The Periodic Table of Elements Coloring Book Sample

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By Teresa Bondora

Illustrated by Ty Mullery

This book was 6 years in the making. It was truly a labor of love. If you enjoy this sample, please do these things:

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- Let people know about the book who own businesses that cater to homeschoolers and teachers.
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If you haven't seen or read this yet, please take a moment to do so. It's very important.

The Big Chemistry Secret

When our babies are born, they come into a world of sight and sound that can be overwhelming. And what do we do? We speak in a language they don't understand. We show them toys they can't use. As they grow we put maps on their wall when they can't understand the concept of Earth. And then a miracle happens. They begin to speak. They start making sentences, writing letters, learning words.

We should have the periodic table of elements on the wall as well. Everything on our planet is made of the items on the periodic table. It is a very basic tool.

But isn't Chemistry hard? Sure it's hard if it's guarded like a secret and sprung on our children when they are teenagers. What if we taught no math to our children but then, in 6th grade, popped out with the square root table and told them we were now going to start math? We would find that most unusual but we do this very thing with science.

But if, like math, we presented the periodic table in a basic way exposing them to the next level each year, do you think chemistry would be intimidating to them? Just like learning math, they would know it, be fluent in its use and accept it as a normal part of life from which they could choose to continue their studies. Instead, America is falling behind in the Sciences, a shame for the country which lead the race to space.

So why is it not on the walls in kindergartens? Why is it not in children's programming? Why isn't it in children's books? We can present it in bright, colorful and elementary ways, just like we do letters, colors, numbers and shapes. I believe it's because many people fear chemistry. And I believe that fear is passed on to our children through our silence.

That's why I developed free lessons on each element, a **simple periodic table for children** and a booklet for their parents and teachers. Teaching the table is easy. All it takes is placing one on the wall. You do not have to be a chemist to teach the periodic table just as you do not have to be Pythagorus to teach math. As a science teacher, I understand many people are not comfortable with the sciences so I wrote a booklet to give you the answers to the questions your children will probably ask you. I explain the periodic table in a way that is fearless and simple. I also provide lessons you can use to facilitate learning which will not interfere with your current and probably overwhelming schedule. For example, we can point to items on the table and show them copper when we have a penny. I hope you agree that placing a periodic table on the wall is a wonderful gift you can give your children. Our children are capable of learning basic chemistry at an early age. Lets hope that our society changes its attitudes about Chemistry and our little folks. It's my dream to see it happen!

From page 12:

About the facts in this book

In writing this book and researching facts and information I learned several things. As I researched I found that information I learned in college has either changed or been updated or revised or added to in some instances. We've found new uses for elements or discovered new facts or properties about an element. So keep in mind that what I write here is what was true as of the final editing in 2010.

The next thing I learned is that there's lots of conflicting information about some details in relation to the history of the elements' discovery, the number of isotopes an element may have or the exact nature of an element's use or application in the real world. What I did was gather information from at least 3 sources, then from a field where that element is being used and in some cases, I used 4 or more references. Usually they agreed but where they did not, I could usually see where the disagreement was and state that. If I could not find it and the disagreement was a complete opposite of information I would investigate it further. If I could not find a resolution I went with the field that uses that element or I did not include it. A list of the references can be found at the end of this book. If you find a fact that you disagree with, welcome to my world! I encourage you to investigate it, you may be surprised at what you find.

Lastly, please understand that this book is written on an introductory level. My work, my attitude that children can be introduced to chemistry on an elementary level, is a new concept. As I wrote these lessons I would put them out in the form of a newsletter and distribute it to those who signed up to my site. Some of those who were scientists would write and criticize my work saying it was misleading or dumbed down or that I was doing a disservice to not include x or y or z information. They would then go into long diatribes of chemistry and information that would boggle the mind of anyone new to chemistry. This is not the first time I have encountered this resistance since the inception of my work. Some people say my version of the children's periodic table is misleading because it leaves off the man made elements and atomic weights. All of these things are exactly what I complain about as being what's wrong with the science field. This attitude is exactly what makes people run from the sciences. If I tell you about an element's natural isotopes but leave out all the man made ones, I'm not misleading you, I just don't believe that this is the time or place to go into the detail about those. I want to help parents and teachers understand that you do not have to buy into that and you CAN approach the sciences just like you do any other subject. Chemistry is not the domain of high school or college or elite professionals. It will be okay if we don't present all the facts here, to a 7 year old.

What we are doing is creating a child who will continue to learn and in time will gather all the information she will need to continue her studies. It is not misleading to present part of the information now without all the particular details that can easily be gained by reading a chemistry text later.

It is my dream to change these outdated attitudes and open up a new world of science teaching and to change the way science is taught around the world. I dream of a periodic table on the wall in every kindergarten and elementary classroom and on the walls of homeschoolers around the world! Not because I believe all children will love chemistry, but because all children deserve a chance to look at it and decide without fear if it is something they would be interested in pursuing some day. Because science shouldn't be anything to fear.

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Sodium

- Sodium is a metal.
- Sodium's atomic number is 11.
- It's in the first column of the periodic table so that means its outer shell has one electron available for bonding.
- Sodium has 11protons, 11electrons
- Sodium's atomic weight is 22.990u
- Sodium is the sixth most abundant element on Earth and makes up 2.6% of Earth's crust.
- Sodium is very soft, like the consistency of cold butter.
- Sodium is bright metallic silver in color but turns white when exposed to air (oxidation).
- Because it is a metal, it can be hammered out into sheets (malleable) or drawn into thin wire (ductile). See chapter on characteristics of metals.
- Sodium has 7 isotopes.
- Sodium is very important in animals and is one of the important electrolytes needed for nerve and muscles to function properly.
- We use sodium bonded with chlorine as table salt, our largest supply of which is found in the oceans.
- Sodium, alone, will explode in water. It must be stored in oil or it will react with the moisture in air.
- Sodium is abundant in the sun and is responsible for part of the color in the spec trum seen in a prism and in rainbows.

Facts for the advanced learner:
Sodium's electron configuration is [Ne]$3s^1$
Atomic radius is 1.54
It has a body-centered cubic crystal structure.
Pauling electronegativity .93

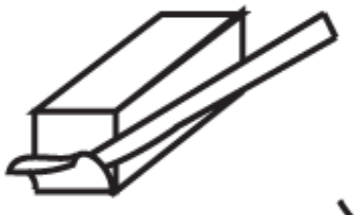
History
Potassium, Sodium and Calcium were all isolated or discovered by Humphrey Davy within a few weeks' time in 1807. Sodium in the form of sodium bicarbonate is an ancient element and as such has an alchemical symbol. The element was named, originally, for Natrium derived from the Hebrew, Neter and the Latin, Nitrum for substances that were very alkaline. So from the 1500's on, it was called Natron. In Arabic, Suwad, is a plant with a high soda content. Sodanum, Latin, was used for centuries as a headache remedy. Sodium was given the symbol Na as a nod to its origins and the name, Sodium, since it was called that in Davy's time.

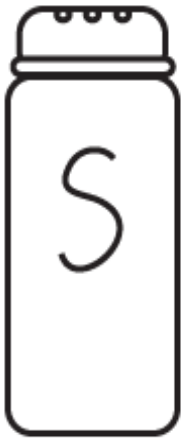
Na

Sodium's Symbol

11

Sodium's Atomic Number





Sodium

Manganese

- Manganese is a transition metal.
- Manganese's atomic number is 25.
- It's a transition metal so that means it has electrons in the two outer shells available for bonding.
- Manganese has 25 protons, 25 electrons.
- Manganese's atomic weight is 54.94.
- It is a gray-white metal that's very brittle and tarnishes quickly.
- Manganese is the main component of low cost stainless steel.
- Manganese is also used with aluminum to make a stronger alloy.
- The first dry cell batteries used manganese in the form of manganese dioxide.
- Manganese is used in glass making to remove the greenish tint that iron can give glass. In higher amounts, it adds a purple color to glass.
- Manganese is an essential trace mineral in all life forms. It is important in the manu facture of insulin. It is important for the activation of vitamin C and B_1. It is a powerful antioxidant. Manganese is important in bone structure and all enzyme activity in the body.
- Food high in manganese are whole grains and nuts
- South Africa and the Ukraine account for more than 80% of the world's Manga nese. American Manganese has poor quality and hard to mine.
- Large amounts of Manganese exists in the ocean floor but attempts to mine it were abandoned in the 1970's.
- Manganese is used to cure fish skin diseases.
- The presence of Manganese in amethyst is what gives it its rich purple color.
- Manganese is toxic and is regulated by OSHA.
- Manganese toxicity has been linked to early onset of Parkinson's disease.

Facts for the advanced learner:

Manganese's electron configuration is $[Ar]3d^5\ 4s^2$

Atomic radius is 1.17pm

Crystal structure is body centered cubic.

Pauling electronegativity is 1.5

History

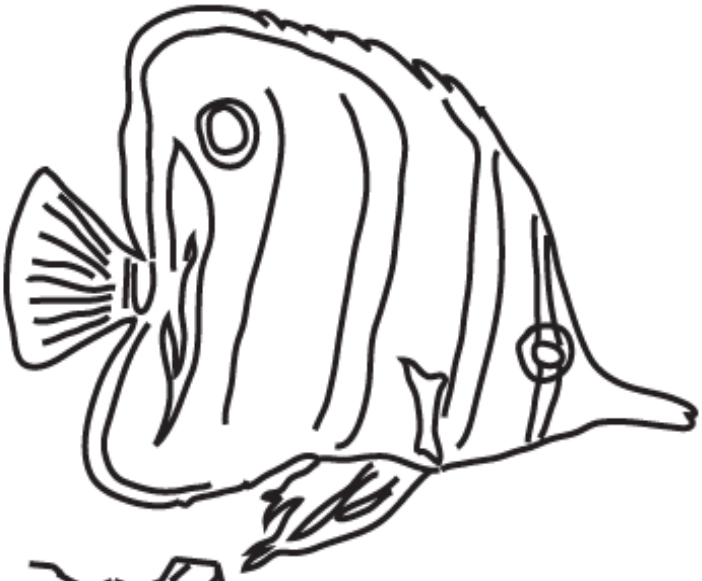
Paints pigmented with manganese have been traced back 17,000 years. The Egyp-tians and Roman societies also used manganese in glass making. The Spartans were legendary for their unusually hard steel and tests hint that it was due to the iron-manganese alloy used. The metal was originally discovered in 1770 by Ignatius Kaim. It was investigated and studied and finally isolated by Johann Gottlieb Ghan in 1774. It was named after the Latin for magnetism, magnes.

Mn

Manganese's Symbol

25

Manganese's Atomic Number



Manganese

Heavy Metals and Biomagnification

I wrote this chapter because I wanted to connect the dots between the mention of toxic elements in the data pages and the toxicity of these elements in the food or water supply. There are many metals, semi-metals and metalloids on the periodic table of elements. But it's the ones who have an atomic number that is high and therefore heavy that we are interested in when it comes to poisoning. These metals are referred to as heavy metals and yes that's the analogy of the term "heavy metal" used to mean heavy music which is said to have originated in the 1960's-70's.

Heavy metals on the periodic table have a unique quality that the other elements on the table do not. These metals, once released from the earth by humans and removed from the ores they are bonded to, become free and isolated. Once humans have used them they are left to be deposited into the ground where water carries them into the lakes and streams. Algae absorb them. Small fish eat the algae but it doesn't harm the fish. Then larger fish eat many of these smaller fish and the concentration of these metals is now higher in these medium sized fish than it was in the smaller fish. Then large fish eat large numbers the medium fish and the amount of heavy metals in these large fish become toxic. They don't harm the fish but when we catch and eat them, we get harmful levels of that metal. Because the concentration of these metals increases with its rise up the food chain, it is called magnification and because it deals with living things, the pre-fix "-bio" is used.

In this particular example I have used the metal, mercury, as it's the most common one we think of. The most common heavy metal pollutants are lead, mercury, cadmium and antimony. But all heavy metals have the potential to wind up in our drinking water and food supply if used by humans in industry.

The book covers data and coloring pages for Hydrogen through Radon in keeping with my children's version of the periodic table. We skip the man made elements numbers 58-71 and 90-103.
There are also activities and articles in the back of the book for further understanding. This book does not teach how the table works or introductory chemistry nor does it have activities for teaching each element. These things can be found either for free or in books available at www.HowToTeachScience.com

These coloring pages are great for

- car trips,
- taking to doctor visits,
- for playdates,
- teaching multiple ages,
- Easing into science for the fearful
- Downtime
- Easy science day
- To construct your own personalized book for each child's interest
- as items to "litter" for young learners to find sitting out,
- for waiting at restaurants while waiting for food,
- as a floor time activity,
- as enhancements for lapbooks,
- a cool thing to show family members that your kids are doing,
- a great babysitter activity
- great daycare activity
- for an element a week study
- kitchen table activity
- pass one out at Halloween :)
- Scrapbooking
- Refrigerator art
- Wall art

And please post any other ideas to the coloring book's facebook page…
http://www.facebook.com/topic.php?topic=173&uid=136193936419437#!/pages/The-Periodic-Table-of-Elements-Coloring-Book/136193936419437?ref=mf