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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: February 25.2023
Re: *Solar energy*

Solar technology isn't new. The use of solar energy spans thousands of years. As long ago as the 7th century BCE (BC), humans used sunlight to light fires using glass materials as magnifiers. Ancient Egyptians used passive solar energy to heat their homes. They designed their houses to store the sun's heat in the building walls during the day. The walls released the heat after the sun went down and regulated the temperature of the house during cool nights.

The photovoltaic effect is the process that uses certain materials, such as silicon, to convert sunlight into electricity.

French physicist Alexandre Edmond Becquerel discovered this in 1839. Then, in 1905, Albert Einstein published his theory of the photoelectric effect, which explained how light could be used to create electricity.

In 1979, former President Jimmy Carter had a set of 32 solar panels installed on the roof of the White House as a symbol of America's commitment to renewable energy. Reagan removed them. In 2003, George W. Bush put in a new set of solar panels. In 2010, Barack Obama had a larger set of solar panels mounted on the White House roof to promote renewable energy. Today, solar panels are still in use on the White House roof, as a symbol of America's commitment to clean energy and sustainability.



During Raven Hill's Career Expo in 2019, middle school students worked with two solar energy experts and retrofitted the Center's two golf carts to solar energy! The carts are always charged WITHOUT having to be put on the battery chargers!



*In 2007, Raven Hill built the **Alternative Energy House**. More of an exhibit than a livable space right now, the **Energy House** illustrates energy transfer from solar to light, heat, sound and mechanical energies. There's even a solar oven installed in 2010 by volunteer Glenn Hindbaugh. Someday, guests may be able to spend a weekend "off grid" and experience an alternative and sustainable lifestyle.*

These days, there are solar-powered buildings and vehicles. They even sell solar backpacks to keep our cell phones, cameras and iPads charged, while hiking and camping. Solar energy is one of the fastest-growing sources of renewable energy.

Raven Hill's **Alternative Energy House** uses solar energy to power its lights. The solar energy is stored as chemical energy in batteries and from there, the energy is converted to electrical energy for the lights, as well as changed to mechanical energy in a fan, heat energy in a hot plate and sound energy in a radio.

One of the learning stations in the new **Connections Trail** has a solar panel hooked up to a bank of LED lights. There are shutters over the panel and when the shutters are both closed, the lights are off. Open one shutter and the lights come on partially. Open both panels and the lights are super-bright.



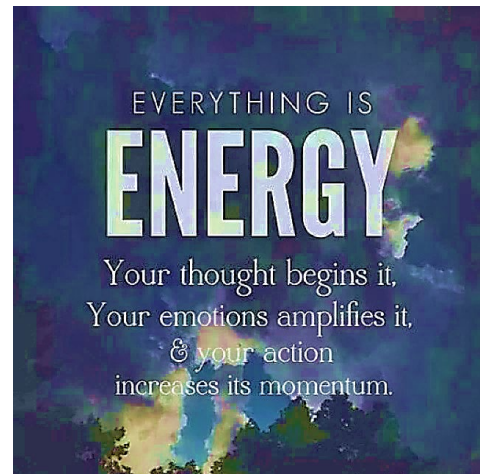
*The black and white plates attached to the shutters on the **Solar Station** illustrate heat energy absorption. Feel them and you can understand why we wear light colors in the summer and darker colors in the winter. White and light colors reflect heat and keep us cool. Black and dark colors absorb heat energy and keep us warmer.*

The new **Solar SMART** display,

due to be installed this spring, will illustrate the energy efficiency of the four cardinal directions and three different slopes, so that visitors can better understand how the placement of solar panels influences the amount of energy produced.



*Getting the wattage, amperes and voltage just right to allow visitors to read a meter and see the energy efficiency of a solar panel is a trial-and-error process. It's taking several iterations to get things adjusted just right and that's what innovation is all about! **Solar SMART** should be up and running in the summer of 2023.*



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Speaking of technology, remember to mark your calendars for next summer. Raven Hill Discovery Center will host a Smithsonian project in collaboration with local 7 to 12 grade students, **Youth Innovation in**

Rural America, from May 6 to October 7, 2023 and a Museum on Main Street traveling exhibit, **Spark! Places of Innovation**, from August 26 to October 7, 2023.



Raven Hill Discovery Center | August 26 to October 7, 2023

Currently, Raven Hill is open weekends—noon to 4pm on Saturdays; 2pm to 4pm on Sundays, as well as holidays and other times by appointment. For more information about visiting or outreach programs, email info@miravenhill.org or call 231.536.3369. Enjoy the sunshine and its inherent solar energy!

Cheri