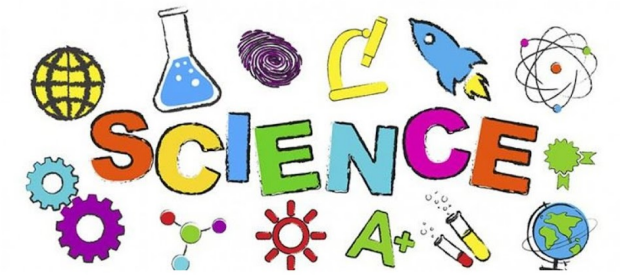
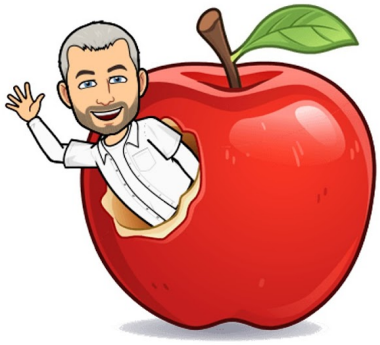




Soil Erosion A STEM Lab

What I Will Be Learning In This Mastery Badge:
In this mastery badge we will learn about soil erosion, including what it is, its causes, and how engineers are working to mitigate it.

What This Packet Includes:
It is important that you complete all aspects of this packet so that you gain the knowledge and skills that we are working on.

I. **Discovering Lab**
A discovering lab is a fun, introductory lab, where we discover the knowledge on our own.

II. **Video Instruction**
You will watch a video presented by Mr. Bertoch, and answer questions about it.

III. **Literacy Practice**
Reading and writing are critical life skills, and also very important to science. You will read the assigned article and complete a writing prompt.

IV. **Applying Lab**
An applying lab is how you pass off the Mastery Badge. It serves as the quiz. It is a hands on demonstration that you have mastered the skills and content of this badge.

Key Things We Will Learn In This Mastery Badge

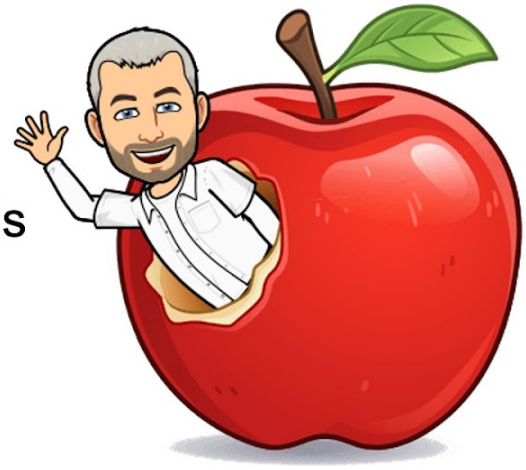
Some of the most important things we will learn in this mastery badge:

- What is soil?
- How soil forms.
- How farmers select the perfect location for their farm.
- How farming affects the soil.
- What is soil erosion?
- How soil erosion affects the environment.
- What farmers and engineers are doing to mitigate soil erosion.

Name:_____ Date:_____

Discovering Lab

Learning Through Hands On Activities



Activity: Discovering Soil Erosion.

Directions: Follow the instructions below to learn about soil erosion.

Video Instructions Available For This Assignment. Watch this video to learn how to do this assignment, and why it is important.

Scan This QR Code To Watch Mr. Bertoch Give You Directions For This Assignment

Goal: To learn as much as you can about soil erosion.

The solemn Farmer Sam. S. Sammerson The Second has been farming his stately estate for many seasons. Mr. Sammerson's father the saintly Samuel S. Sammerson Sr. started selling succulent salads many years ago. Sam S. Sammerson the Second is feeling sad and sick as he prepares to pass the stately estate on to his sophomoric son Sammy S. Sammerson The Second Second (also known as the third). Whew!

Anyway…

After generations of farming, their soil seems to be disappearing. As a result, their crops are not growing as well as they used to. The three of them have hired you to examine their field in order to determine what is happening to their soil.

Step 1. Building A Farm

Follow each step carefully to build a farm.

- Use a cookie sheet or other flat surface as a base for your farm. Turn the cookie sheet upside down so that water can easily drain off, without becoming trapped.
- Add a couple inches of soil on top of the cookie sheet. Spread the soil out so that its thickness is even. You can use potting soil from a local store, or collect soil from outside.

Step 2. Plant Crops In Your Soil
Use toothpicks to create little rows of corn. Place the toothpicks into your soil in even rows.

Step 3. Irrigate (Water) Your Crops
Be very careful as you complete this step. You don't want to create a mess in your house. It is best to do this step outside. Fill a pitcher, kettle, or other container with water. Gently pour the water onto your farm and observe what happens.

Describe what happened when you watered your farm. Be very detailed. Pay close attention to what happens to the soil.

Final Questions:
Remember that your answers must ALWAYS be written in complete sentences.

1. Did any of your soil wash off of your farm (cookie sheet)?
2. Why do you think this happened?
3. How do you think this might relate to the real world? In other words, how do you think watering a farm might impact the soil on that farm?
4. Can you think of any reasons why soil on farms washes away, while the soil in natural habitats doesn't?
5. Now that you have completed your study, write an explanation that you can share with the farmers explaining why their soil is disappearing.

Handsome Science Teacher One Take Videos

Now that you have completed the Discovering Lab let's watch the video that goes with it. In this video Mr. Bertoch will help connect the discoveries that you made during the lab to the broader concepts covered under this badge, and will also introduce the vocabulary that goes with these concept.

Take Your Time, Pause And Rewind As needed

You are not in a hurry! It is more important that you understand the concepts in this video than that you finish it quickly. Take your time. If you don't understand something, pause the video and use the Internet or other resources to look up the concept that has you confused.

When you finish this video, you should have a good understanding of the concepts that have been taught. If you find yourself confused, rewind, and rewatch.

The Video For This Mastery Badge Can Be Opened Using This QR Code

This Mastery Badge includes one video:

Watch The Assigned Science Video

Scan This QR Code To Open And Watch The Assigned Video For This Mastery Badge

Check Point

Let's make sure that you really did take your time and watch the video carefully! Remember that it is important to hold yourself accountable to a high standard and to take pride in your own success as a learner.

I watched the video carefully, and paused to look up anything I didn't understand.

Recording Your Learning

On the next page, you will record your learning and connect it to things you already know.

Ten Things I Learned From This Video

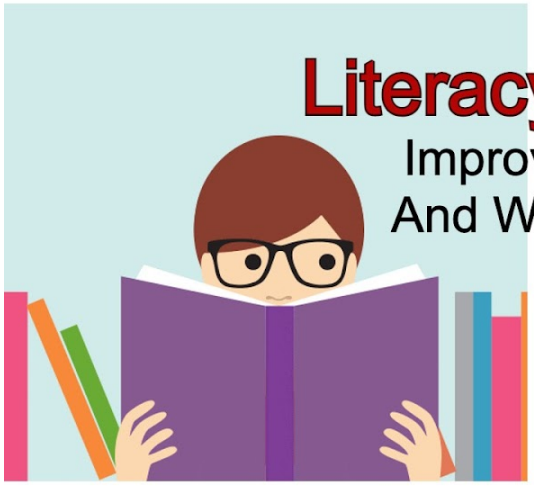
A powerful tool to help you retain what you learn is to take notes. Notes give you something that you can look back at later, to quickly remind your brain reinforcing the memories for the concepts you have learned. Record ten things that you learned or that you perhaps already knew that were discussed in this video.

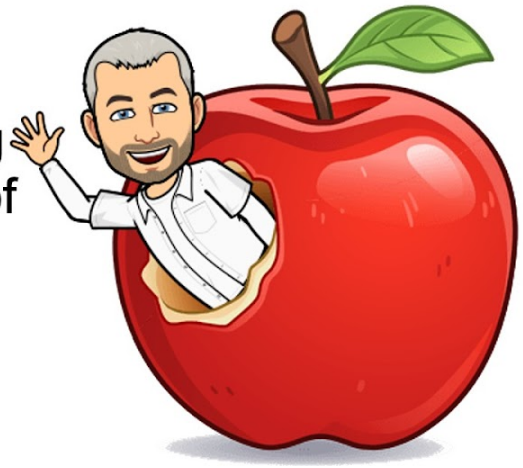
1.
2.
3.
4.
5.
6.
7.
8.
9.
10.

Now, Let's Connect These New Concepts To Things You Already Knew

Another great way to help your brain retain new things is to connect these new concepts to other things that you already know. This gives your mind a place to store the new knowledge. Imagine that you are placing the new knowledge on a shelf in your brain next to facts that are already in there.

Write a paragraph explaining how the concepts taught in this video relate to things you already knew. There are no wrong answers. What are some things that you already knew that this video reminded you of?





Activity: Reading And Writing

Directions: Reading and writing are very important life skills. Good scientists must be able to learn through reading and communicate their own discoveries through writing.

Video Instructions Available For This Assignment. Watch this video to learn how to do this assignment, and why it is important.

Scan This QR Code To Watch Mr. Bertoch Give You Directions For This Assignment

1. **Practice Reading For Understanding**
   Read the article below **for understanding** Reading for understanding means that you take your time and monitor your own learning. If you get to the end of a sentence and you do not remember or understand what you read, **re-read it.**

2. **Practice Writing To Communicate**
   Complete the writing prompt below. Do your very best to write clearly so that others will understand what you are saying. This means using correct spelling, grammar, and writing, taking your time to think about the best ways to clearly communicate to others the main ideas that you are trying to get across to them.

Article:

Read The Assigned Article Carefully For Understanding.
https://handsomescienceteacher.com/Online-science-classes-kids/soil-and-soil-formation/

Scan This QR Code To Open And Read The Article That Goes With This Mastery Badge

Check Point

Let's make sure that you really did read for understanding! Remember that it is important to hold yourself accountable to a high standard and to take pride in your own success as a learner.

I Read For Understanding. I did not skim the articleI understood the material that the article discussed.

Quiz Time

Complete the quiz at the end of the article and post your score in the box below. Your goal is to get at least 75% on the quiz. Did you accomplish this goal?

%

Now Let's Write To Communicate

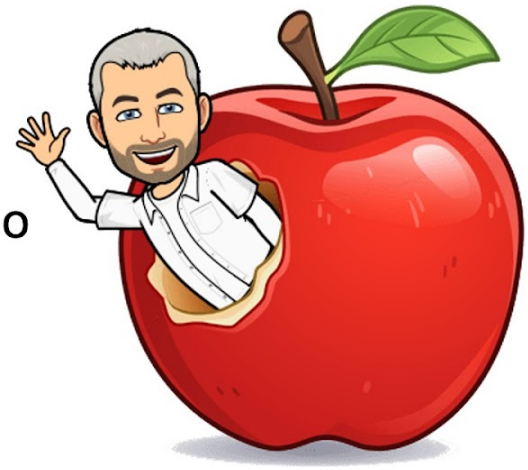
Remember that when you write to communicate you are taking your time, and explaining the topic in a detailed and concise way. Don't rush! You are not in a hurry. Think about what you are going to say, and plan how you will say it. So that someone else who reads your paragraphs will understand them easily.

Writing Prompt: Write two paragraphs in your own words discussing the factors that influence the creation of soil.

Name:_____ Date:_____

Applying Lab

Proving That We Can Do It Ourselves



Activity: Applying Soil Erosion

Directions: You will follow the Engineering Design Process to design a solution to protect the soil.

Video Instructions Available For This Assignment. Watch this video to learn how to do this assignment, and why it is important.

Scan This QR Code To Watch Mr. Bertoch Give You Directions For This Assignment

Goal: Design a solution to reduce soil erosion.

Look at you! You are AMAZING! And because you're amazing, your reputation has spread throughout the county. Everyone is so impressed by how you solved the mystery of the Sammerson's disappearing soil. And now, all the other farmers have begun to notice that they too have soil issues.

They have all gotten together and hired you to come up with a solution to mitigate (reduce) their soil erosion troubles. In this lab, you will design and build a solution to reduce the amount of soil that disappears when these farmers water their crops.

Step 1. Building A Farm

Follow each step carefully to build a farm.

- Use a cookie sheet or other flat surface as a base for your farm. Turn the cookie sheet upside down so that water can easily drain off, without becoming trapped.
- Add a couple inches of soil on top of the cookie sheet. Spread the soil out so that its thickness is even. For soil you can use potting soil from a local store, or collect soil from outside.

Step 2. Plant Crops In Your Soil

Use toothpicks to create little rows of corn. Place the toothpicks into your soil in even rows.

Step 3. Design And Build A Solution

Scientists who design and build solutions are called engineers. These engineers are very important to society. They help society by coming up with new ideas, inventions, and solutions that improve our lives.

1. Before you build your solution, it is important to think about the problem and come with ideas for how you might address it. In the box below, describe the problem, and share some possible ideas for how you might solve this problem.

2. Before you build something, it is also important to sketch it out. Draw a diagram showing how you will reduce soil erosion around a farm.

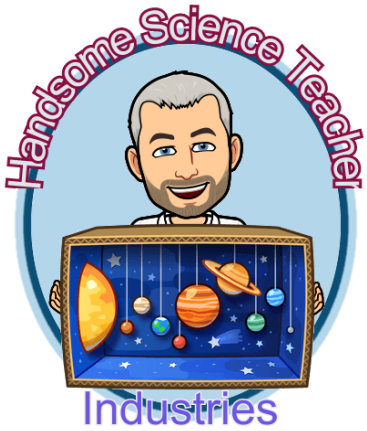
3. Now it is time to put your plan into action. Build your design. You can use any supplies that you have access to around your home. Once it is built, place it on, around, or in your farm.

Step 3. Irrigate (Water) Your Crops

Be very careful as you complete this step. You don't want to create a mess in your house. It is best to do this step outside. Fill a pitcher, kettle, or other container with water. Gently pour the water onto your farm and observe what happens.

What happened this time? How does it compare to last time? Were you able to reduce the amount of soil that eroded away?

Engineers are always looking for ways to improve their designs. If you were to build another solution what would you change? What could you do to make your design even better?



Congratulations! You Have Completed The Entire Mastery Badge
You have worked really hard to earn this mastery badge. More importantly, you have worked hard to earn your knowledge!

Time To Evaluate Your Work
Check each of the following to evaluate your work:

1. Did you do every assignment?
2. Did you read the assigned article?
3. Did you watch the assigned video?
4. Did you answer all the questions using complete sentences?
5. Are your answers accurate?

My Self-Evaluation:
Based on the criteria listed above, I believe I have passed off this Mastery Badge because… (Be detailed ans specific)

Mastery Badge Counselor Evaluation:
I have reviewed this student's work. Based on the criteria listed above I hereby certify that they have passed off the Mastery Badge because… (Be detailed and specific) Note: Any adult may serve as a Mastery Badge Counselor, so long as they are committed to ensuring the highest standards of excellence.

Student's Signature	**Date**	**Signature of Mastery Badge Counselor**	**Date**

Certificate For Your Homeschool Records

The following certificate which has been awarded through self-evaluation by the student, and also certified by a mastery badge counselor proves that the student listed thereon has completed all the work and has mastered all the concepts for the specified topic.

Keep this on file as evidence of your successful completion of this topic.
If audited by the State, these certificates stand as evidence that you have worked on and successfully completed a rigorous science curriculum.