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We are currently open noon to 4pm Saturdays & 2pm to 4pm Sundays | Open holidays & other times by appointment
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: Raven Hill Friends

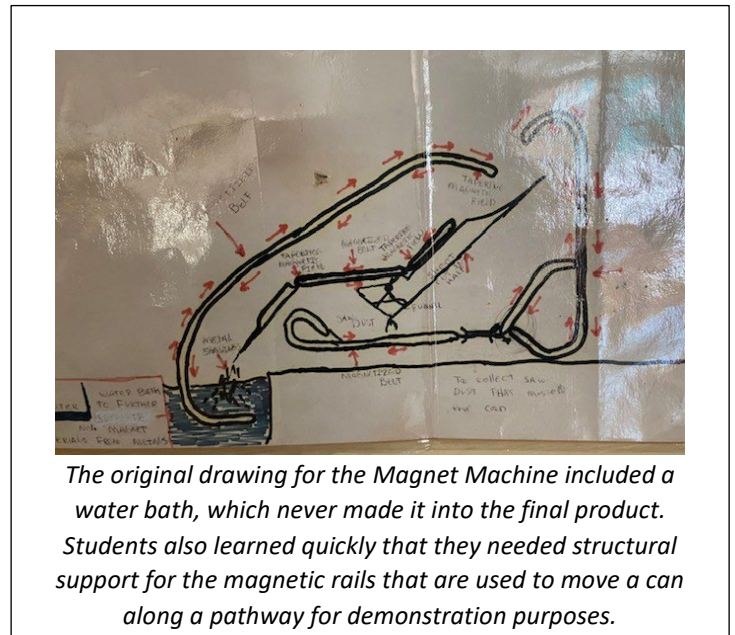
From: Cheri

Date: March 11, 2023

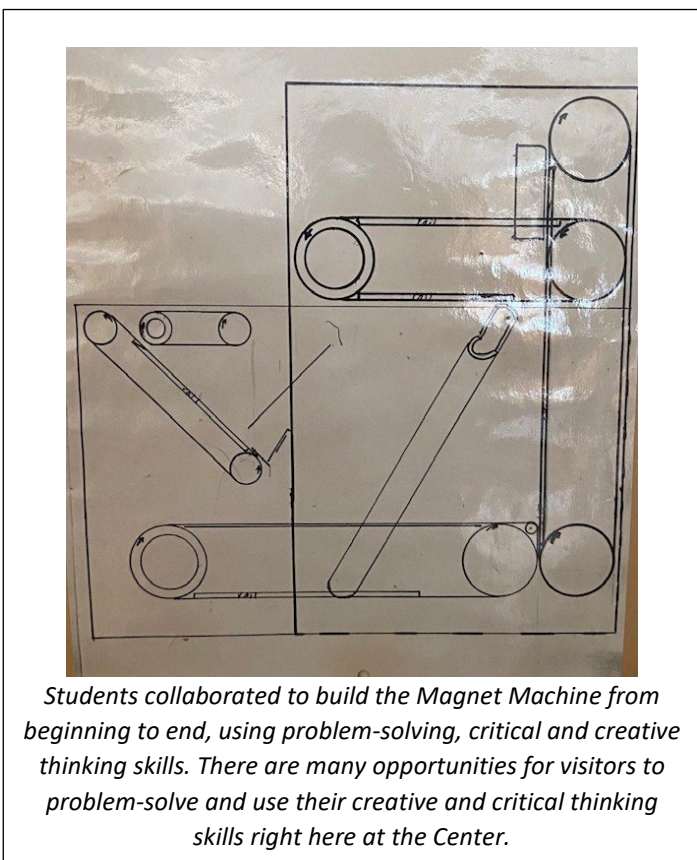
Re: Magnet Machine—its science, history & art!

During the fall of 1988, a group of eighth graders from Boyne City Middle School became a part of the Research and Development Lab at Industrial Magnetics, Inc. (IMI), a Boyne City, Michigan manufacturing company that builds magnets for industrial uses.

The students were assigned a product to develop, and then followed through with the entire project, from designing to blueprinting to building a scale model. Their challenge was to create and construct a machine demonstrating a variety of industrial magnetic applications, plus that machine had to fit in a given space—a cupboard for storage. The Magnet Machine or Can Mover became a part of the eighth grade classroom for years, until Raven Hill opened. It is now a permanent interactive exhibit at Raven Hill Discovery Center.



The original drawing for the Magnet Machine included a water bath, which never made it into the final product. Students also learned quickly that they needed structural support for the magnetic rails that are used to move a can along a pathway for demonstration purposes.



Students collaborated to build the Magnet Machine from beginning to end, using problem-solving, critical and creative thinking skills. There are many opportunities for visitors to problem-solve and use their creative and critical thinking skills right here at the Center.

Over 50 students applied for a spot on the development team. Students were chosen on the basis of ability, maturity, interest, creativity, and problem-solving skills. Twelve students were invited to participate. These students first received a tour of the facility at Industrial Magnetics and a demonstration of the many uses magnets have in industry. Their task was then to develop a machine that would demonstrate as many of those uses as possible, within given parameters. Students decided on a design and began to develop the product. During each visit, the students would build and then refine their machine with cardboard, flashing and balsa. IMI would do the actual cutting and welding of the steel between visits. Like all of us, eighth graders are not perfect! There were and still are a couple of little glitches, where the can needs help to continue along the pathway, but all in all, this was quite an impressive project for middle school students with guidance from IMI engineers.

After encountering various problems and frustrations, the final product was completed. The project gave students an idea of the real world difficulties faced by all industries at one time or another.

The Magnet Machine is a perfect example of a STEM (Science Technology Engineering Mathematics) project, but this all happened over ten years before the STEM acronym was introduced in 2001 by NSF (U.S. National Science Foundation). Thanks to Industrial Magnetics for their partnership and their support of real-world experiences for students over the years.

Now is a great time to visit the Center. Raven Hill is open weekends—noon to 4pm on Saturdays; 2pm to 4pm on Sundays and is open holidays and other times by appointment. Families and field trip groups can visit and explore both indoors and outside or book a science, history or art class for all ages and abilities. The Center is a perfect place for scout and 4H activities, birthday parties for youngsters & adults, retreats, weddings and other gatherings.

Outreach programs, like “Museum To Go”; “Reptiles To Go” or “Under Michigan—This State’s Geologic History” that come to **YOUR** site are also available for booking. Raven Hill staff can visit to provide small group “assemblies” and classes. Touring exhibits, like **History Heritage & STEAM**, can travel to schools and public libraries, as well as other venues.

For more information about onsite or outreach programs, email info@miravenhill.org or call 231.536.3369. Have a great week,

Cheri



The final Magnet Machine consists of two sections, which can come apart. The vertical part rotates 90° and sits parallel to the horizontal piece for easy storage inside a cabinet. Be sure to give the Can Mover a try next time you visit Raven Hill. Be willing to help the can along the pathway, as needed.



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