



The Formation of The Earth

What I Will Be Learning In This Mastery Badge:

In this mastery badge we will learn about how the Earth formed, including the processes that led to its formation, the makeup of the Earth, and its age.

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:

- The Solar System formed from a cloud of dust
- Inner Planets and Outer Planets
- The Great Bombardment
- The Formation of The Moon
- The Goldilocks Zone
- A Thousand Years of Rain

Name: _____

Date: _____



Discovering Lab

Learning Through Hands On Activities



Activity: Discovering Evidence For The Formation of The Earth

Directions: Follow the directions below.



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 the formation of the Earth

Part 1: Evidence For How Solar Systems Form

Observe The Formation of A Minature Solar System In Your Bathtub or Sink

For this experiment, you will be creating a cloud of “dust” and “gas” in your bathtub, or sink. Replicating what existed in the gas cloud where our solar system formed. You will then trigger the formation of the solar system by adding gravity (draining your tub or sink) and observing what happens.

- **Step 1.** Review this lab with an adult, and make sure you have their permission before starting.
- **Step 2.** Fill the tub or sink with water. The water represents gas.
- **Step 3.** Add things that might represent dust to your tub or sink. Pepper, spices, and little bits of rice, are good choices. Be careful if you use anything larger than rice. We don't want to clog your drain!
- **Step 4.** Add gravity to your dust cloud by pulling the drain. Once your sink or tub starts draining, stand back, and do not interfere. **DO NOT HELP ANY PARTICLES TOWARD THE DRAIN.** Your goal is to simply observe what happens.
- **Step 5.** When your sink or tub has completely drained, record your results below.

Observe how much of the gas and dust (water and debris) ended up going down the drain. Remember that the drain represents the center of gravity, which in the case of the Solar System would be the Sun.

How much of the water (gas) went down the drain? How much was left behind, such as in the basin of the sink or tub after it stopped draining? Explain why you think you got these results.

How do you think this might compare to the formation of the actual Solar System?

Observe what was left around the basin of the sink or tub. This debris that is left represents the planets, asteroids, and comets that orbit the Sun.

Roughly how many planets formed in your experiment? The planets might be the bigger clumps of debris.

How many asteroids or comets formed? These might be the smaller debris left around your drain.

Why do you think most of the debris and water (dust and gas) go down the drain? Explain your answer in detail.

When our Solar System formed, most of the gas and dust ended up in the Sun. Only small amounts remained in outer space around the Sun. Explain why you think this might have occurred.

As your sink or tub drained, did the water and debris orbit (spin around) the drain? How might this relate to the formation of the Solar System?

Part 2: Observing Evidence of The Great Bombardment

Observe Evidence That A Period of Great Bombardment Occurred in The Earth's Past

It is difficult to find evidence of the Great Bombardment on the surface of the Earth because all of the old scars like craters have eroded away. However, erosion is not occurring on the Moon. Thus, we can look to the moon to find evidence of this past event.

- **Step 1.** Using a telescope or binoculars observe the Moon. If you do not have binoculars, you will have to use pictures from the Internet to complete these observations.
- **Step 2.** Record your results.

Describe what you see.

Write a detailed description of what the surface of the moon looks like.

Why do you think the moon's surface is covered by craters?

Final Questions:

1. How are the inner planets different from the outer planets in our solar system?

2. What happened during the great bombardment?

3. How old is the Earth?

4. What is the goldilocks zone?

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

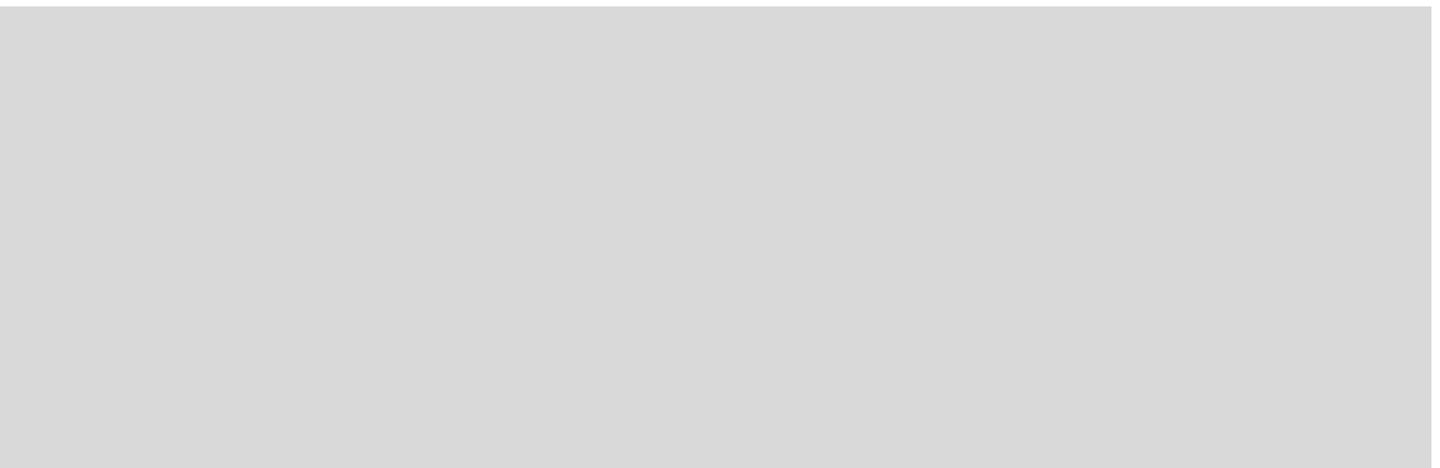
back at later, to quickly remind your brain reinforcing the memories for the concepts you have learned. Record ten things that you learned or that you perhaps already knew that were discussed in this video.

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

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

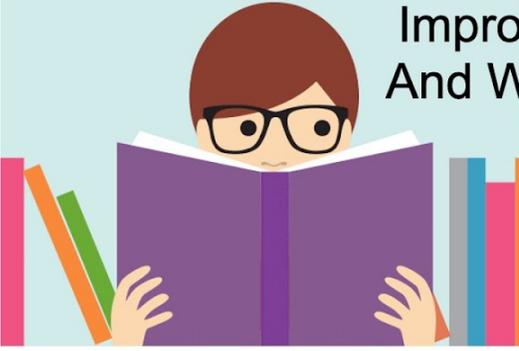
Another great way to help your brain retain new things is to connect these new concepts to other things that you already know. This gives your mind a place to store the new knowledge. Imagine that you are placing the new knowledge on a shelf in your brain next to facts that are already in there.

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 The Formation of The Earth

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/the-formation-of-the-earth/>

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 describing key features of the Earth and how it formed.

Blank writing area for the student to respond to the writing prompt.

Name: _____

Date: _____



Applying Lab

Proving That We Can Do It Ourselves



Activity: Creating A Textbook Diagram

Directions: Follow the instructions below create a textbook diagram showing how the Earth formed.



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 demonstrate your understanding of how the Earth formed.

You Have Been Hired To Work For Acme Textbooks Incorporated! Congratulations!!

Here at Acme, we pride ourselves on creating the most accurate textbooks possible. For your first assignment, our team needs you to create a diagram that will be used in a fifth-grade textbook. Your diagram must demonstrate how the Earth formed.

Please make sure to include **each** of the following in your diagram:

- A timeline showing the creation and history of the Earth.
- The Age of the Earth at different points along your timeline.
- Important events, like the creation of the Solar System, the Great Bombardment, the early rain, and so forth.
- Make sure that your diagram is in color. This can be done using crayons, colored pencils, paint, or digitally.
- Make sure all the artwork is your original work.

Complete this assignment on a separate blank piece of paper or in a computer program.



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.

