



**Virginia Association of Soil and Water Conservation Districts**

# **Soil Expert**

**A Patch Program for Virginia Students  
in Grade 3 and Above**





VA Association of Soil & Water Conservation Districts  
7308 Hanover Green Drive, Suite 100  
Mechanicsville, VA 23111  
[www.vaswcd.org](http://www.vaswcd.org)



Henricopolis Soil & Water Conservation District  
8600 Dixon Powers Drive  
Henrico, VA 23228  
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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, Youth Conservation Camp, Youth Conservation Leadership Institute and the Conservation Poster Contest are 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 county in Virginia can be found on pages 4 and 5. If you can not find your Soil and Water Conservation District please reach out Bonnie Mahl– [bonnie.mahl@vaswcd.org](mailto:bonnie.mahl@vaswcd.org)



# Soil and Water Conservation Districts



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# 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

County/City	SWCD
Essex Co.	Three Rivers 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 Williams Co.	Three Rivers SWCD
Lancaster Co.	Northern Neck SWCD
Lee Co.	Daniel Boone SWCD
Lexington, City of	Natural Bridge SWCD

# Soil and Water Conservation Districts

Listed by County/City



County/City	SWCD
Loudoun Co.	Loudoun SWCD
Louisa Co.	Thomas Jefferson SWD
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

County/City	SWCD
Rockingham Co.	Shenandoah Valley SWCD
Russell Co.	Clinch Valley SWCD
Scott Co.	Scott County SWCD
Shenandoah Co.	Lord Fairfax 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 students in 3rd Grade but may be enjoyed by older students as well. Students must complete all 10 activities to earn the patch. On pages 6-11, background information to assist you in completing this patch. 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?
7. What is the state soil of Virginia?
8. What is your local Soil & Water Conservation District?
9. What type of work do they do that involves soils?
10. What kinds of jobs depend on knowing about soil?



# 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 Earth.



## 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.

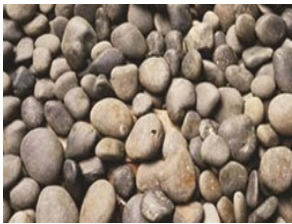
A conservationist is someone who works to save or conserve things in nature. Anyone can be a soil conservationist... even you!



# How is Soil Formed?



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



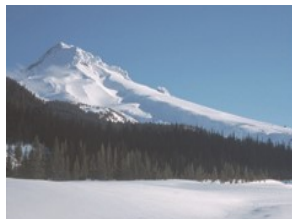
## Parent Material

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.



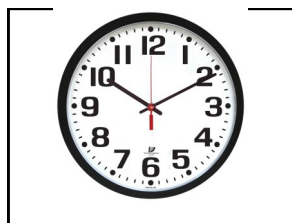
## Topography

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



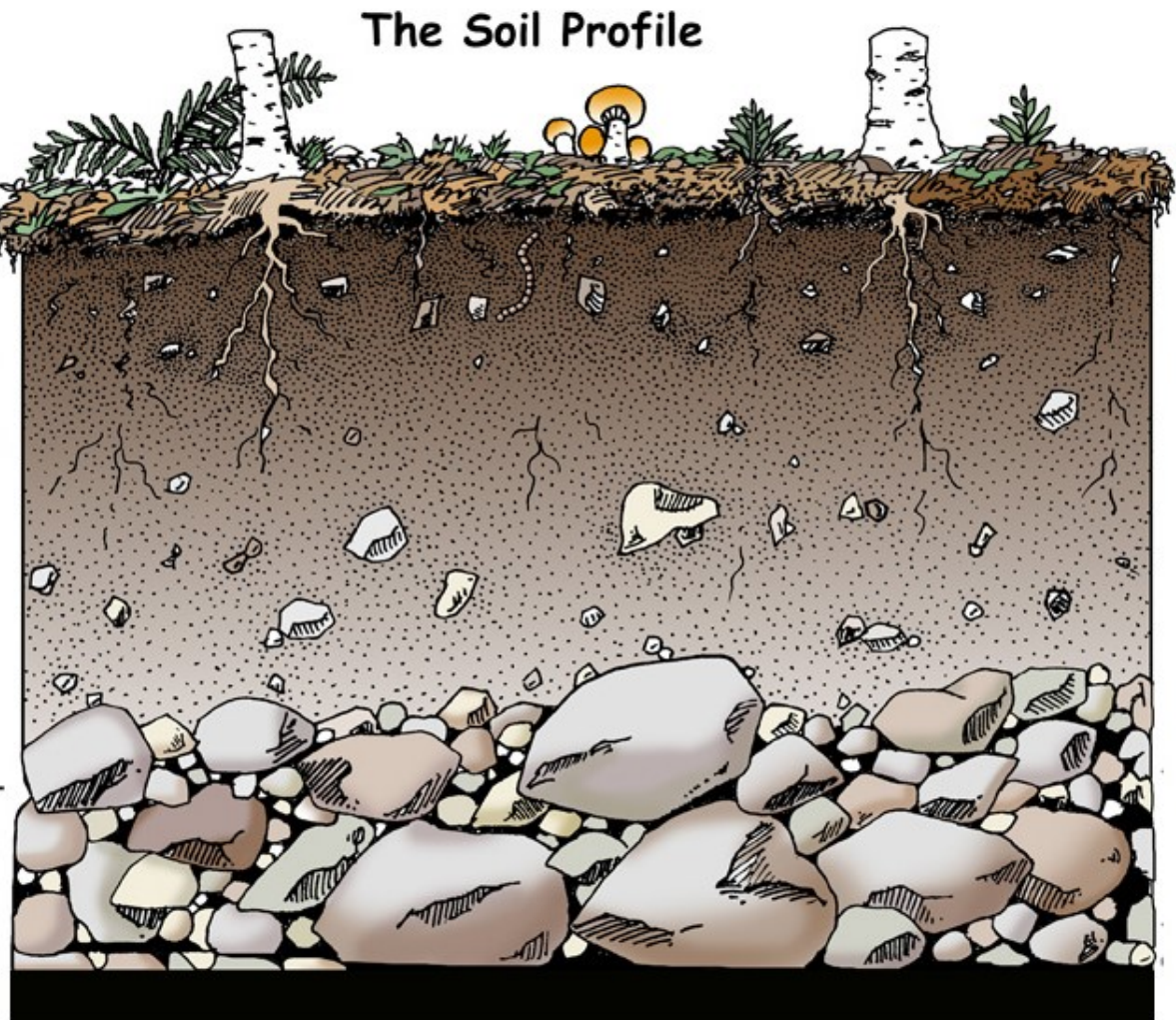
**Surface Litter - Layer O**  
Leaves, branches, animal scat and bodies, mushrooms and other rotting matter.

**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**





# 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.



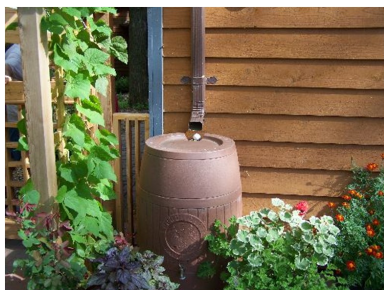
Grow plants on slopes.



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](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.

## Virginia Soil Information

<https://www.soils4teachers.org/files/s4t/k12outreach/va-state-soil-booklet.pdf>



# **The Form**

## **To earn the patch fill out this form and email it to your local SWCD**

Name:  
Grade:  
Mailing Address:

Please answer the questions-

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?
7. What is the state soil of Virginia?
8. What is your local Soil & Water Conservation District?
9. What type of work do they do that involves soils?
10. What kinds of jobs depend on knowing about soil?