



Molecules & Compounds

What I Will Be Learning In This Mastery Badge:

In this mastery badge you will learn about how atoms combine to form molecules and how a molecule with two different elements forms a compound. We will also learn the difference between covalent and ionic bonds.

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:

- Review Atoms
- Review Ions
- What are valence electrons?
- How valence electrons cause elements to be attracted to each other.
- Two ways that elements can combine. Covalent / Ionic
- What is a compound?

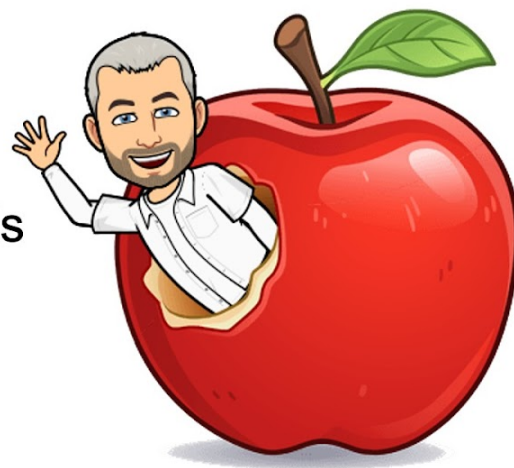
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Discovering Lab

Learning Through Hands On Activities



Activity: Discovering Molecules

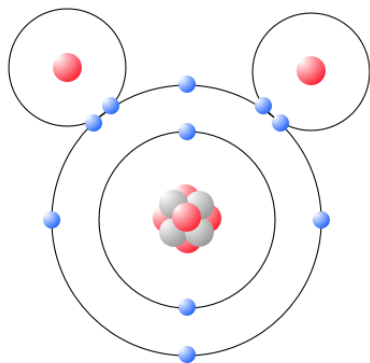
Directions: Follow the directions below.



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 molecules



Molecule

In the last mastery badge we learned that atoms are made up of protons, neutrons, and electrons. We also learned to identify atoms based on the number of protons. In this model, the protons are red, the electrons are blue, and the neutrons are gray.

How many protons are in each of the top atoms?

Use a periodic table to identify which atoms they are.

Some of the protons are hidden in the large lower atom so I will tell you that there are 8. Which atom has 8 protons?

This is a water molecule. Look closely at it. Notice that the hydrogen atoms are “stuck” to the oxygen atom. What do you think might cause these atoms to stick together? There are no wrong answers here. Scientists don’t always know the right answers. This is your opportunity to be thoughtful and to think about possible reasons for why two hydrogen atoms would stick to one oxygen atom. Later we will discover why this occurs. For now, just do your best to guess.

Online Simulations

There are some really great molecule simulations online. It is impossible to post a link to these because the links change and this packet would quickly become outdated. Using a search engine, find an online simulation that allows you to create molecules. Use the simulation for 30 minutes, and then record what you learned from it below. Just as before, there are no wrong answers here. Just be thoughtful.

What observations did you make? What did you learn from the simulation?

Final Questions:

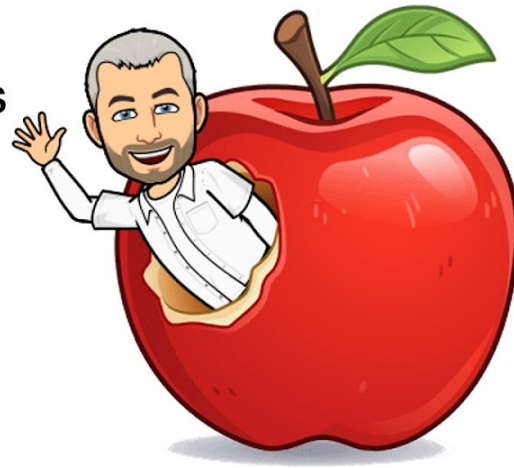
Remember to answer each final question using complete sentences.

1. What is a molecule?

2. Why do you think molecules form?

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.

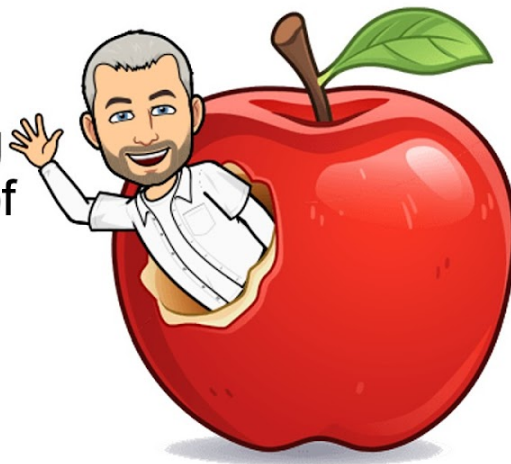
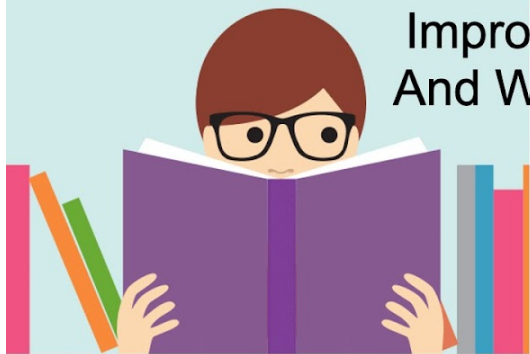
Now, Let's Connect These New Concepts To Things You Already Knew

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 Atoms

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/molecules/>

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 how atoms combine to form molecules.

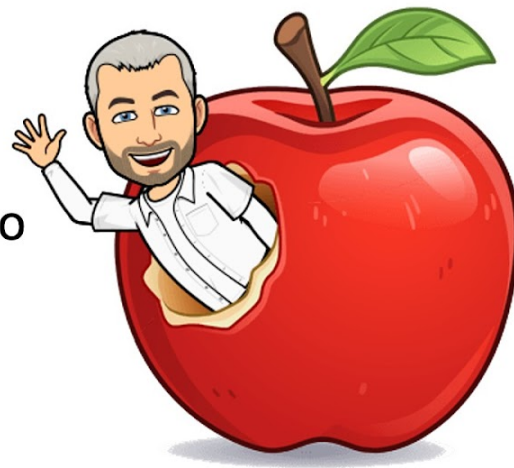
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Date: _____



Applying Lab

Proving That We Can Do It Ourselves



Activity: Diagramming A Covalent And Ionic Bond

Directions: Follow the instructions below to diagram your own bonds.



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 an ionic bond and covalent bond.

You Are Going To Create A Detailed Diagram of A Covalent And An Ionic Bond

To do this, you will need paper and colored pencils, or crayons.

Part I: Covalent Bond

Select any molecule that has a covalent bond. To find one, you will need to use a search engine. You can search for something like "Examples of covalent bonds." Your molecule does not need to be super complex but should have at least three atoms.

Which molecule are you going to draw?

List all of the types of atoms in the molecule you selected.

Covalent Diagram # 1

Draw each atom separately. Showing where the valence electrons are. Label each atom including their names, and draw an arrow pointing to the valence electrons. Remember, valence electrons are the furthest out electrons in the orbit of an atom.

Covalent Diagram # 2

Now draw the same atoms again, but this time as a combined molecule. Show how the electrons have become stuck together. Label each atom, as well as the molecule that they formed.

Part 2: Ionic Bond

Select any ion that has an ionic bond. To find one, you will need to use a search engine You can search for something like "Examples of ionic bonds." Your ion does not need to be super complex but should have at least two atoms.

Which ion are you going to draw?

List all of the types of atoms in the ion you selected.

Ionic Diagram # 1

Draw each atom separately. Showing where the valence electrons are. Label the atoms with the names, and draw an arrow pointing to the valence electrons. Remember, valence electrons are the furthest out electrons in the orbit of an atom.

Ionic Diagram # 2

Now draw the same atoms again, but this time as a combined ion. Show how one atom donated an electron to the other. Label each atom, as well as the ion that they formed.

Final Questions:

1. What is the difference between an ionic bond and a covalent bond?

2. What is a valence electron?



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 various planets. 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: Molecules & Compounds

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

