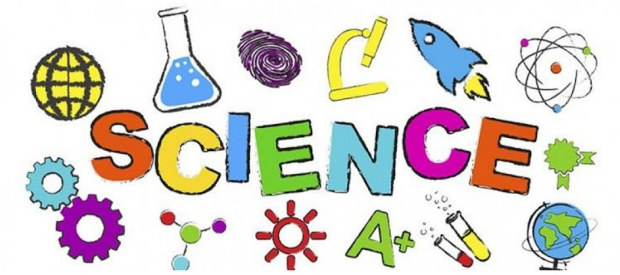
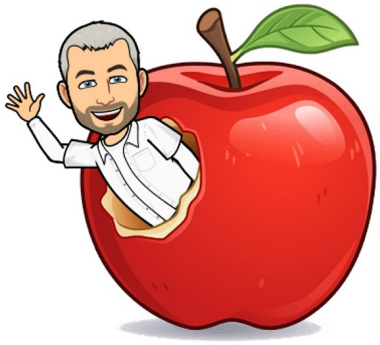




Fields, Electricity, Magnetism

What I Will Be Learning In This Mastery Badge:
In this mastery badge we will analyze and interpret data about what fields are and how they work. To do this we will investigate two very common types of fields, including static electricity and magnetism.

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

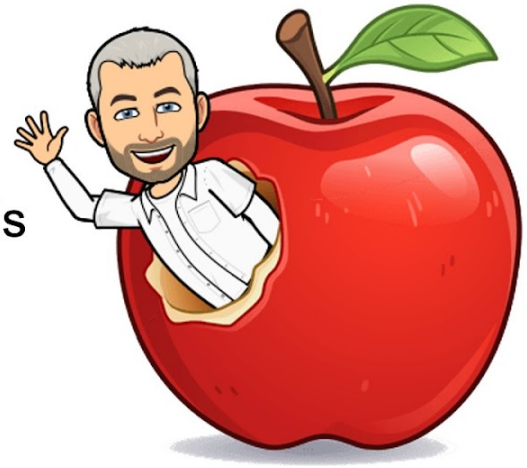
Some of the most important things we will learn in this mastery badge:

- What are fields?
- How does static electricity work?
    - Positive And Negative
- How does magnetism work?
    - North And South
- Opposites Attract
- Likes Repel

Name:_____ Date:_____

Discovering Lab

Learning Through Hands On Activities



Activity: Discovering The What Fields Are And How They Work

Directions: Follow the steps below to collect data about fields. Make sure you record all of your answers using complete sentences.

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 fields

Trial # 1: Balloons & Hair

Instructions: Collecting and graphing data about the impact of static electricity on your hair.
Rub a balloon against your hair one time, then hold the balloon about six inches above your head and observe in a mirror how many of your hairs stand up. Graph the number of hairs that stand up towards the balloon by coloring in the chart below. Repeat but this time rub the balloon against your hair 2 times, then 3 times, etc. Each time graph how many hairs stand on end. Note: It is okay to estimate. You don't have to count each hair! Also, note that some types of hair are not ideal for this lab. It is okay to us a doll as a substitute if needed.

Complete this graph by filling/shading in the boxes

500+ Hairs Standing									
300 Hairs Standing									
100 Hairs Standing									
50 Hairs Standing									
10 Hairs Standing		`							
	1 Rub	2 Rubs	3 Rubs	4 Rubs	5 Rubs	6 Rubs	7 Rubs	8 Rubs	9 Rubs

1. **Analyze your data.** What conclusions can you draw about how rubbing the balloon against someone's hair affects the static electricity found in the balloon and in the person's hair?

2. How does distance affect the strength of static electricity? In other words, if you move the balloon further away from your head, what happens? What happens if you move the balloon closer to your head?

3. Why is your hair attracted to the balloon? Explain what is happening.

4. Notice that each strand of your hair appears to separate or to repeal one another. Each hair going in a different direction. Explain why you think this is occurring.

Trial # 2: Can Racing

Instructions: Rub a small balloon (not fully inflated) against your hair 40 times. Then use the balloon to pull an empty soda can across a table. Use a ruler to measure the maximum distance from the can that you can place the balloon while still attracting it. Graph your results below. Then repeat with a medium-sized balloon and a large-sized balloon.

Complete this graph by filling/shading in the boxes

Distance of 24 cm			
Distance of 21 cm			
Distance of 18 cm			
Distance of 15 cm			
Distance of 12 cm			
Distance of 9 cm			
Distance of 6 cm			
Distance of 3 cm			
	Small Balloon	Medium Balloon	Large Balloon

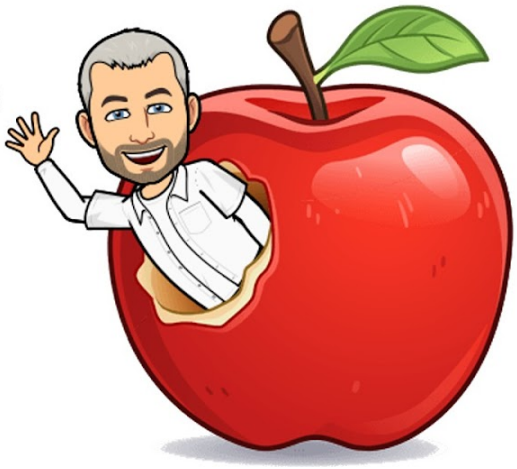
1. **Analyze your data.** What conclusions can you draw about how the size of a balloon affects the strength of static electricity.

2. How does distance affect the strength of static electricity? If you move a balloon further from a can what happens to its ability to attract the can?

3. What is static electricity? Explain how static electricity can attract and repel objects.

4. What are the two opposing (opposite) charges that exist within static electricity? Explain how these two charges react to each other.

5. What is an electron? What charge does it have?



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

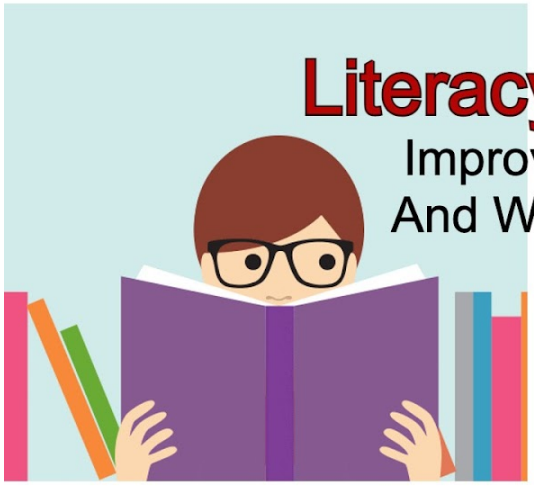
A powerful tool to help you retain what you learn is to take notes. Notes give you something that you can look back at later, to quickly remind your brain reinforcing the memories for the concepts you have learned. Record ten things that you learned or that you perhaps already knew that were discussed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

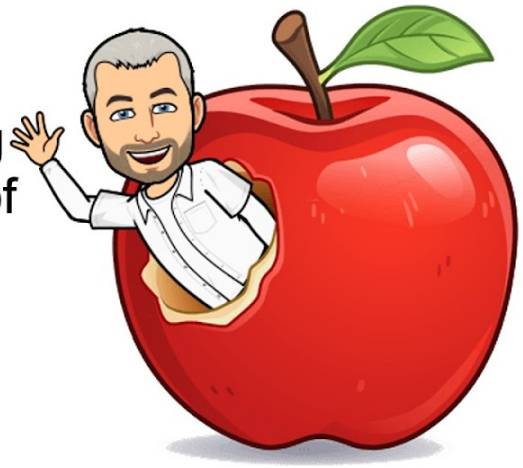
1.
2.
3.
4.
5.
6.
7.
8.
9.
10.

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 About Biomes

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/why-do-magnets-attract-and-repel/

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 article. I 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

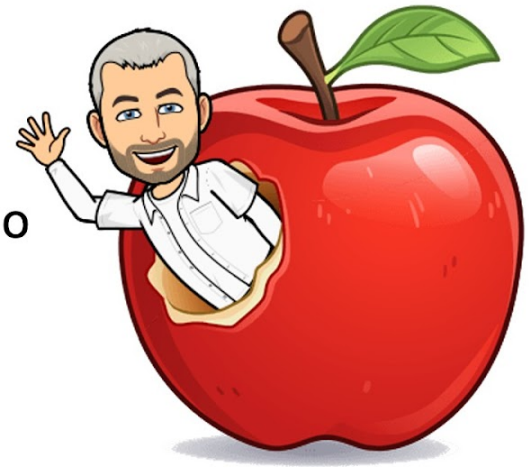
Remember that when you write to communicate you are taking your time, and explaining the topic in a detailed and concise way. Don't rush! You are not in a hurry. Think about what you are going to say, and plan how you will say it. So that someone else who reads your paragraphs will understand them easily.

Writing Prompt: Write two paragraphs in your own words explaining what magnetism is, and how it works.

Name:_____ Date:_____

Applying Lab

Proving That We Can Do It Ourselves



Activity: Applying Fields Using Magnetism

Directions: You are going to collect data about the strength of various magnets and how this impacts the objects it can attract. You are then going to analyze your data to draw appropriate conclusions.

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 collect and analyze data about magnetism.

Trial # 1: Three Magnets

Instructions: Using three different magnets and several metal objects such as washers, paper clips, pins, and so forth, observe how many objects each magnet can hold. Graph your data below. T

Complete this graph by filling/shading in the boxes

More than 50 objects			
41 - 50 objects			
31 - 40 objects			
21 - 30 objects			
11 - 20 objects			
4 - 10 objects			
3 or less objects			
	Magnet # 1	Magnet # 2	Magnet # 3

1. **Analyze your data.** What conclusions can you draw about how the strength of a magnet affects the objects it attracts?

2. How does the distance you hold a magnet away from the metal objects affect the strength of their attraction? If you move a magnet farther from metal what happens to its ability to attract objects?

3. What is a magnetic field? Explain how a magnetic field can attract or repel objects.

4. What are the two sides or poles of a magnet? Explain how these two sides react to each

Final Questions:

1. What is a field?

2. Name at least two types of fields.

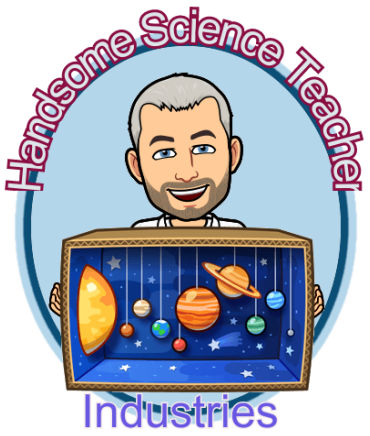
3. What evidence could you use to convince someone that a balloon has static electricity?

4. What evidence could you use to convince someone that the Earth has a magnetic field? (this might require some thinking on your part! What can you think of that interacts with the Earth's magnetic field? You could use this type of object or tool to prove the Earth does have a magnetic field).

5. Why is it important for a scientist to collect data?

6. How can graphing data be helpful?

7. How can looking for patterns in the data be helpful?



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.