

Raven Hill Discovery Center, incorporated in 1991, is a 501(c)(3) tax-exempt organization.

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: March 6, 2021
Re: Weekly Update

Greetings, Everyone!

I can't wait to share our new **GLASS ODDITIES** exhibit with you. When it comes to glass, there are many things to discover! We commonly think of glass in terms of its form, like stained glass or blown glass, or function, like windows or dishes, but there's more! In most cases, sand plus heat equals glass. Quartz sand or silicon dioxide is the main ingredient in the most common forms of glass. Sometimes, soda ash or potash is added to the quartz to lower the melting point. The mixture is heated to a temperature of about 3090°F (1700°C). Once molten, the glass cools to a solid. Vitrified sand has been heated to a high enough temperature to partly or fully melt the quartz sand to glass.

Nature was the first producer of glass. There is at least one animal that produces glass, several natural processes that produce glass and a few man-made methods of vitrified sand.

Glass sponges don't need heat to produce glass. They pull the silica straight out of the salt water. These sponges have a skeleton made of thin needle-like structures called **spicules** that are arranged in a star-like pattern. The spicules are made of silica, the same material that makes up sand.



Also called Venus flower baskets, glass sponges provide a home for certain crustaceans and other animals. Size: 8"



Most lightning strikes reach a temperature of 4532°F (2500°C).



This fulgurite came from Oklahoma.
Size: 3"

When lightning strikes a beach, the sand melts into glass forming worm-shaped **fulgurites**. The Utah Geological Survey describes fulgurites as natural tubes of glass formed by the fusion of silica (quartz) sand from a lightning strike. Their shape looks something like the path of the lightning bolt as it disappears into the ground. All lightning strikes that hit the ground are capable of forming fulgurites. A temperature of 3272°F (1800°C) is required to instantly melt sand and form a fulgurite. Sand fulgurite tubes have a glassy interior, due to rapid cooling and solidification of the sand after the lightning strike.

Meteors that penetrate Earth's atmosphere are called meteorites. Some hit the ground and heat it. Sand or other terrestrial debris is ejected into the air during meteorite impacts and form **tektites** (Greek for "molten"), which are small chunks of black, green, brown, or gray natural glass.

(Right) Some people love tektites in jewelry, because of its connection to outer space. Others believe they have healing properties. I like the space connection! Size: 1"





Volcanic glass is not fused sand because it is formed from molten lava, but it is naturally formed glass. Wikipedia defines a volcano as a rupture in the crust of the Earth allowing hot lava, volcanic ash, and gases to escape from a magma chamber below the surface. **Obsidian** results from super-heated materials erupting from the core of a volcano. Some of the pieces are shot out of the volcano into the air and cool before they hit the ground forming volcanic glass. Today obsidian is used in other countries to make knife blades that are 100 times sharper than high-quality steel surgical scalpels. These knives are currently not approved in the United States for use on humans.

Early human cultures used obsidian to make knives, arrowheads, spear points, scrapers and many different weapons and tools. Size: 3"

Man also creates glass from sand. When electrical wires come down during a thunderstorm, the live wires can act like lightning, if they hit sand. A local line worker gifted Raven Hill this special example (far right) years ago. Copper atoms from the wire actually turned the glass tube that formed in the sand a "copper red" color.



A lineman maintains electric power lines. This is a dangerous job, when the live wires come down.



Close up picture of vitrified glass that formed, when this live copper wire fused the sand around it. Total size: 7"



Considering that Brazil nuts and bananas emit low levels of radiation and will set off our Geiger counter, there's little for visitors to worry about with our small sample of Trinitite! Size: 1"

Trinitite is also known as atomsite or Alamogordo glass. It is the name for the glassy residue left on the desert sand after the Trinity nuclear bomb test on July 16, 1945, near Alamogordo, New Mexico. The temperatures during the blast had never been reached on Earth before, not even by an asteroid strike or a volcanic eruption. Samples of Trinitite are extremely rare. Most of the vitrified sand was buried in 1952. It is now illegal to remove any from the site. Trinitite samples like ours that were collected before 1952 are considered historical artifacts and are legal to possess.

If I bring our Geiger counter near the sample we have, you can hear the "clicking" sound, which indicates radioactivity. Trinitite will remain radioactive as long as our Earth survives. It's up to us to ensure that we never create anything like it again.

Look for the strange and unusual coming soon to Raven Hill. You'll love exploring **GLASS ODDITIES** and other intriguing exhibits right here at Raven Hill in our "eyes-only" indoor spaces. And don't worry, we're making the outdoors our new "hands-on" area—a museum without walls!

If you know someone who would like to receive weekly updates, please send their email addresses to info@miravenhill.org. I will add their names to the list. If you are interested in previous updates, you can find them all on our website—www.MiRavenHill.org

Please remain cautious. I would hate to see another surge and not be able to open in mid-April. I have had both vaccinations, but I will continue to wash my hands, wear my mask, socially distance and stay away from crowds. It's better to be safe than sorry, as the saying goes. All that being said, I do look forward to seeing you soon!

Cheri