and eggs. In fact, Rockingham County is called the "Turkey Capital of the World." Dairy cattle are also important to this county in Virginia.

The Piedmont Region is known for its heavy, clay soils. In the southern reaches, Virginia's most famous crop, tobacco, is grown. Four different types of tobacco are raised across the Commonwealth: flue-cured, burley, dark-fired, and sun-cured.

The soils of the northern Piedmont, by contrast, are good for growing grass. Turfgrass and crops like winter wheat thrive. As the name implies, winter wheat is planted in the fall and lives through the winter at a height of a few inches. In the spring, it grows rapidly and, come summer, is harvested. The northern Piedmont is also home to dairy cows, horses, corn, and peach orchards.

Soils of the Tidewater Region are lighter and sandy in nature. These soils promote the growth of evergreens and pine forests, as well as cotton, corn, wheat,and soybean. Peanuts also grow well in the sandy soils of the Tidewater Region. The many peanut farms in Virginia are famous for producing large peanuts of excellent quality.

Many years ago pigs in this area ate peanuts, which gave their meat a special flavor. They were called "Smithfield Hams" after the town of Smithfield. Today, however, the term "Smithfield Ham" refers to a ham that has undergone a special curing process using smoke.

Cradled by the Atlantic Ocean to its east and the Chesapeake Bay to its west (and part of the Tidewater Region) is Virginia's Eastern Shore. Here, not surprisingly, you'll find plenty of light, sandy soil. The soil warms up quickly in the spring, permitting the early planting of crops. Because of this "jump" on the growing season, a second crop can be raised after the first is harvested.

Farmers on the Eastern Shore raise over 60 kinds of vegetables and fruits. Potatoes, cucumbers, squash, and green beans are vegetables common to the area. Fruits raised include tomatoes, apples, peaches, and strawberries. Farmers on the Eastern Shore also raise corn and soybean – staples in many kinds of feed for both people and animals.

Soil Conservation is Key

Soil is a mixture of minerals, water, and air. It also contains organic matter, such as dead leaves and grass. It is generally a combination of clay, silt, and sand, with the majority of its nutrients in the top layer, ranging from six to 10 inches deep. This top layer,or topsoil, also contains the most minerals and is the layer in which plant roots best take hold.

Topsoil is the only layer in which plants grow well and, for this reason, across the nation many agricultural programs focus on conserving America's topsoil. Nature may take more than 100 years to build an inch of topsoil. Yet, without good management, an inch of topsoil can be lost in just a few days. The loss of soil is called erosion and is generally caused by water and wind.

Farmers can reduce water erosion by several means. Using grass waterways and field strip cropping are ways that work with the natural slope of the land. (See Illustration B, page 20)

Windbreaks can help prevent erosion caused during high winds. A windbreak uses several rows of trees to slow the wind's movement across a field. Growing and leaving a cover of crops instead of exposed, bare soil also helps prevent wind erosion. All of these methods are collectively referred to as "best management practices."

Farming in Colonial Times

In colonial days, farm families grew corn, wheat, and tobacco and raised cattle and hogs. Native Americans, who were the country's agricultural experts, taught these first families appropriate methods of farming in the New World. One critical technique the colonial farmer learned from the Indians was the planting of crops in rows.

During colonial times, rich farmers were few and far between. Large landholders were known as planters, and they lived on plantations. Work on these plantations was performed by slaves. Planters grew vegetables and livestock for themselves and their laborers. They grew tobacco and cotton for export.

Cotton was important to the colonial economy in Virginia. Corn, beans, wheat, and peas were also grown. They were called "foodstuffs," or crops grown for food. However, in Virginia the single most important crop during colonial times was tobacco. At one time, in fact, it was used as currency. Tobacco has been raised for over 300 years and has brought more money to our state than any other crop.

Agriculture Today

Agriculture remains Virginia's largest industry. There are approximately 47,000 farms in Virginia, averaging 181 acres. (To qualify as a Virginia farm, $1,000 of farm income must be produced.) Compared to other states, particularly those in the Midwest, Virginia has small farms. In some places in the eastern part of the state farm size is increasing, while in other areas it is on the decline.

In addition to traditional production methods, farmers are utilizing modern techniques, such as nutrient management and integrated pest management, to maximize production while minimizing their use of fertilizer and pesticides. Some farmers are using organic production methods in response to increased demand for organically grown food. The U.S. Department of Agriculture is work-ing to determine a uniform definition for food that is organically grown. Regardless of the production method used—traditional, modern, or organic – each has costs and benefits.

The chart here indicates that both the number of farms and acres in farm land are on the decline. And in Virginia, as across the United States, farmers are growing older. According to the U.S. Census of Agriculture, in 1955 the average age of the American farmer was 49.6. Today it is 57. Each farmer in the U.S. produces enough food for about 130 people – distributed to roughly 100 here and 30 overseas.

The poultry industry (broilers) provides the largest percentage of agricultural product to the state's economy. Corn, cotton, hay, peanuts, soybeans, wheat, and fruits such as apples, are also important, and are complemented by beef and pork production, dairy farming, and tree harvesting (silviculture).

Discussion Questions

1. How is agriculture different than it used to be?
2. How is agriculture changing today?
3. What does the word livestock mean?
4. What is the size of the average farm in Virginia?
5. How would Virginia's crops and livestock be different if we had different natural conditions?
6. Name Virginia's four geographic regions.
7. Identify two important crops and two important types of livestock for each region.
8. Why is it important to protect soil from erosion?
9. Name four ways to prevent soil erosion.
10. Is land use in your area changing? How? (e.g., number of farms, farm size, crops grown)
11. Are there farms in your area? (Check farmer's market directory for help.)

Additional Resources

Web Sites:

- **U.S. Department of Agriculture –** www.usda.gov/history2/front.htm *and* www.nass.usda.gov/va/
- **Virginia Farm Bureau** – www.VAFB.com
- **Utah AITC** – www.ext.usu.edu/aitc/
- **Virginia Tech (VPI&SU)** – www.ext.vt.edu/departments/cses/agroeco/agroeco.html

Other Resources:

- The Virginia Foundation for Agriculture in the Classroom (AITC) provides free training and materials for teachers around the state. Teacher guides (K-4) are available to those attending in-service training sessions. Materials below can be ordered from AITC at 804-290-1141, or e-mail:aitc@vafb.com.
- Farm Facts booklet, CD and posters. Outlines facts about today's agricultural production, food consumption, and international trade; great for bulletin boards. Published by the American Farm Bureau Federation; for more information or to order, call 202-406-3600.

Changes in Virginia Farming

(Courtesy of the North Carolina Farm Bureau)

Related Standards of Learning

Science: 4.2, 4.8
English: 4.7, 4.8, 4.9
History and Social Science: 4.1, 4.2, 4.3

Level

Grade 4

Materials

- Background information
- Research materials on modern and colonial farming in Virginia

Objectives

1. Identify the reasons for and effects of changes in Virginia agriculture.
2. Use pre-writing techniques to generate ideas for writing and create a draft with emphasis on content related to agriculture.

Vocabulary Words

acre, best management practice, forestry, organic, textiles

Purpose

To be able to compare and contrast colonial and modern farming.

Activities

1. Instruct students to research farming in colonial Virginia. Have each student make a list of changes that have occurred in Virginia farming, such as the switch from horse and plow to mechanized farming and changes in crops, fertilizer use, insect control, harvest techniques, and other management practices.
2. Using the information collected and charts provided, ask students to write paragraphs and graphically depict what they have learned.
3. Analyze with students how simple machines were the foundation of farm equipment.

Extension Activities

1. Instruct students to write cause and effect paragraphs, explaining the reasons for changes in farming. After checking the papers, make suggestions and have the students revise their paragraphs.
2. Have students create shoe box dioramas depicting colonial farming techniques.
3. Divide students into two groups. One group will represent farming in the 1700s. The other will represent farming in the present day. Have the groups write short skits to share facts about their time period with the class. The skits should include information about the types of equipment used, the kinds of crops grown, and the kinds of people laboring on farms.

Virginia's Rank in US Agriculture, 2002

Rank	Item
4	Tobacco
4	Turkeys
5	Horses, ponies, mules, burros, donkeys
9	Broilers and other meat-type chickens
10	Cut Christmas trees
10	Poultry and eggs
13	Aquaculture
16	Cotton and cottonseed
17	Fruits, tree nuts and berries
19	Milk and other dairy products from cows
19	Soybeans
20	Hogs and pigs
21	Nursery, greenhouse, floriculture and sod
22	Cattle and calves
22	Sheep, goats and their products
23	Vegetables, melons, potatoes and sweet potatoes
23	Corn for grain
25	All wheat for grain
28	Grains, oilseeds, dry beans, and dry peas
29	Other animals and other products
32	Other crops and hay

Virginia Farm Income

Commodities	20002 Receipts in $1,000s	2002 % of Total Sales
Total Commodities Sold	2,360,911	100.0
• Poultry and eggs	750,035	31.8
• Cattle and calves	471,703	20.0
• Milk and other dairy products from cows	275,402	11.7
• Nursery, greenhouse, floriculture and sod	218,698	9.3
• Grains, oilseeds, dry beans and dry peas	157,985	6.7
• Tobacco	112,503	4.8
• Vegetables, melons, potatoes and sweet potatoes	79,345	3.4
• Other crops and hay	78,384	3.3
• Hogs and pigs	72,213	3.1
• Fruits, tree nuts and berries	40,954	1.7
• Horses, ponies, mules, burros and donkeys	40,581	1.7
• Cotton and cottonseed	20,718	0.9
• Aquaculture	19,945	0.8
• Cut Christmas trees	9,633	0.4
• Other animals and animal products	6,782	0.3
• Sheep, goats and their products	6,030	0.3

Trends in Virginia – Farm Numbers & Size

Year	Number of Farms	Farm Land (in 1000 acres)	Avg Size (in acres)
1980	58,000	9,800	169
1985	54,000	9,500	176
1990	46,000	8,900	193
1995	47,000	8,600	183
1997	47,000	8,500	181
2002	47,600	8,600	181

Usual Harvesting Dates

Crops	Begin	Most Active	End
Field Crops			
• Barley	September 10	Oct. 5 - Oct. 30	November 5
• Corn (grain)	April 5	April 20 - May 20	June 5
• Cotton-upland (lint)	April 10	April 20 - May 10	May 20
• Peanuts for nuts	April 20	May 5 - May 20	May 25
• Rye	April 20	Aug. 25 - Nov. 20	November 30
• Soybeans	April 30	May 20 - June 30	July 10
• Flue Tobacco	April 30	May 5 - May 20	May 30
• Wheat (winter)	September 25	Oct. 20 - Nov. 15	November 30
Vegetables			
• Snap Beans (summer)	June 1	June 10 - July 31	September 30
• Cabbage (summer)	June 1	July 15 - Aug. 31	September 15
• Sweet Corn (summer)	June 25	July 1 - July 31	September 15
• Cucumbers (summer)	June 15	July 1 - July 31	August 25
• Tomatoes	June 25	July 1 - Aug. 31	August 31

Source: Virginia Agricultural Statistics.

Illustration A: *Where Things Grow in Virginia*

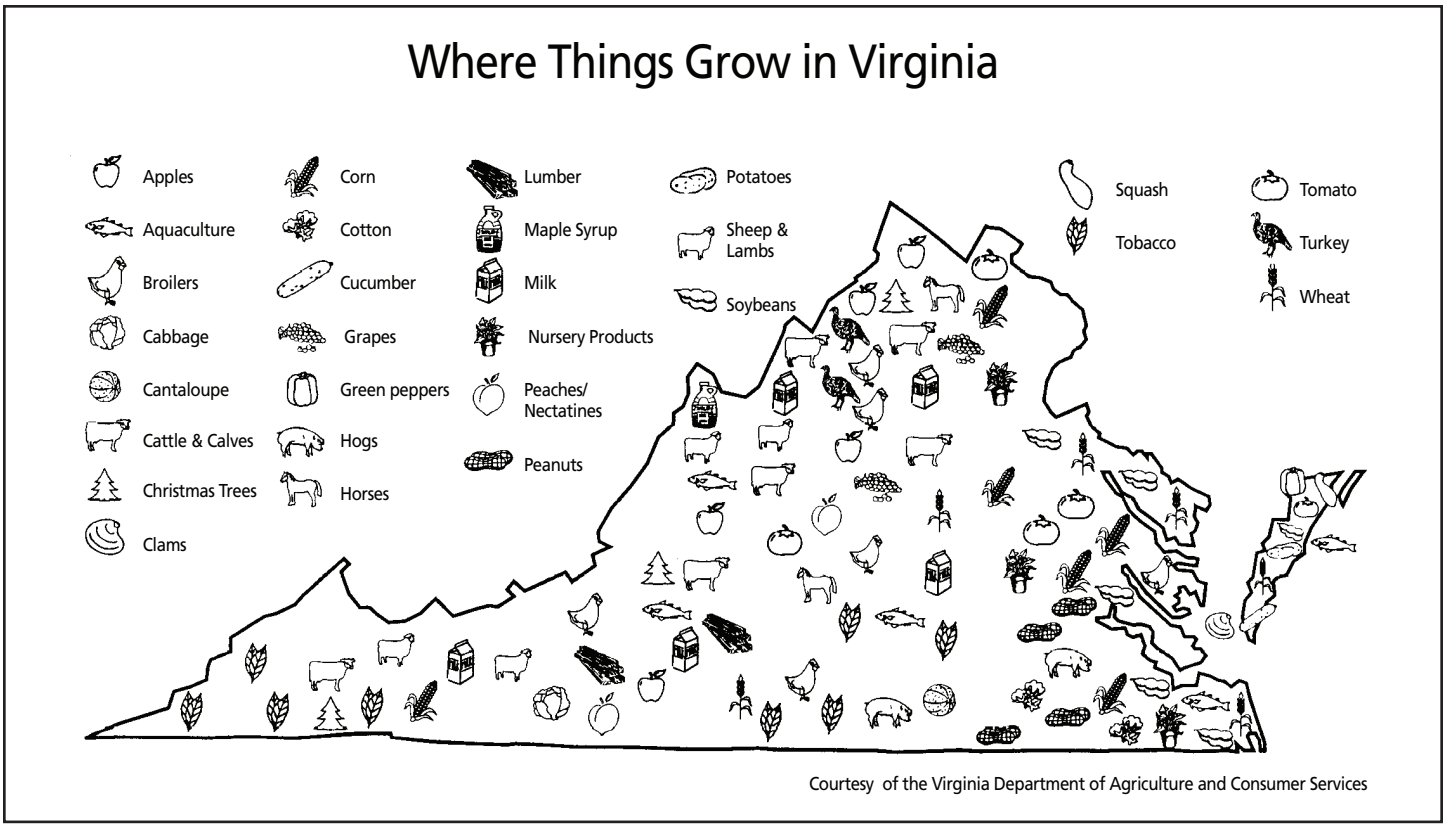
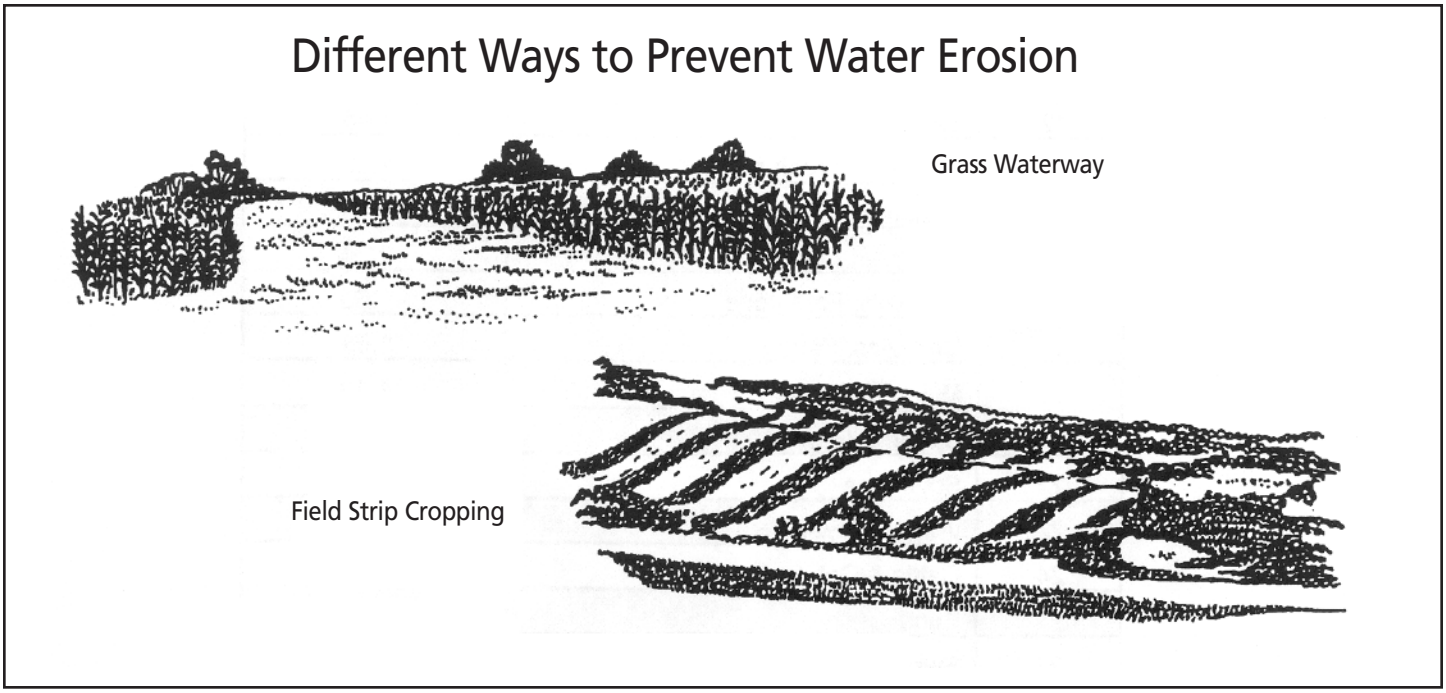


Illustration B: *Different Ways to Prevent Water Erosion*



7 ACTIVITY

Drought Days Simulation

(Project WET)

PROJECT WET Water Education for Teachers

1890 Family This scenario is based on a homesteading household in the American West. You are a family of eight persons: two adults and six children (a 9-month-old boy, a 3-year-old girl, a 6-year-old boy, an 8-year-old boy, a 10-year-old girl, and a 15-year-old girl). You live in a wooden house with three rooms.

You get your water from a well located near the barn, 150 feet (45 m) from your house. Your dad recently dug a pit for an outhouse. Your family has horses (consuming 12 gallons [45.6 l] of water per horse per day), two hogs (3 gallons [11.4 l] per hog per day), and four cows (12 gallons [45.6 l] per cow per day). Also, you rely on a garden for most of your family's vegetables.

Gallons of Water Consumed by Common Uses

Before Running Water

Water Use	Gallons	Liters
Toilet (outhouse)	0	0
Wash basin	1	3.8
Washing dishes by hand	2	7.6
Drinking water (see present-day common uses)		
Washing clothes by hand	5	19
Watering the garden	10-20	38-76
Bathtub	30	114

Problem 1:

You have noticed that the well is unable to meet your family's water needs during prolonged periods of hot and dry weather. If dry weather conditions persist, you will have to decrease your water consump-tion or take some other action.

On the *Water Use Calculations Worksheet* (below), list the ways your family uses water. Remember, there was no running water or electricity in 1890. In addition, water was often recycled for several purposes. For example, bath and dish tub rinse water were used to water the garden.

Problem 2:

How much water do you think your family of eight would consume in one day?

How much of this total would be consumed by livestock?

Why do you think the well was dug closer to the barn than to the house?

If the family had to decrease water consumption, how would they do it? List your ideas on the worksheet.

Water Use Calculations Worksheet – Past

Water Use	Gallons	First Change	Saved
Total Use			

The Present Think of your family and its water use. Typically, a person uses about 50 to 100 gallons (190 to 280 liters) of water every day. Using that figure as a guide and referring to the chart, *Gallons of Water Consumed by Common Uses,* calculate how much water your house-hold requires daily.

Gallons of Water Consumed by Common Uses

Present Day

Water Use	Gallons	Liters
Brushing teeth *(water running)*	2	7.6
Drinking water. *(1 quart/50 lbs. [1 l/22.5 k] body weight/day)*	____	____
Flushing toilet	5-7	19-26.6
Dishwasher	10	38
Shaving *(water running)*	20	76
Leaky faucet *(per day)*	25-30	5-114
Washing dishes by hand *(water running)*	30	114
Bath	35	133
Ten-minute shower. *(without water-saving head)*	25-50	95-190
Washing machine *(large load)*	60	228
Watering lawn *(10 minutes)*	75	285
Washing car *(hose running)*	180	684

Consider the following two problems and perform calculations:

Problem 1:

The area in which you live is beginning to experience a water shortage because of persistent hot, dry weather. Your water department has requested that each household voluntarily reduce water consumption by 20 percent. Decide how you will deal with the request. List the ways your family commonly uses water and determine quantities. Identify five changes you can make in your water use habits. Record your computations on the *Water Use Calculations Worksheet.*

Problem 2:

Two weeks have passed. Hot and dry conditions continue to plague your area. The water department has asked each house-hold to decrease water consumption another 20 percent. On the *Water Use Calculations Worksheet,* list an additional five changes you can make and figure the result.

Water Use Calculations Worksheet – Present

Water Use	Gallons	First Change	Saved	Second Change	Saved
Total Use					

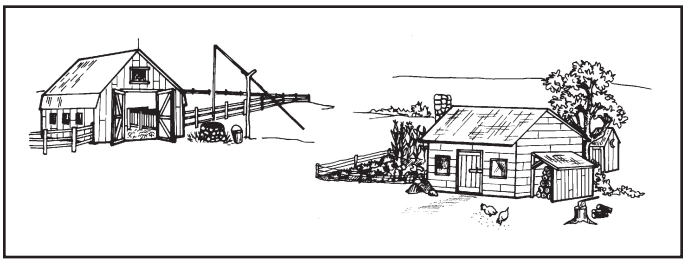
Cool Clear Water

Kerwhump-squeak, kerwhump-squeak. The cold water gushed from the pump. Was any drink ever as sweet as that you caught in an improvised hand-cup dipper and sucked up noisily?

Towering above the well was the windmill, sentinel of the prairie. Kicked into gear she whipped her AEROMOTOR or DEMPSTER tail away from the wind and pushed her wheel to catch the breeze. With a clank of gears the pump-stick began its up and down rhythm lifting cool water from the depths of earth, sending it splashing into the wooden stock-tank or waiting buckets.

It took very little wind to operate the mill. Ten to fifteen miles an hour would keep things going nicely.

The well was the hub of the farm. If possible the barn was located nearby. This was best for labor if not hygienic reasons. All livestock had a mighty thirst.



Children of the bygone era were, as now, loved for themselves but they filled a real need in the family unit. A child was measured, not only on the kitchen door where heights were carefully charted, but in the chores they were able to accomplish. A child could take pride in and know he was really growing up and amounting to something when he could help with the watering.

It began with a small bucket dipped full from the tank and lugged drippingly beside Dad who swung along with two five-gallon pails hanging light as feathers from his powerful fingers. Gradually you progressed to a twelve-quart galvanized pail that only had to be set down a couple of times as you watered the chickens.

That nice pail-full of water offered many youngsters their first practical lesson in physics. How fast must you windmill your arm, swinging the pail in a complete circle to prevent any water from spilling? No one mentioned centrifugal force; it was called “Spin the Pail.”

You knew you had arrived the day Dad said, “Use the five-gallon pail beside the barn and water the pigs, I’ll feed the calves.”

It was a feeling of sheer power to stand by the fence, alone, pouring water into the hog trough as the squealing porkers fought noisily for a drink. The livestock, your family needed you!

The importance wore a bit thin as you made possibly ten trips. It was an incentive to keep trying to haul two pails at one time and cut the trips to five.

If the well and water tank were in the best possible position it might be possible to arrange fences so that at least two yards had access to it.

The water tank, because of its importance and danger, had an unofficial set of rules for children. For toddlers… “Stay away from the tank. You may fall in and drown.”

For middle sized children… “Yes, you may sail stick boats on it but take them out when you are done and DON’T stir up the water. The horses will be in from the field at noon and need a good, fresh drink.”

If by chance a few days of calm descended on the farm the hand pump would be pressed into service. Farm boys with an inclination for arithmetic could tell how many strokes it took to fill the tank.

Farm children were and are notorious dreamers of big dreams. Pumping water was a chore that required almost no concentration and visions of wonder flashed through active minds as they pumped away. Not one of the most accomplished, wildest dreamers envisioned a farm where water fountains supplied every pen and barn with an automatic supply of water, warmed and kept from freezing in cold weather; center-pivot irrigation units watering a quarter-section of land; or rural water systems with mains crossing the countryside bringing water to every farm.

If such notions had been proposed to a B.E. (Before Electricity) farm kid he would surely have laughed and answered . . . "Ya, come with me; I'll race you to the foot of the rainbow."

—Marian Cramer, *Lantern Glow*

The Bath

Ma took down the wash-boiler from the back-porch wall about three o'clock on Saturday afternoon and summoned her chief water-hauler, a boy about ten years old. He must fetch four pails of water for the boiler.

Though washday was past or coming whichever way you looked at it, this was Saturday—the night of the bath.

Ma and the girls would start things off with a head-wash every second week. Since their hair was long it was nice to do that in the afternoon as it would be completely dry by bedtime.

After supper the boiler steamed away on the stove. In winter the steam that collected on the windowpane quickly froze to thick, white frost but near the stove it was cozy.

Some families had tin bath tubs you could soak in. Some used the round rinse-tub from washday in which you stood and scrubbed; some used a wash basin. It was sort of a matter of tradition and using what you had.


Courtesy: National Resource Conservation Service, Washington, D.C.

The kitchen was hot with the stove really fired up. Ma brought out a big hooked rug and put it right in front of the open oven door. The turns usually went from the youngest to the oldest ending with Pa. Sometimes a boy or girl of courting age might have Saturday night plans and they could be worked in the early part of the schedule. During summer when the whole family went to town on Saturday night the bath hour was moved up so the baths came before town.

In winter Ma laid out neat piles of clean underwear and night clothes for each member of the family. With a pail of cold water at hand to blend with the hot water it was bath time.

Ma presided over scrubbing the small children until they were considered old enough to manage themselves and then they could bathe alone and be checked after-wards.

Privacy was honored. No one interfered as one by one the family members took their turn enjoying the nice hot water. It usually wasn't emptied between bathers, but more water could be added to keep it nice and warm. Homemade soap was used for scrubbing, but sometimes there was a bar of town-soap with its good smell.

There would be at least three bath towels for family use. These would be nice, soft, terry cloth, not the hard huck toweling used for everyday. As one towel got wet it could be draped over the oven door to dry and later used again. Ma had likely cut and hemmed the wash rag from a bath towel gone thin in the middle.

There might be a bottle of lotion set on the table to smooth on elbows and rough heels.

Pa, the last one in the bath, took care of emptying the water into slop pails. He would wipe out the tub and hang it on the back-porch wall by the boiler.

Ma would come in quietly wearing her night clothes with her hair braided into one big braid down her back. She picked up the piles of discarded clothes for her washbox and tidied up the kitchen for tomorrow was Sunday.

Sunday could come. Her family was all clean for another week.

—Marian Cramer, *Lantern Glow*

Web Resources

Web resources:

- Walk Smart Virginia (www.walksmartvirginia.com)
- US History (ushistory.pwnet.org)
- Teaching and Learning VA K-3 History and Social Science SOL's (k3hss.pwnet.org)
- Virginia's First People (virginiaindians.pwnet.org)
- Virginia Studies resources for the classroom (vastudies.pwnet.org)
- Federal Commission site for Jamestown (www.jamestownjourney.org)
- Chesapeake Bay Program Education site (http://www.chesapeakebay.net/chart)
- Virginia Association of Museums (http://www.vamuseums.org)
- Chesapeake Bay Gateways Network (http://baygateways.net)
- Virginia Naturally (www.vanaturally.com)
- Virtual Jamestown (http://www.virtualjamestown.org/page2.html)
- National Geographic Xpeditions (http://www.nationalgeographic.com/xpeditions)
- Chesapeake Bay Foundation (www.cbf.org)
- John Smith Trail on the James River (www.johnsmithtrail.org)
- Jamestown 2007 (Official Web site of the 400th Anniversary of Jamestown) www.jamestown2007.org
- Jamestown Settlement and Yorktown Victory Center (www.historyisfun.org)
- "The Paintings of John White" interactive on DHR website http://www.dhr.virginia.gov/John_White/JohnWhite.html
- "First People: The Early Indians of Virginia" book by DHR staff, published by U Va Press (2nd edition this fall) details human habitation in Virginia from 15,000 BC to present http://www.dhr.virginia.gov/arch_NET/timeline/time_line.htm
- Building footprints . . . . from old DHR Teachers' Packet (3 pp activity sheet)

Link on DHR website to Virginia Historical Society's

- "Becoming a home place: classroom activities: archaeology" http://www.vahistorical.org/sva2003/classroom_archaeology.htm
- Three lesson plans:
  - Archaeology – Its Methods and Use (Middle school)
  - Archaeological Self-Study (Elementary)
  - History Underfoot (Elementary

Historic Jamestowne; America's birthplace. www.historicjamestowne.org/learn/
Includes lesson plans and activities for elementary, middle, and high school students, plus supporting information.

National Park Service program, Teaching with Historic Places at web site http://www.cr.nps.gov/nr/twhp/ has Social Studies Curricula aimed at middle grades but adaptable to lower and higher and also US National History Standards for grades 5-12.