



Energy Can Create Waves

What I Will Be Learning In This Mastery Badge:

In this mastery badge we will discover how waves sometimes form when energy moves through a substance or space.

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:

- When energy moves through space or through substances, it sometimes forms waves.
- Waves are usually circle-shaped and radiate outward from a central point.
- When we see a wave moving outward, it is the energy and not the substance that moves.
- Waves are measured by their wavelength and amplitude.

Name: _____

Date: _____



Discovering Lab

Learning Through Hands
On Activities



Discovering How Energy Can Create Waves

Making your own discoveries.



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

Adding Energy Into A Substance Can Create Waves

If you suddenly add energy to a substance you might disrupt it, creating waves. These waves typically start in a central location, and roll outward, away from the epicenter.



Let's Create Some Waves

In order to see this phenomenon in action, you are going to create some waves of your own.

Supplies:

For this lab you will need a large body of water, such as a pond, stream, or lake. If this is not possible, a bathtub filled with water can be used. You will also need some objects to throw into the water, such as rocks. Finally, you will need a metal pan, sand, and a spoon.



Waves Travel Through Many Substances

If you shake a pan of jello you will see waves. You see them in water. They even travel through the ground when earthquakes occur. Waves form when energy travels through a substance.

Making Waves In Water

With the supervision of an adult go somewhere, where there is a lot of water. Find a calm place where there are as few waves on the surface as possible. Throw a single rock into the water and observe what happens.

The rock adds energy to the water.

Where does this energy go? What does the energy do to the water?

Blank area for drawing or writing.

Draw a diagram (picture) showing what the surface of the water looks like right after you throw a rock into it.

Blank area for drawing or writing.

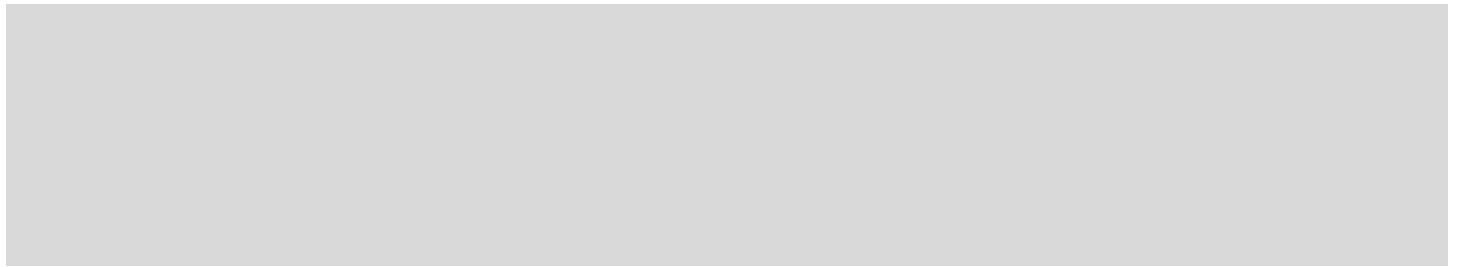
Making Waves In Sand

Turn a pan upside down, and cover it in a thin layer of sand. Using a spoon, carefully tap the center of the pan.

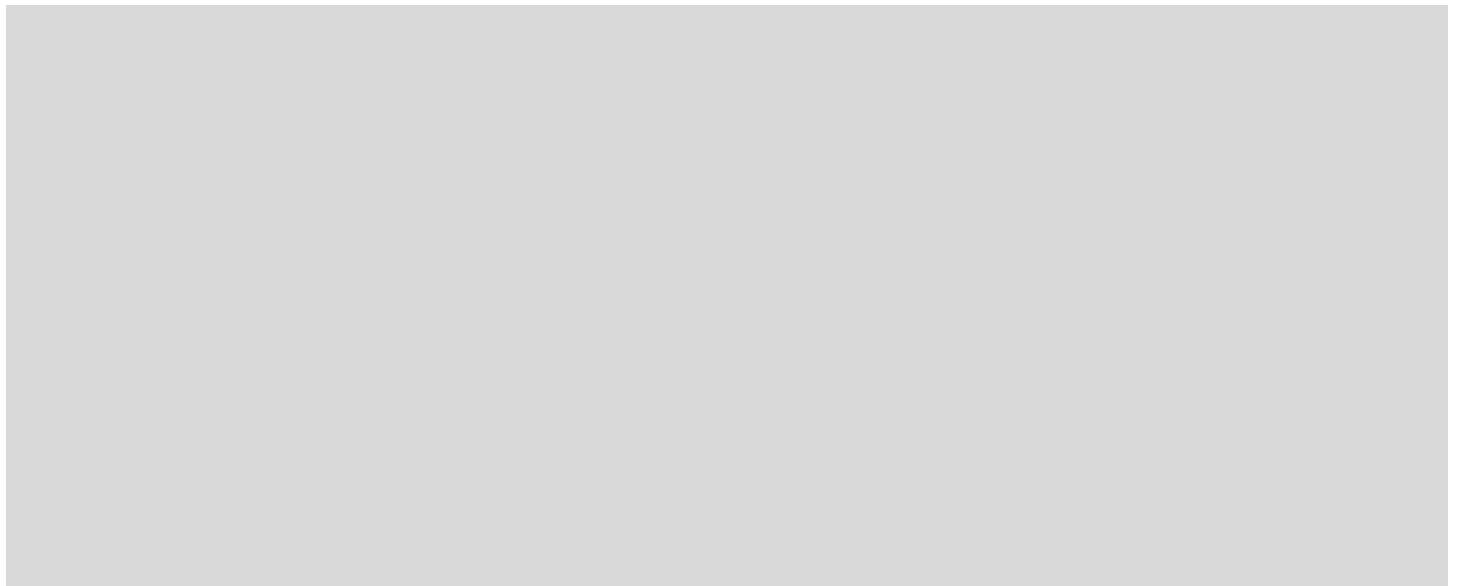
What happens to the sand? How is this similar to what the water did when you threw rocks into it?



Explain how an earthquake might be similar to what you observed when you threw rocks into the water.



Draw a picture of what you think it might look like when waves travel through land creating an earthquake.

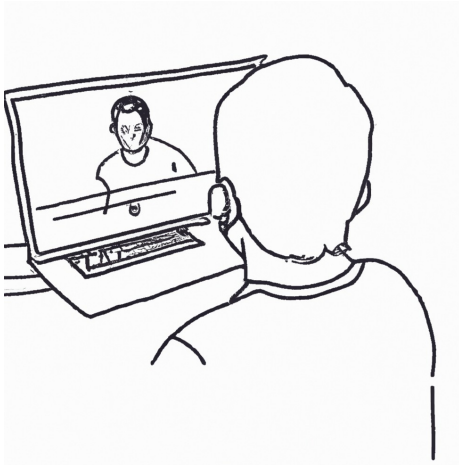


Video Instruction

Reviewing The Teacher's
Instruction At My Own
Pace



Handsome Science Teacher One Take Videos



Good Job On Completing The Discovering Lab!
Now let's connect your discoveries to the vocabulary.
Mr. Bertoch has created a video for you to watch.

Take Your Time, Pause And Rewind As needed
You are not in a hurry! It is more important that you understand the video than that you finish it quickly. Take your time. If you don't understand something, pause the video and discuss with an adult.

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

I watched the video carefully, and understood what Mr. Bertoch taught me.
(If not, that is okay. Watch the video again, and discuss it with an adult)

What I Learned From This Video



One very powerful way to help yourself remember what you learned from the video is to summarize it in your own words and in the form of pictures.

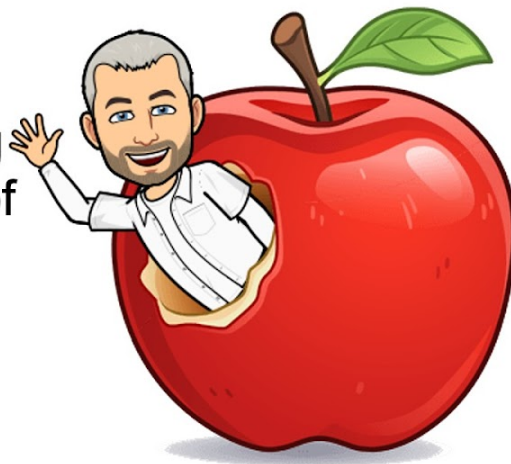
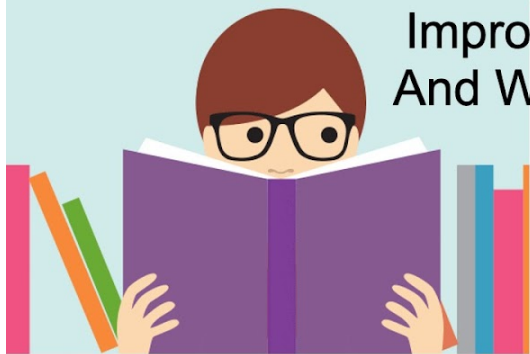
Write one sentence in your own words explaining what you learned from the video. Then draw a picture of something you learned from the video.

What I learned from this video (One Sentence):

A picture of something I learned from the video:

Literacy Practice

Improving Our Reading
And Writing In Search of
Knowledge



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.



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.



Read The Assigned Article Carefully For Understanding.

<https://handsomescienceteacher.com/Online-science-classes-kids/energy-moving-through-a-substance-creates-waves/>

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

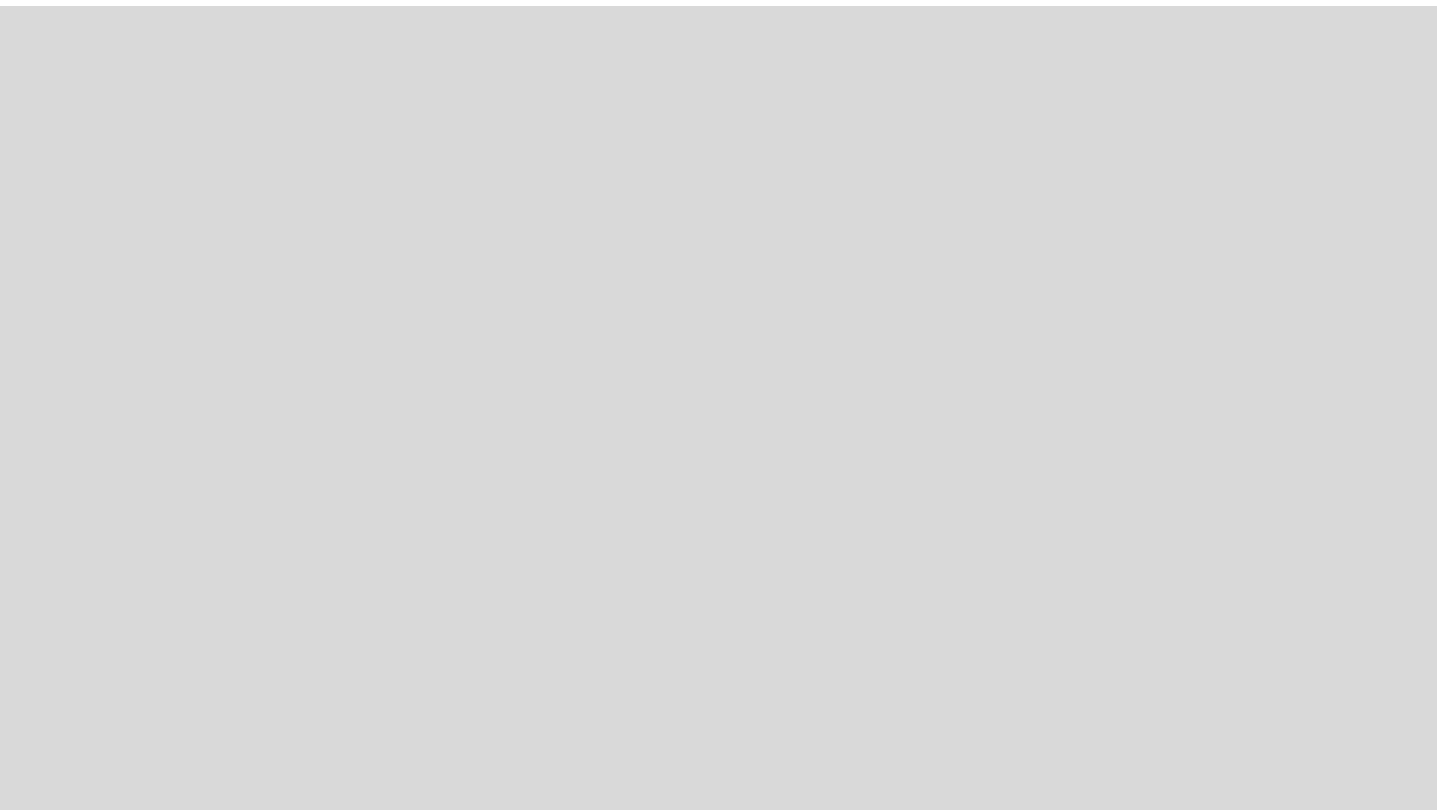
Complete the quiz at the end of the article and post your score in the box below. Your goal is to get at least 75% on the quiz. Did you accomplish this goal?

%

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 sentences will understand them easily.

Writing Prompt: Write two sentences describing how energy sometimes forms waves when it travels through substances.



Name: _____

Date: _____



Applying Lab

Proving That We Can Do
It Ourselves



Applying Waves

Applying What We Have Learned.

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



Measuring The Wavelength And Amplitude of Rope Waves



It is difficult to measure the size of waves when they are moving. It just isn't possible to get a measuring tape or ruler next to a moving wave of water. However, we can create 'frozen' waves using rope.

Supplies:

For this lab you will need a rope, and a ruler or measuring tape.

Frozen Rope Wave 1

Create a 'frozen' wave using a rope by laying the rope out on a table in a wave pattern. After creating the wave, use a measuring tape or ruler to measure the wavelength and amplitude. Record your results below.

Wavelength

Amplitude

Frozen Rope Wave 2

Create another 'frozen' wave using a rope by laying the rope out on a table in a wave pattern. Make this wave a different size than the last. After creating the wave, use a measuring tape or ruler to measure the wavelength and amplitude. Record your results below.

Wavelength

Amplitude

Frozen Rope Wave 3

Create another 'frozen' wave using a rope by laying the rope out on a table in a wave pattern. Make this wave a different size than the last. After creating the wave, use a measuring tape or ruler to measure the wavelength and amplitude. Record your results below.

Wavelength

Amplitude

Describe what wavelength is and how it is measured.

Describe what amplitude is and how it is measured.



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.



The certificate is framed by a decorative, repeating pattern of stylized faces. On the left side, there is a circular logo featuring a cartoon man with a beard and glasses, wearing a white lab coat, holding a tablet displaying a solar system with planets and stars. The text "Handsome Science Teacher" is written in a pink, curved font above the man, and "Industries" is written in a blue, curved font below the man.

Mastery Badge Certificate

Topic: Energy Can Create Waves

Student Name: _____

This certificate certifies that the person named above has completed all of the requirements to earn this Mastery Badge.

MASTERY BADGE COUNSELOR SIGNATURE

DATE AWARDED



A smaller version of the logo is located in the bottom right corner of the certificate.