



The Properties of Light

What I Will Be Learning In This Mastery Badge:

In this mastery badge you will learn about one of the most prevalent and yet fascinating phenomena in the Universe. Which is light. Light is all around us, but what is it? Why does it move so fast? Why does it allow us to 'see' things? By the end of this Mastery Badge, you will be able to describe what light is, and how it interacts with other substances.

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 light, Electromagnetic Spectrum
- Light moves in waves.
- Light is made up of photons
- Light has no mass. Which allows it to travel very fast.
- Absorption, Transmission, Reflection
- Transparent, Translucent, Opaque

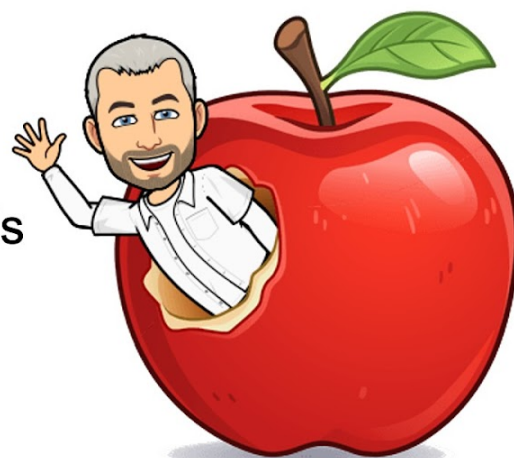
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Discovering Lab

Learning Through Hands On Activities



Activity: Discovering How Light Interacts With The Environment

Directions: Follow the steps below to discover the properties of light.



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 light

Experiment: Predicting How Light Will Interact With Objects In An Environment

Supplies

For this experiment, you will need a piece of clear glass such as a cup or window. A mirror, a book, your hand, and a flashlight.

How Does Light Interact With Its Environment?

When light encounters different objects and substances it doesn't always behave in the same way. Sometimes it passes through an object, sometimes it bounces off an object, and other times it is simply absorbed. Complete the chart on the next page by first making a prediction about what you think will happen when light is applied to an object or substance. Then perform the experiment and record what actually happened.

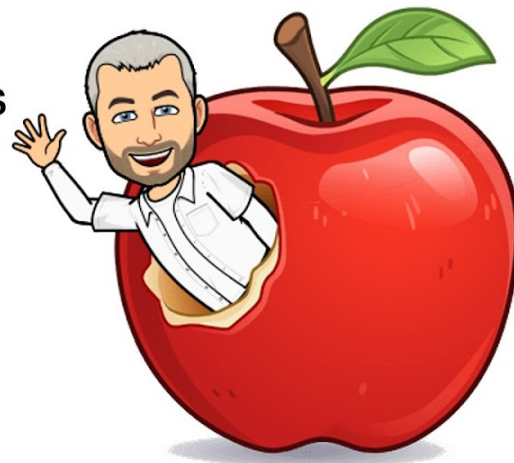
Object	My Prediction	What actually happened
Clear Glass		
Mirror		
Book		
My Hand (In A Dark Room)		

Analyze your Results

What did you learn about how light interacts with objects and substances? There are no wrong answers. What is important is only that your answer can be supported by the results of your experimentation. Write a detailed explanation of what light does when it encounters different types of objects. Support your answer with your experiment results.

Video Instruction

Reviewing The Teacher's Instruction At My Own Pace



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

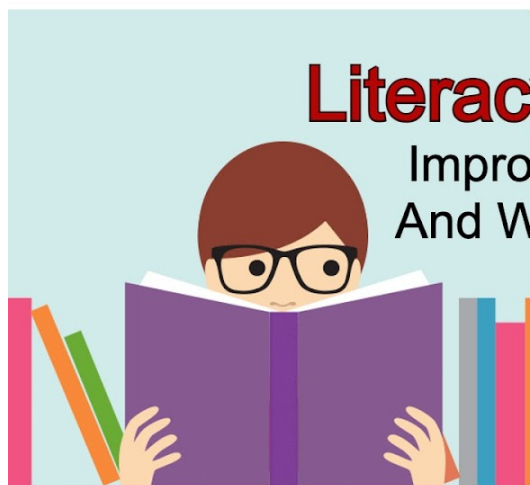
A powerful tool to help you retain what you learn is to take notes. Notes give you something that you can look back at later, to quickly remind your brain reinforcing the memories for the concepts you have learned. Record ten things that you learned or that you perhaps already knew that were discussed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

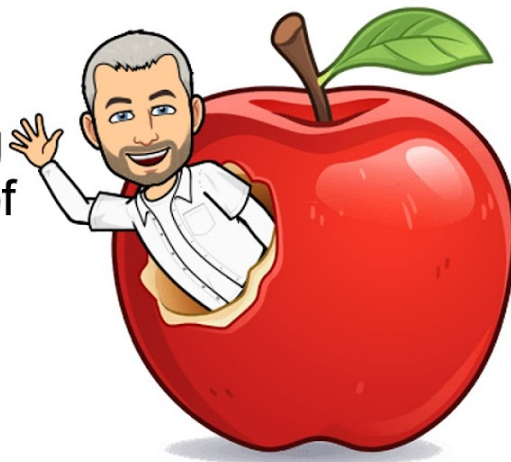
Another great way to help your brain retain new things is to connect these new concepts to other things that you already know. This gives your mind a place to store the new knowledge. Imagine that you are placing the new knowledge on a shelf in your brain next to facts that are already in there.

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?



Literacy Practice

Improving Our Reading
And Writing In Search of
Knowledge



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/what-is-light/>

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 light is, and how it works.

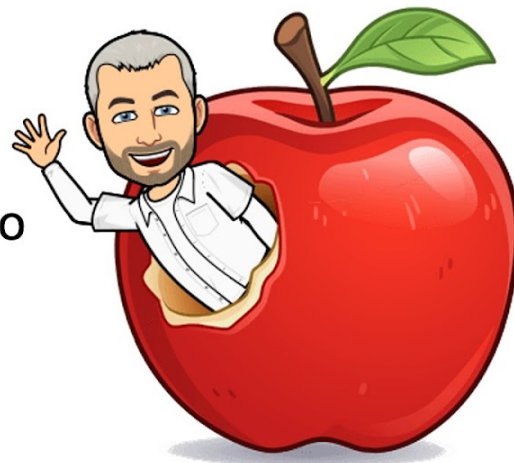
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Applying Lab

Proving That We Can Do It Ourselves



Activity: Applying The Properties of Light By Making Your Own Experiment

Directions: Scientists do far more than just carry out the experiments of others. They also create their own experiments. Which can be very challenging. In this lab you will be designing your own experiment.



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 create your own experiment using light.

Asking A Question:

Creating your own experiment is both challenging and fun. All experiments begin with a question. Write a question that you would like to explore further.

Examples: What will happen to light if I pass it through different types of liquids?
 How do humans perceive and react to different colors of lighting?
 Can the color of light be altered by passing it through a substance?

This is your question and your experiment. You are the scientist. You can explore any aspect of lighting that you want.

The Question I Will Explore:

Why I Selected This Question:

Planning Your Experiment:

Once you have selected a question, you need to design your experiment. Write detailed steps, explaining how to carry out your experiment. These should be written so that someone else can follow them. Don't skip any steps. Mention everything that the scientist is supposed to do from beginning to end.

Step By Step Procedures:

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

Carry Out Your Experiment:

Once you have planned your experiment the next step is to carry it out, and to record your observations. Briefly describe what happened when you carried out the experiment you created above.

I observed the following things from my experiment:

- 1.
- 2.
- 3.
- 4.
- 5.

Communicate Your Discovery To Others:

When scientists make discoveries they must communicate these discoveries to other people. Write a brief two-paragraph summary outlining your experiment and what you learned. Pretend that you are writing an article for a science journal (magazine). Be detailed as you explain to other scientists what you did, and what you learned from your research.

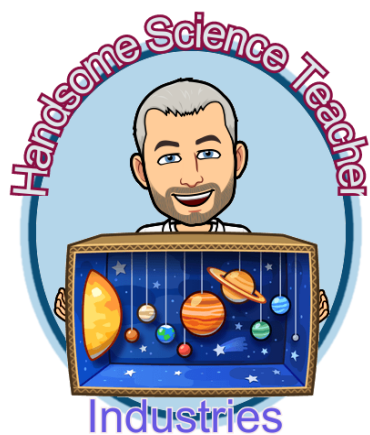
Final Questions:

Remember to use complete sentences.

1. What is light made of?

2. How fast does light travel?

3. What are the three things that light does when it interacts with objects? Be detailed and specific. Give examples of each type of interaction.



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 and 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.

