Raven Hill DISCOVERY CENTER
WHERE SCIENCE, HISTORY AND ART CONNECT

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Raven Hill Discovery Center, incorporated in 1991, is a 501(c)(3) tax-exempt corporation.
Mission: Raven Hill provides a place that enhances hands-on and lifelong learning for all ages by connecting science, history & the arts.

To: Friends and Family everywhere
From: Cheri and Raven Hill
Date: April 9, 2022
Re: Changes over time at Raven Hill!

When Raven Hill Discovery Center opened in 1992, the Periodic Table of the Elements was made of construction paper and hung on the south wall of the Hands-on Room. In 1994, the Periodic and Animal Rooms were added to the main building and a door to the Animal Room was put in, where the paper Periodic Table hung. In 1995, the Charlevoix County Community Foundation awarded the Center a grant to build an oak Periodic Table of the Elements in the new Periodic Room. The wooden Periodic Table is twenty-foot-long and each element has its own one-foot cubicle. Each "cubbie" is filled with the natural occurring ore as much as possible and products made from that element. Raven Hill's Periodic Table shows the natural elements that make up our earth, as well as synthetic elements that have been discovered over the years.

The gold symbol "Au" is actual "gold leaf", which is a very thin sheet of gold—about 4 millionths of an inch thick—applied over base metal letters.

The original Periodic Table was invented by Dmitri Mendeleev in 1869. Mendeleev listed the 70 elements known at the time and grouped them by their characteristics. His first table was laid out vertically and not horizontally as ours is today. Mendeleev also left 3 spaces for elements that had not yet been discovered. All three—gallium, scandium and germanium—were discovered within seventeen years after his invention.

Many patterns can be found in the Periodic Table. For example, the left side of the table has the most reactive elements and the right has the noble gases, which are the least reactive. Also moving from left to right, elements gain electrons and become progressively less metallic across the Periodic Table. A third pattern is ductility. Ductility is the ability of a metal to be pulled into wire. The ductility of copper, silver and gold illustrates a very clear pattern. Gold is the most ductile. One ounce of gold can be stretched into a wire 2000 kilometers (km) long. One ounce of silver can be stretched into a wire 1000 km long. An ounce of copper can be stretched into a wire 500 km, making copper is the least ductile of all three metals.

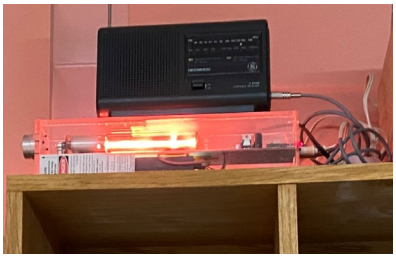
The 1992 Periodic Table was made of laminated construction paper. It hung where the door to the Animal Room is now located.

In 1995, the twenty-foot Periodic Table was constructed with wooden "cubbies" for each element.

Now, large pieces of Plexiglas cover the cubbies to insure that the ores and elements remain in their correct positions.

Raven Hill even has some products with radioactive elements in them. Uranium can be found in the glaze used on the old orange Fiesta ware. Thorium is also weakly radioactive and is used in the woven mantles on Coleman lanterns. When the mantle is lit, it glows with a bright white light.

Some elements still have the original construction paper letters from the 1992 Periodic Table, but several have the letters cut out of their metal element. For instance, the symbol for copper is "Cu". The two letters were cut out of an old copper plate used for printing a yearbook page. You can see the faces of students on the plate. At first, these items in the cubicles on Raven Hill's Periodic Table were accessible. The element symbols were mounted on Plexiglas picture stands that could be pulled out and examined closely. For example, if you placed nickel (Ni) and chrome (Cr) side-by-side, the nickel would be dull and yellowish in comparison to the very shiny chrome. Before 1926, the metal trim on cars was nickel and had to be polished frequently, because the nickel trim oxidized and turned dark easily. In 1928, the auto industry switched to chrome trim on cars and trucks. Between 1926 and 1928, both nickel and chrome were used on vehicles. When the metal symbols were fastened on Plexiglas stands & accessible, it was easy to compare them, plus you could feel the texture and hardness of the various elemental ores in the cubicles. Now, to keep items from being accidentally misplaced from cubicle to cubicle, the entire Periodic Table is covered with Plexiglas and unfortunately, not so hands-on!



The laser (above) and the lens & speaker (below) are twenty feet apart, but function together to relay sound via a laser light beam. It's almost like magic!

Helium and neon are two of the noble gasses. They have 5000 volts of electricity applied to the gas in the tubes, which excites the electrons. The extra energy is given off as light.

Some elements are used to color glass. Copper is a good example. In reduction, with no oxygen, copper colors glass a deep red. With oxygen, the glass is an aqua blue color. Another example is iron. Iron turns glass a dark "beer bottle" brown with reduction and it is "coke bottle" green in oxidation. The element, cobalt, turns glass a deep blue color.

The noble gases have their symbols made of glass tubing. The tubes are in the shapes of the letters to form the element's symbol and charged with electricity causing the gases to light up. Neon is very bright, which is why we used it for signage. We have a helium-neon laser positioned near the Helium and Neon cubicles. The laser's color is a mix of the helium & neon colors. There is a radio plugged into the laser. The sound from the radio is changed to a light code and carried twenty feet across the room, where there is a lens that picks up the laser beam &. feeds it into a speaker. The light code is then changed back to sound. When the speaker is turned on, you can hear the radio playing. If you block the laser beam with your hand, the radio stops playing. It is much like fiber optics, but without any fibers!

Raven Hill is open to the public noon to 4pm on Saturdays and 2pm to 4pm on Sundays, plus other times by appointment. You can call 231.536.3369 or email info@miravenhill.org for reservations. Be sure to schedule classes, summer day camps, field trips, birthday parties and scout groups soon. The Smithsonian ***Labor Days: History of Work*** exhibit is on display during regular hours or by appointment through all of 2022. Remember also to save Sunday, July 10th from noon to 4pm, so that you can help us celebrate 30 years of connecting science, history and art at Raven Hill Discovery Center.

Hope to see you soon!

Cheri