



Atoms

What I Will Be Learning In This Mastery Badge:

In this mastery badge you will learn about matter. Starting with protons, neutrons, and electrons. By the end of this mastery badge, you will be able to describe how these sub-atomic particles combine to form atoms.

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:

- Atoms, The Smallest Piece of Matter
- Protons, Neutrons, Electrons
- Opposites Attract, Likes Repeal
- Reading A Periodic Table

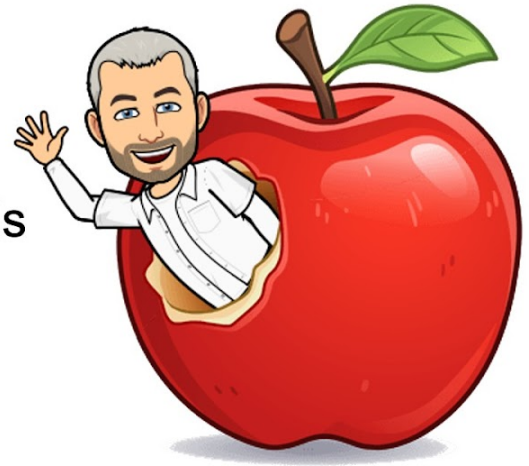
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Discovering Lab

Learning Through Hands
On Activities



Activity: Discovering Atoms

Directions: Follow the directions below.

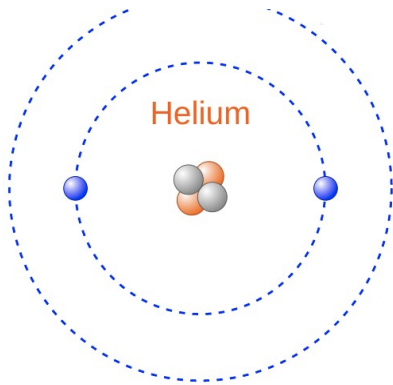


Video Instructions Available For This Assignment. Watch this video to learn how to do this assignment, and why it is important.

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

Goal: To learn as much as you can about atoms.

First Atom:



This is a helium atom. Take a minute and examine it. You will notice blue circles which are called electrons, gray circles called neutrons, and orange circles called protons.

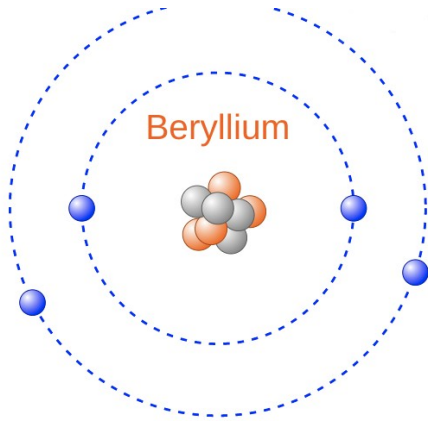
How many electrons are there?

How many protons are there?

Where are the electrons located?

Where are the protons and neutrons?

Second Atom:



This is a beryllium atom. Take a minute to examine it. Remember that the blue circles are electrons, the gray circles are neutrons, and the orange circles are protons.

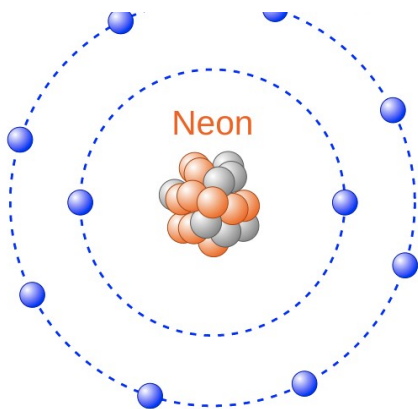
How is this atom different from an atom of helium?

How many protons and electrons are there?

The center of all atoms is called the nucleus. Why do you think scientists might call it that? There are no wrong answers, but be thoughtful.

The outer layers of an atom are called either shells or orbitals. Why do you think scientists call them that? Again, there are no wrong answers, but be thoughtful.

Third Atom:



This is a neon atom. Neon atoms are important because **they completely fill the first two orbitals**. Take a minute to examine it.

How many electrons are in the first orbital?

How many atoms are in the second orbital?

How many protons and electrons are there? Do you notice any patterns with protons and electrons? Explain your answer.

Final Questions:

Remember to use complete sentences.

1. What is an atom?

2. What are the three sub-atomic particles that make up atoms called?

3. What charge do protons have? You might have to research this question using books and websites.

4. What charge do electrons have?

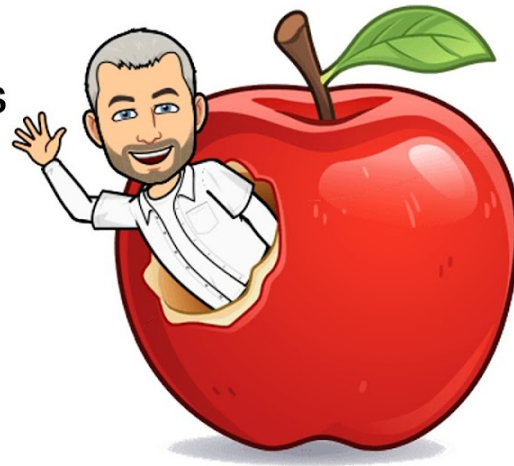
5. What charge do neutrons have?

6. With positive and negative charges, what do opposites do?

7. What do like charges do?

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 Videos For This Mastery Badge Can Be Opened Using These QR Codes

This Mastery Badge includes Two videos:



Watch The Assigned Science Videos

Scan These QR Codes To Open And Watch The Assigned Videos For This Mastery Badge

Check Point

Let's make sure that you really did take your time to watch this 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.

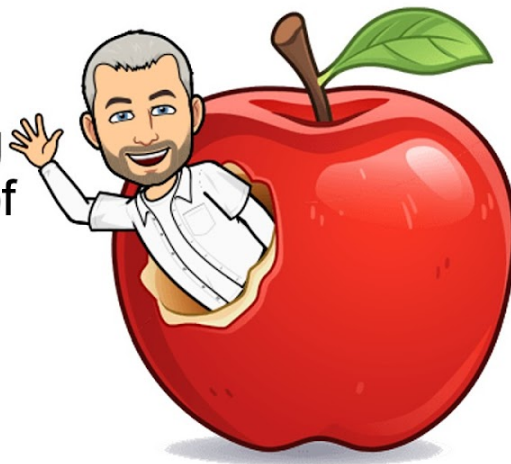
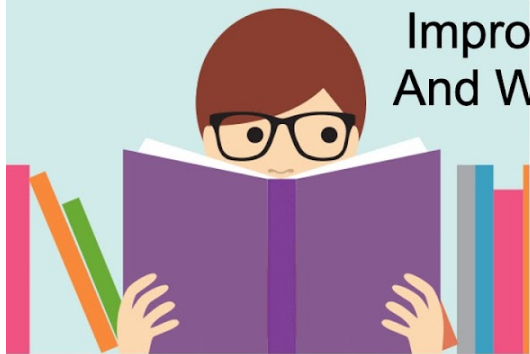
Now, Let's Connect These New Concepts To Things You Already Knew

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/atoms/>

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: Pick two topics that you learned about from these articles. Write a two-paragraph summary explaining what atoms are and what they are made of.

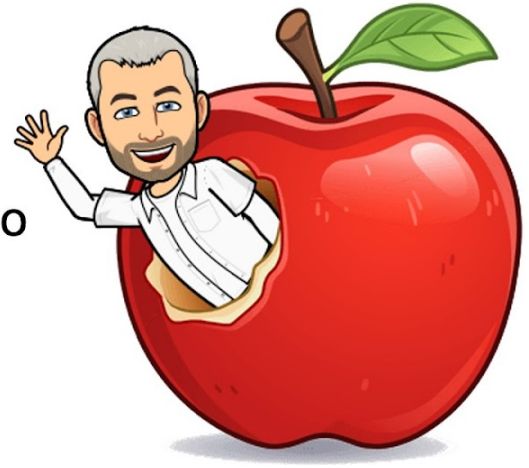
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Applying Lab

Proving That We Can Do It Ourselves



Activity: Making My Own Atoms

Directions: Follow the instructions below to make your own planet



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 atoms form and how they are structured.

Creating Atoms

In this lab, you Are Going To Create An Atom. Actually, You Are Going To Create Several. To do this, you will need to gather some supplies to represent each part of the atom. You will need something to represent protons, something to represent neutrons, and something to represent electrons. Beads, marshmallows, candy, coins, are all things that would work really well.

What I am using to represent protons:

What I am using to represent neutrons:

What I am using to represent electrons:

Using The Periodic Table To Create Atoms

For each atom, you will need to use this periodic table to look up the number of protons (atomic number). Place the correct number of protons in the middle of the atom. Then place an equal number of electrons in orbit around the protons. Make sure that you do not exceed the maximum number of electrons per orbital. The nucleus of your atom will also need neutrons, in order to hold the protons together.

1																	2
H																	He
3	4											5	6	7	8	9	10
Li	Be											B	C	N	O	F	Ne
11	12											13	14	15	16	17	18
Na	Mg											Al	Si	P	S	Cl	Ar
19	20	21	22	23	24	24	26	27	28	29	30	31	32	33	34	35	36
K	Ca	Sc	Ti	V	Cr	Mn	Fe	Co	Ni	Cu	Zn	Ga	Ge	As	Se	Br	Kr
37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54
Rb	Sr	Y	Zr	Nb	Mo	Tc	Ru	Rh	Pd	Ag	Cd	In	Sn	Sb	Te	I	Xe
55	56	57-71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86
Cs	Ba		Hf	Ta	W	Re	Os	Ir	Pt	Au	Hg	Tl	Pb	Bi	Po	At	Rn
87	88	89-103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118
Fr	Ra		Rf	Db	Sg	Bh	Hs	Mt	Ds	Rg	Cn	Uut	Fl	Uup	Lv	Uus	Uuo
Lanthanoids		57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	
		La	Ce	Pr	Nd	Pm	Sm	Eu	Gd	Tb	Dy	Ho	Er	Tm	Yb	Lu	
Actinoids		89	90	91	92	93	94	95	96	97	98	99	100	101	102	103	
		Ac	Th	Pa	U	Np	Pu	Am	Cm	Bk	Cf	Es	Fm	Md	No	Lr	

Create An Oxygen Atom (The Symbol For Oxygen is O)

Remember: First look at the atomic number to find out how many protons you need in your nucleus. Then balance your atom by adding the same number of electrons in orbit around the protons. Finally, add some neutrons to the nucleus to act as glue.

When you are done making your atom, take a picture of it then continue to the next atom.

Create An Aluminium Atom (The Symbol For Aluminium is AL)

When you are done making your atom, take a picture of it then continue to the next atom.

Create An Calcium Atom (The Symbol For Calcium is CA)

When you are done making your atom, take a picture of it then continue to the next atom.

Create An Silver Atom (The Symbol For Silver is AG)

When you are done making your atom, take a picture of it then continue to the next atom.

Final Questions:

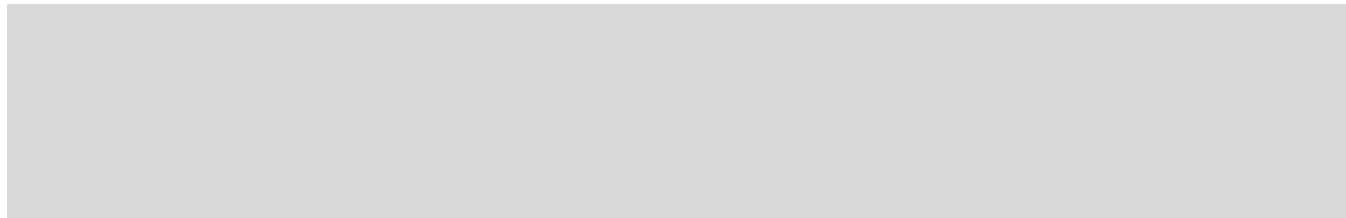
Answer each question using complete sentences.

1. Oxygen and silver are physically very different from each other. Yet structurally they are both made up of the same three ingredients. Oxygen has 8 **protons**, while silver has 47.

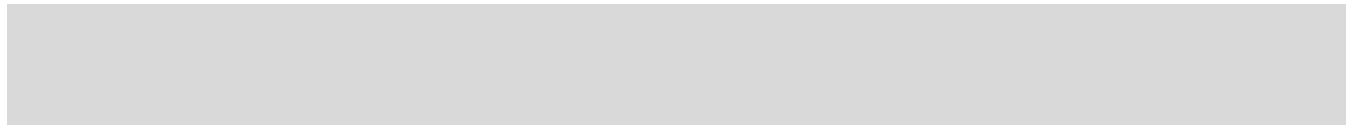
How many **electrons** does an oxygen atom have?

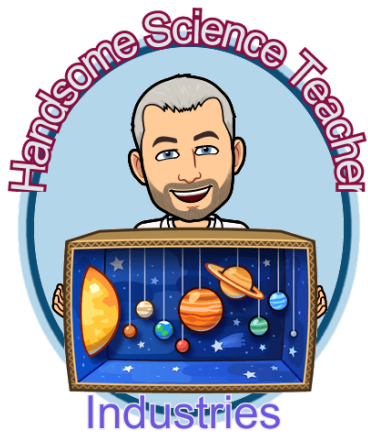
How many **electrons** does a silver atom have?

Why do you think adding more protons and electrons makes the two elements behave so differently from one another?



2. What is an ion? How are they different from other atoms?





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)

[Large gray rectangular area for student self-evaluation]

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.

[Large gray rectangular area for counselor evaluation]

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.

