

Meet Grand County  
Extension Director



Travis Hoesli

Good Day 4-Her's. I am Travis Hoesli the 4-H, Agriculture Agent and County Director for Grand County. I live with my wife and two daughters in Kremmling, CO where we have the ability to enjoy many of the beautiful natural resources of Colorado. I grew up in the SE Colorado where my interest in agriculture sciences started from my involvement as a 10 year 4-H member and FFA. Through my participation in leather craft and various livestock projects, my interest in agriculture sciences grew.

After high school I started on my career path at North Eastern Junior College. After completing one year there I transferred to Lamar Community College where I had a college advisor that encouraged me to get into agriculture education. After completing my Associates of Science Degree in Agriculture Education, I transferred to Oklahoma Panhandle State University to finish my BS in Agriculture Education. Later on while teaching, I continued my education and completed a Master of Science in Agriculture from Colorado State University.

Through my 17 years of teaching high school agriculture education in three different communities in Rural Eastern Colorado, I was able to experience how agriculture is so different in the different communities and states. I started teaching principles of production agriculture but as my position changed over the years, I expanded my knowledge into Colorado's Green Industry. I am in my fourth year as an Extension Agent I still continue to educate myself of the new scientific principle involved with agriculture and how I can educate the youth on the broad application of agriculture and environmental sciences.

# STEM Connections



Connecting Science, Technology, Engineering, and Math concepts to our everyday lives.

## The Dirt on Dirt! (Part 1)

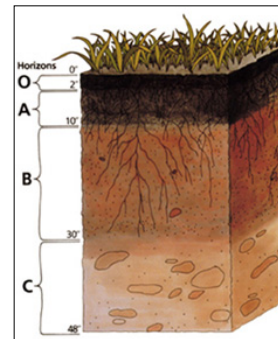
While plants need sunlight and carbon dioxide to grow, they also need a good, rich soil

<http://www.coopext.colostate.edu/TRAVWeeds/BBSweetCorn/bandbroadcast.html>

Plants need soil to not only anchor themselves in an upright position with their root system, but also to absorb mineral nutrients left over from decomposed plants, animals, and their waste. This **organic** matter breaks down, and begins mixing with the soil and is called **humus**. It provides minerals that plants need for healthy growth. This decaying **organic** matter gets turned into the top layers of soil by bacteria, and animals that dig, like insects and prairie dogs. **Humus** continues to mix with lower layers of the soil that contain more and more **inorganic** materials from the parent material—i.e. weathered **bedrock**. At the surface, soil is almost 100% **organic** matter, but as you go deeper, it eventually becomes 100% **inorganic**.

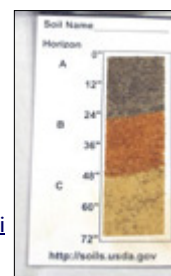
**Soil horizons** differ greatly from location to location in color, texture, structure, and thickness. In addition, laboratory tests can also identify differences in mineral and chemical content, consistency and reaction.

Soil scientists use the capital letters O, A, B, C, and E to identify the horizons. Most soils have three horizons: (A) the **surface** horizon, (B) the **subsoil** horizon, (C) the **substratum** horizon. Some soils have (O) an **organic** horizon usually on the surface, and (E) subsurface horizon which has a significant loss of minerals, and therefore would be identified in a laboratory test. Hard bedrock, which is not soil, uses the letter R. You are going to collect data to begin an analysis of the soil in your own area.



### EXPLORE IT - DESIGN IT - DO IT

- You will be visiting several sites that have exposed soil horizons (e.g. road cuts, stream erosion along the bank, or construction sites) to collect soil data. Bring the tape measurer, your prepared soil cards, and your trowel.
- At the first site, stand back and examine the cut. Can you see each horizon?
- Write your location on the back of the soil sample card, and be as precise as you can be. If you have a GPS unit, use those coordinates.
- Note if you have an O horizon (**organic** layer).
- Measure the depth of the A layer. Using the trowel, get a bit of the A layer.
- Peel the backing from the carpet tape to the depth you measured as indicated on the card (leaving the rest of the backing to protect the sticky part of the tape for the next layers) and add a bit of the A layer soil you collected on your trowel to the exposed sticky tape.
- Measure the depth of the B layer. Using the trowel, get a bit of the B layer.
- Peel the backing from the carpet tape to the depth indicated on the card (leaving the rest of the backing to protect the sticky side for the next layer) and add a bit of B soil you collected on your trowel..
- Measure C layer and get some C soil with your trowel.
- Peel the backing from the carpet tape to the depth indicated on the card (leaving the rest of the backing to protect the sticky side) and add a bit of the C soil you collected on your trowel. (If present, all more horizons.)
- Repeat these steps at additional sites on different cards.
- Compare soil horizon samples from the different locations (color, thickness of each layer, etc.). You can also check the soil compositions in your county at this website: [http://i-farmtools.iastate.edu/i-farm/data\\_SSURGO\\_frame.asp](http://i-farmtools.iastate.edu/i-farm/data_SSURGO_frame.asp)



To be a successful farmer, one must first know the nature of soil.

(Xenophon, Greek historian, soldier, mercenary, and student of Socrates)

#### Age Appropriate:

4th—HS grades

#### Time Required:

About 2+ hours

#### Materials:

- 1" wide carpet tape
- tape measurer
- scissors
- cardstock
- pencil
- trowel

#### The Set-up:

- copy soil.usgs.gov cards (included in the newsletter) on cardstock
- Cut the cards apart
- Put carpet tape on each card from the 0 to 72 but do not remove the backing

#### The Clean-up:

- Dispose carpet tape backing.

#### Power Words

- **bedrock (R)**: solid rock underlying loose deposits such as soil
- **humus**: organic component of soil
- **inorganic**: not coming from living organisms
- **organic**: coming from living organisms
- **soil horizon**: layers generally parallel to the soil surface, whose physical characteristics differ from the layers above and beneath identified by color and texture differences
- **subsoil (B)**: the soil lying immediately under the surface soil.
- **substratum (C)**: an underlying layer or substance, in particular, a layer of rock or soil beneath the surface of the ground
- **surface (A)**: uppermost layer of soil

Activity adapted from: USDA/NCRS Soil Profiles and photo of completed soil sample card used from: [http://www.ncrs.usda.gov/wps/portal/ncrs/detail/soils/edu/kthru6?cid=ncrs142p2\\_054308](http://www.ncrs.usda.gov/wps/portal/ncrs/detail/soils/edu/kthru6?cid=ncrs142p2_054308)

Soil Name \_\_\_\_\_

Horizon

A 0"

12"

B 24"

36"

C 48"

60"

72"

<http://soils.usda.gov>

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