



Virginia Association of Soil and Water Conservation Districts

Soil Expert

**A Patch Program
for Brownie Girl Scouts and Wolf/Bear Cub Scouts**



VA Association of Soil & Water Conservation Districts
7308 Hanover Green Drive, Suite 100
Mechanicsville, VA 23111
www.vaswcd.org



Henricopolis Soil & Water Conservation District
8600 Dixon Powers Drive
Henrico, VA 23228
www.henrico.us/swcd

The Conservation Poster Contest Patch Program was developed by
the Virginia Association of Soil and Water Conservation Districts and
the Henricopolis Soil and Water Conservation District.

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Soil and Water Conservation Districts

The VASWCD Educational Foundation Mission

The Virginia Association of Soil and Water Conservation Districts Educational Foundation is nonprofit and classified as a 501(c)(3) organization that was established in 1990. The VASWCD Educational Foundation provides and promotes leadership in the conservation of natural resources through stewardship and education programs. Funding for activities such as Envirothon is provided through donations made by individuals, corporations, organizations and other foundations as well as fundraising efforts. Contributions to the VASWCD Educational Foundation are used to support educational efforts within the Commonwealth.

There are 47 Soil and Water Conservation Districts serving localities throughout the Commonwealth of Virginia. Governed by a board of directors of local citizens, districts work hand-in hand with state, federal and county agencies, other conservation organizations, schools, and many community partners to achieve their conservation objectives.

Districts offer many educational programs which target a variety of audiences. Emphasis is on education programs based on the VA Standards of Learning. Resources include activities, games, models, videos, skits, and more. Many districts also have a variety of resources available to teachers and scout leaders.

Contact information for the Soil and Water Conservation District serving each of the Girl Scout Commonwealth Councils counties can be found on the following pages

Soil and Water Conservation Districts



Virginia Association of Soil and Water Conservation Districts

Beth Sokolik

804-559-0324 • Elizabeth.sokolik@vaswcd.org

Appomattox River SWCD

Sara Cravath
Phone: (804) 469-7297
Sara.cravath@vaswcd.org

Big Sandy SWCD

Edna Justus
Phone: (276) 935-7750
bsswcd@outlook.com

Big Walker SWCD

Rachel Havens
Phone: (276) 228-3513
Rachel.havens@va.nacdnet.net

Blue Ridge SWCD

Kathy Smith
Phone: (540) 483-5341
ksmith@brswcd.org

Chowan Basin SWCD

Sue Morris/Kim Clarke
Phone: (434) 634-2115
Smorris.chowanbasinswcd@telpage.net

Clinch Valley SWCD

Andrew Gilmer
Phone: (276) 889-4650
andrewgilmer@bvu.net

Colonial SWCD

Brian Noyes
Phone: (757) 645-4895
Brian.noyes@colonialswcd.net

Culpeper SWCD

Stephanie DeNicola
Phone: (540) 825-8591
stephanied@culpeperswcd.org

Daniel Boone SWCD

Lisa Cope
Phone: (276) 346-1658
dbswcd@verizon.net

Eastern Shore SWCD

Bonnie Mahl
Phone: (757) 787-0918
Bonnie.mahl@esswcd.org

Evergreen SWCD

Jeana Waddle
Fax: (276) 783-7280
jeana.waddle@comcast.net

Halifax SWCD

Janice Jackson
Phone: (434) 476-7923
halsoil@pure.net

Hanover-Caroline SWCD

Pattie Bland
Phone: (804) 537-5225
ppbland@hanovercounty.gov

Headwaters SWCD

(540) 248-0148
cperry@co.augusta.va.us

Henricopolis SWCD

Lindy Durham
Phone: (804) 501-5175
dur24@co.henrico.va.us

Holston River SWCD

Mandy Fletcher
Phone: (276) 628-8187
mandyf.hrswwcd@gmail.com

James River SWCD

Linda McAllister
Phone: (804) 732-6550
lmcallister@princegeorgeva.org

John Marshall SWCD

Michael Trop
Phone: (540) 347-3120
michael.trop@fauquiercounty.gov

Lake Country SWCD

Alvis Inge
Phone: (434) 738-0150
lcswwcd@gmail.com

Lonesome Pine SWCD

276-926-6621
lpswcd@hotmail.com

Lord Fairfax SWCD

Mark Wastler
Phone: (540) 465-2424
Mark.wastler@lfswwcd.org

Loudoun SWCD

Suzanne Brown
Phone: (571) 918-4530
suzie.brown@lswcd.org

Monacan SWCD

Betty McCracken
Phone: (804) 556-4936
Betty.McCracken@vaswcd.org

Mountain SWCD

Lorie Baldwin
Phone: 540-839-4616
mswcdlorie@tds.net

Mountain Castles SWCD

Tim Miller
Phone: (540) 977-2698
trailrunner95@gmail.com

Natural Bridge SWCD

Margaret Spencer
Phone: (540) 463-7124
Margaret.spencer@vaswcd.org

New River SWCD

Tracy Goodson
Phone: (276) 236-7191
thgoodson@embarqmail.com

Northern Neck SWCD

Kathleen Watson
Phone: (804) 313-9102
kathleen.watson@nnswwcd.org

Northern Virginia SWCD

Lily Whitesell
Phone: (703) 324-1460
lily.whitesell@fairfaxcounty.gov

Patrick SWCD

Sandra Heath
Phone: (276) 694-3121
sandra.heath@va.nacdnet.net

Peaks of Otter SWCD

E.B. Watson
Phone: (540) 587-7645
eb.watson@verizon.net

Peanut SWCD

Tara Outland-Williams
Phone: (757) 357-7004
tarawilliams@peanutswcd.net

Peter Francisco SWCD

Elise Corbin
Phone: (434) 983-7923
Elise.corbin@vaswcd.org

Piedmont SWCD

Amanda Hancock
Phone: (434) 392-3782
abraham@piedmontswcd.org

Pittsylvania SWCD

Hanna Lindsey
Phone: (434) 432-8146
pittsswcd@yahoo.com

Prince William SWCD

Phone: (571) 379-7514
education@pwswwcd.org

Robert E. Lee SWCD

Jaclyn Hall
Phone: (434) 352-2819
J.hall@releeconservation.com

Scott County SWCD

Shelia Richards
Phone: (276) 386-9241
Shelia.richards@vaswcd.org

Shenandoah Valley SWCD

Blake Rogers
Phone: (540) 433-2853
Blake.rogers@svswcd.org

Skyline SWCD

Cynthia Hancock
Phone: (540) 381-0071
Cynthia.skylineswcd@verizon.net

Southside SWCD

Julie Hamlett
Phone: (434) 542-5405
Julie.hamlett@vaswcd.org

Tazewell SWCD

Elizabeth Bennett
Phone: (276) 988-9588
Elizabeth.bennett@richl.twcbc.com

Thomas Jefferson SWCD

Lauriston DaMitz
Phone: (434) 975-0224
lauriston.damitz@tjswcd.org

Three Rivers SWCD

Michelle Carter
Phone: (804) 443-2327
michelle.carter@trswcd.org

Tidewater SWCD

Carl Thiel-Goin
Phone: (804) 693-3562
Cthiel-goin@tidewaterswcd.org

Tri-County/City SWCD

Izabela Sikora
Phone: (540) 656-2401
izabela.sikora@tccswcd.org

Virginia Dare SWCD

Kathleen Sullivan
Phone: (757) 385-4775
ksulliva@vbgov.com



Soil and Water Conservation Districts

Listed by County/City

County/City	SWCD
Accomack Co.	Eastern Shore SWCD
Albemarle Co.	Thomas Jefferson SWCD
Alleghany Co.	Mountain SWCD
Amelia Co.	Piedmont SWCD
Amherst Co.	Robert E. Lee SWCD
Appomattox Co.	Robert E. Lee SWCD
Augusta Co.	Headwaters SWCD
Bath Co.	Mountain SWCD
Bedford Co.	Peaks of Otter SWCD
Bedford, City of	Peaks of Otter SWCD
Bland Co.	Big Walker SWCD
Botetourt Co.	Mountain Castles SWCD
Brunswick Co.	Lake Country SWCD
Buchanan Co.	Big Sandy SWCD
Buckingham Co.	Peter Francisco SWCD
Buena Vista, City of	Natural Bridge SWCD
Campbell Co.	Robert E. Lee SWCD
Caroline Co.	Hanover-Caroline SWCD
Carroll Co.	New River SWCD
Charles City Co.	Colonial SWCD
Charlotte Co.	Southside SWCD
Chesapeake, City of	Virginia Dare SWCD
Chesterfield Co.	James River SWCD
Clarke Co.	Lord Fairfax SWCD
Covington, City of	Mountain SWCD
Craig Co.	Mountain Castles SWCD
Culpeper Co.	Culpeper SWCD
Cumberland Co.	Peter Francisco SWCD
Dickenson Co.	Lonesome Pine SWCD
Dinwiddie Co.	Appomattox SWCD
Essex Co.	Three Rivers SWCD

County/City	SWCD
Fairfax Co.	Northern Virginia SWCD
Fauquier Co.	John Marshall SWCD
Floyd Co.	Skyline SWCD
Fluvanna Co.	Thomas Jefferson SWCD
Franklin Co.	Blue Ridge SWCD
Frederick Co.	Lord Fairfax SWCD
Fredericksburg, City of	Tri-County/City SWCD
Galax, City of	New River SWCD
Giles Co.	Skyline SWCD
Gloucester Co.	Tidewater SWCD
Goochland Co.	Monacan SWCD
Grayson Co.	New River SWCD
Greene Co.	Culpeper SWCD
Greenville Co.	Chowan Basin SWCD
Halifax Co.	Halifax SWCD
Hanover Co.	Hanover-Caroline SWCD
Harrisonburg, City of	Shenandoah Valley SWCD
Henrico Co.	Henricopolis SWCD
Henry Co.	Blue Ridge SWCD
Highland Co.	Mountain SWCD
Isle of Wight Co.	Peanut SWCD
James City Co.	Colonial SWCD
King George Co.	Tri-County/City SWCD
King & Queen Co.	Three Rivers SWCD
King William Co.	Three Rivers SWCD
Lancaster Co.	Northern Neck SWCD
Lee Co.	Daniel Boone SWCD
Lexington, City of	Natural Bridge SWCD
Loudoun Co.	Loudoun SWCD
Louisa Co.	Thomas Jefferson SWCD

Soil and Water Conservation Districts

Listed by County/City



County/City	SWCD
Lunenburg Co.	Southside SWCD
Lynchburg, City of	Robert E. Lee SWCD
Madison Co.	Culpeper SWCD
Mathews Co.	Tidewater SWCD
Mecklenburg Co.	Lake Country SWCD
Middlesex Co.	Tidewater SWCD
Montgomery Co.	Skyline SWCD
Nelson Co.	Thomas Jefferson SWCD
New Kent Co.	Colonial SWCD
Northampton Co.	Eastern Shore SWCD
Northumberland Co.	Northern Neck SWCD
Nottoway Co.	Piedmont SWCD
Orange Co.	Culpeper SWCD
Page Co.	Shenandoah Valley SWCD
Patrick Co.	Patrick SWCD
Petersburg, City of	Appomattox River SWCD
Pittsylvania Co.	Pittsylvania SWCD
Powhatan Co.	Monacan SWCD
Prince Edward Co.	Piedmont SWCD
Prince George Co.	James River SWCD
Prince William Co.	Prince William SWCD
Pulaski Co.	Skyline SWCD
Rappahannock Co.	Culpeper SWCD
Richmond Co.	Northern Neck SWCD
Roanoke, City of	Blue Ridge SWCD
Roanoke Co.	Blue Ridge SWCD
Rockbridge Co.	Natural Bridge SWCD
Rockingham Co.	Shenandoah Valley SWCD
Russell Co.	Clinch Valley SWCD
Scott Co.	Scott County SWCD
Shenandoah Co.	Lord Fairfax SWCD

County/City	SWCD
Smyth Co.	Evergreen SWCD
Southampton Co.	Chowan Basin SWCD
Spotsylvania Co.	Tri-County/City SWCD
Stafford Co.	Tri-County/City SWCD
Staunton, City of	Headwaters SWCD
Suffolk, City of	Peanut SWCD
Surry Co.	Peanut SWCD
Sussex Co.	Chowan Basin SWCD
Tazewell Co.	Tazewell SWCD
Virginia Beach, City of	Virginia Dare SWCD
Warren Co.	Lord Fairfax SWCD
Washington Co.	Holston River SWCD
Waynesboro, City of	Headwaters SWCD
Westmoreland Co.	Northern Neck SWCD
Williamsburg, City of	Colonial SWCD
Winchester, City of	Lord Fairfax SWCD
Wise Co.	Lonesome Pine SWCD
Wythe Co.	Big Walker SWCD
York Co.	Colonial SWCD



Earning the Patch

The Soil Expert patch is designed for Brownie Girl Scouts, but may be enjoyed by older Girl Scouts as well. Girls must complete all 6 activities to earn the patch. On pages 6-11, background information to assist you in completing this patch with your troop is provided. You can also access the resource information at the end of this booklet for more.

1. Soil is a natural resource that provides support and nutrients for plants to grow. Find out the definition of soil. What's the difference between soil and dirt?
2. Soil is very important to people. What are four ways we use soil?
3. Soil forms very slowly over time. It takes 500 years to make one inch of topsoil! Find out what environmental factors play a role in soil formation.
4. There are three types of soil. Find out their differences and how they affect plant growth.
5. Soil forms in layers. Find out about the O, A, B and C layers.
6. What is soil erosion? What are some ways that soil can be conserved by reducing erosion?

What is Soil?



Soil is a mix of minerals, air, water and organic matter— organisms and the decaying remains of once living things.

Soil is amazing! It is...

- ♥ Light and heavy.
- ♥ Strong enough to hold up a skyscraper.
- ♥ Fragile enough to be blown away by the wind.
- ♥ Loose enough to flow like a river.
- ♥ Solid as a mountain.

What's the difference between soil and dirt?
Dirt is what you find under your fingernails.
Soil is what you find under your feet. Think of soil as a thin living skin that covers the



Why is Soil Important?

Every living plant and animal depends on the condition of our soil, so we must protect it! Soil conservation is all about protecting that natural resource so that it is here for us and for future generations to use.

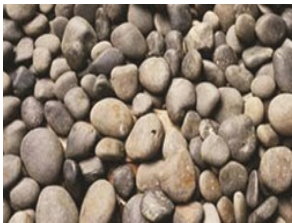
A conservationist is someone who works to save or conserve things in nature. Anyone can be a soil conservationist... even you!



How is Soil Formed?



When trying to understand the formation of soil, there are 5 key factors—parent material, climate, topography, biology and time.



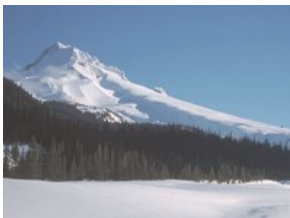
Parent Material

When the weather gets hot, rocks can get bigger. When the weather turns cold, rocks can get smaller. If this happens often enough, the rock will crack and break up into small pieces that break into even smaller pieces. When they get really small they turn into soil. Rain and ice can also get into rocks and break them apart.



Climate

Warmer temperatures and an abundance of water speed up the formation of soil. Cooler temperatures and less rain slows down soil formation. So humid locations tend to have a richer and deeper soil than cooler and dryer landscapes.



Topography

The up and down changes in hills and mountains is referred to as topography. In areas which are flat, the soil gets deeper more quickly than the surface erodes away. On steep slopes, erosion takes place more quickly than the formation of new soil. The result is that flat locations have a deeper, more mature soil layer than location with a steep slope.



Biology

Bio means life. Living organisms have a big impact on soil. Plants and animals provide nutrients to the soil in the form of waste products and dead bodies. A variety of micro-organisms perform important jobs in the soil that can help decompose living materials and give richness to the soil.



Time

Soil doesn't form overnight. In fact, soil formation can take thousands of years. It can take 500 years or more to form 1 inch of topsoil.



Types of Soil



Sand, silt and clay are the basic types of soil. Most soils are made up of a combination of these three. How soil looks and feels depends upon the amount of each type in that particular area. Sand feels *gritty* to the touch, silt feels *powdery* and clay feels *sticky*.

Water soaks into soil at different speeds, depending on the soil type. The large particles of sand allow soil to drain quickly. Clay's small particles packed close together hold water longer.

Soil Layers



Surface Litter - Layer O

Leaves, branches, animal scat and bodies, mushrooms and other rotting matter.

Topsoil - Layer A

Also called **humus**. Rotting organic matter from the litter layer and minerals from weathering rocks.

Subsoil - Layer B

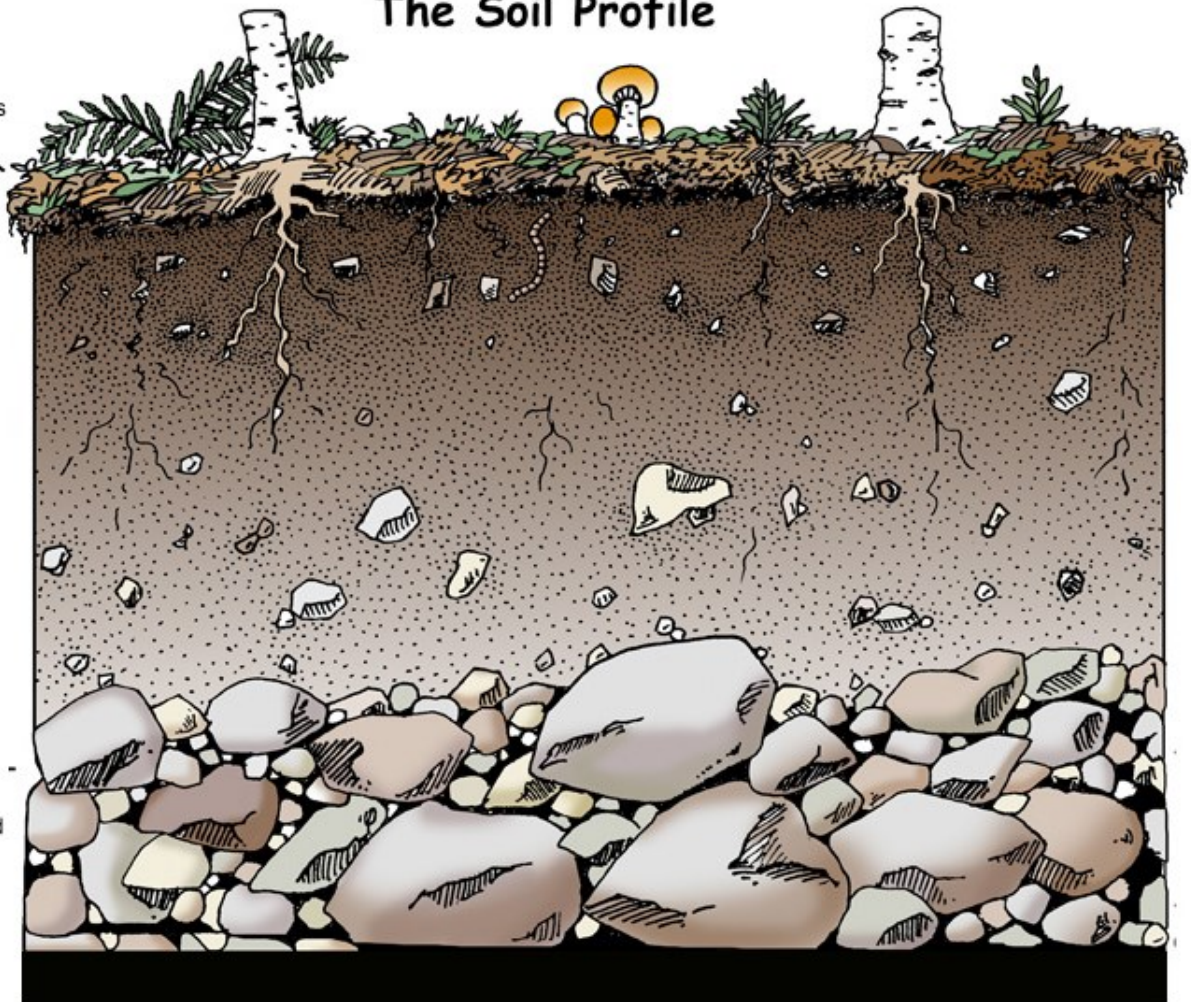
Crumbling rock, sand, clay, gravel and silt.

Parent Material - Layer C

Partially weathered rock underlying the soil layers.

Bedrock - Layer R

The Soil Profile





Conserving Soil

Soil erosion occurs when there is nothing to keep soil in place and water or wind moves it from one place to another. We can help prevent erosion by:



Plant trees and groundcover.



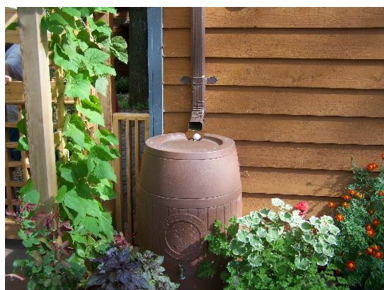
Grow plants on slopes.



Try no-dig gardening.



Plant a rain garden.



Use a rain barrel to catch runoff from your roof.



Build terraces and retaining walls.

Resources



Educational Resources for Children | Soil Science Society of America

<https://www.soils.org/smithsonian/children>

Kids Love Soil! Do You Dig Dirt? The links to the cool sites and activities on this page are to **educational**, government, and SSSA member web pages.

The Dirt on Soil - Free Teacher Resources - Discovery Education

<http://school.discoveryeducation.com/schooladventures/soil/>

Explore **soil** ecology, meet microscopic creatures, and journey underground in the virtual reality voyage of the Earthship. From the Discovery Channel school.

Soil Science Education Home Page - NASA

<http://soil.gsfc.nasa.gov/>

Aims to foster awareness about **soil** and its importance to life. With practical and illustrated **soil** science activities for school **children**.

The Earth's Soil - Geology For Kids - By KidsGeo.com

<http://www.kidsgeo.com/geology-for-kids/0002-the-earths-soil.php> **Educational** Website For **Kids ... Soil** is found on the upper most layer of the Earth . **Soil** consists of a mixture of weathered rock, finely ground into powder, minerals and a variety of living and dead lifeforms.

Kids Site - Butler Soil and Water Conservation District

<http://www.butlerswcd.org/Education/Kids.html>

Great games and activities on natural resources for **children**.

Soil Education Material Flyer

http://www.nacdnet.org/education/resources/soils/pdfs/product_flyer.pdf - -

Soil Education Materials. Written for **children** ages 9-12. Get **kids** excited about the living world of **soil!** ... activities; list of **soil education** resources.

TLC "Science Projects for Kids: Soil Experiments"

<http://tlc.howstuffworks.com/family/science-projects-for-kids-soil-experiments.htm>

Science projects for **kids: soil** experiments let kids get their hands dirty while learning.



The Patch!

The Soil Expert patch is available through your local Soil and Water Conservation District. Contact your SWCD to request a workshop or to order patches after completing the activities on your own. A list of SWCDs and the areas they serve can be found on pages 3 through 5.

