



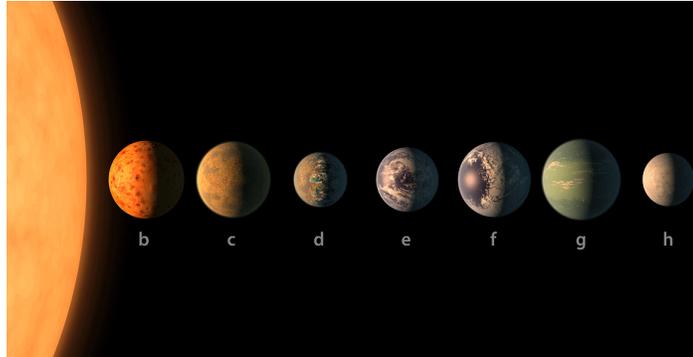
Minnesota Mission Log



Newsletter: Winter 2017

NASA Discovers Seven Earth-Like Planets Around Nearby Star

In February 2017, NASA revealed that they have discovered seven Earth-like planets all orbiting a nearby star. This record-breaking discovery was the first time so many habitable-zone planets were discovered around the same star outside of our universe. Of course NASA's definition of 'nearby' is relative because this star, called TRAPPIST-1, is still 40 light years away! A discovery like this is very rare because all seven planets are similar in size to Earth and could have water on their surfaces, which has the potential to support life.



Credit: NASA An artist's concept shows what the TRAPPIST-1 system may look like based on current data about their sizes, masses and orbital distance.

What is TRAPPIST-1? It is a star located outside of our solar system that is half the temperature and a tenth the mass of our sun, therefore it is called a "Ultra-Cool Dwarf" star. It is just slightly larger than Jupiter and it is located in the constellation Aquarius.

So why is this discovery so exciting? NASA says it's because these planets are close enough that they are actually going to be able to study them, especially with the James Webb Space Telescope that launches in late 2018.

What is an Exoplanet? An exoplanet is any planet that orbits a star found outside of our solar system.

Hidden Figures Movie Shows STEM Role Models

By now most people know about the incredibly inspiring movie called Hidden Figures—have you seen it? This is the untold true story behind the incredible African-American women who worked for NASA as 'human computers' and helped launch the first astronauts into space. These women crossed gender and color boundaries to help the United States win the space race and launch U.S. astronaut John Glenn into orbit, as well as put men on the moon.

In January, Thomson Reuters leaders invited young women from Valley Middle School, Friendship Academy, and CDF Freedom School to attend a private screening of the movie. The students were joined by Thomson Reuters' women technologists and leaders, the first African-American mayor of Minneapolis



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Touching the future through STEM education.



Hidden Figures cont...

Sharon Sales Belton, as well as by our own Executive Director of the Challenger Learning Center MN, Kasey Herzberg. Before the movie, Sharon and Kasey spoke about their roles in technology and what inspired them to follow their career paths. Thomson Reuters gave away books about the true story behind the Hidden Figures movie, as well as gift bags for every girl that attended.

"This movie gave these girls a chance to see STEM role models in action and provide them with an opportunity to hear how these smart, brave, and successful African-American women helped change the world." said Kasey Herzberg. The Challenger Learning Center of Minnesota was honored to be a part of this inspiring event.

Who is Katherine Johnson?

Katherine Johnson was one of the first African-American women to work for NASA as a mathematician, or 'human computer', in a time when minorities held very few jobs in math and science. Her work was instrumental in helping put an astronaut in orbit around the Earth and later helping land astronauts on the moon.

Katherine Johnson was born in 1918 in West Virginia. She was extremely smart, so much so that she started high school at 10 years old and graduated college by 18 years old! After college she taught school for a few years before she went to work for NASA at 34 years old. She started out doing math calculations for the male engineers, but eventually went on to calculate the flight paths for the rocket that would put the first American in space. At that time, computers were just starting to come onboard and astronauts were wary of putting their lives in the hands of the electronic calculating machines, which were prone to hiccups and blackouts. They trusted Katherine with the tough calculations rather than an IBM computer.

Katherine was a trailblazer at a time when men dominated the industry and was soon recognized as a leader. In 1962, her calculations helped put John Glenn into orbit around



Credit: NASA Katherine Johnson in 1966 photographed at her desk at NASA's Langley Research Center.



Credit: NASA Katherine Johnson awarded the Presidential Medal of Freedom from President Barack Obama in 2015.

the Earth and she later went on to help define calculations that would allow astronauts to land on the moon. She eventually went to work on the Space Shuttle program and the Earth Resources Satellite system.

In November of 2015, at 97 years old, Katherine Johnson was awarded the Presidential Medal of Freedom from President Barack Obama. This is the nation's highest civilian honor.

She is currently 98 years old and has a passion for encouraging students to pursue careers in science and technology. Although long overdue, her story is finally being told through the Oscar-nominated feature film 'Hidden Figures'. The movie also tells the story of the other human computers at NASA that so bravely and boldly paved the way for minority women in science and technology. If you haven't seen it, it won't be in theatres much longer—get your popcorn and go!



SpaceX Plans to Fly Humans Around the Moon in 2018



Credit: SpaceX

It's been almost 45 years since Apollo 17, the last manned space mission to the moon returned to Earth. Since that time there have been numerous un-manned missions to the moon, but no manned-missions beyond low Earth orbit...until now. In February 2017 SpaceX announced that they plan to send two private citizens on a mission around the moon in 2018 using their Crew Dragon spacecraft (Dragon 2). This is very exciting news for space enthusiasts or anyone with a spirit for exploration! Although this mission isn't anything human's haven't done before, it is still pretty exciting to hear of humans going back to the moon.

Two private citizens, whom SpaceX will not name quite yet, have paid a significant deposit to be part of this moon mission. The mission will launch atop of the SpaceX's Falcon Heavy rocket, journey to circumnavigate the Moon and return to Earth. The trip would take about a week and is estimated to cost more than \$300 million. This will be a fully autonomous mission but the crew will be trained for emergency procedures. NASA was quoted as saying it "commends its industry partners for reaching higher."

SpaceX has launched their original Dragon spacecraft to the International Space Station many times since 2012, delivering supplies, food and science experiments to the astronauts aboard the ISS. But the crew version of the Dragon spacecraft (Dragon 2) will launch in 2017 for a test flight with no crew onboard. The plan is to launch the first manned crew mission of Dragon 2 to the ISS in mid 2018. The ultimate goal of the Dragon 2 spacecraft is to carry humans to Mars.

Falcon Heavy: First Test Flight This Summer!

Falcon Heavy is set to launch it's first test flight this summer! Once successful it will be the most powerful rocket ever built behind the Saturn V, which took astronauts to the moon. The Falcon Heavy is 2/3 the thrust of the Saturn V but it is still more than double the thrust of the next largest rocket out there. The Falcon Heavy can lift more than double the payload of the Delta IV Heavy (the next closest operational vehicle) - and at 1/3 the cost!

The Falcon Heavy has 27 engines at liftoff generating more than 5 million pounds of thrust—that is more than eighteen 747 aircraft combined!



Credit: SpaceX

How Can You Help?

- > Visit our website for more information and contact us to learn how you can get involved.
- > Sign up for an individual or Family Membership, or consider a donation - information on the website: www.challengermn.org/membership.html
- > Help us get the word out!



"Genius has no color and brilliance has no race."

-Janelle Monae
Actress from the movie
Hidden Figures



Spring Break 2017: STEM Camps & Ideas

Spring break 2017 is almost here! If you are looking to keep your future scientist busy and entertained, here are some fun STEM camps and activities around the Twin Cities:

STEM Camps:

- **Science Museum of Minnesota**
 - Camps offered 4/3-4/7
 - Camps for ages 5 through 18!
 - Robots & Rockets, Theme Park Physics, Detective Science and more! [Click here for more info.](#)
- **The Works Museum**
 - Camps offered both 3/27-3/30 or 4/3-4/7
 - Camps for grades Kindergarten through 5th grade
 - Lego Engineering and Robocoding camps! [Click here for more info.](#)
- **The Bakken Museum**
 - Camp offered 4/3-4/6 for grades 4th-6th
 - Creature Camp! [Click here for more info.](#)
- As always, check your local school districts **Community Education** program for more local STEM camps.

Spring Break STEM Activities:

- **Crayola Experience** at the Mall of America
 - **SPECIAL:** Every day from 3/1-4/16 teachers get FREE admission and immediate family members are 50% off!
 - [Click here for more info.](#)
- **Sportsology** at the Science Museum of Minnesota
 - Check out the science behind sports! [Click here for more info.](#)



Family Science Experiment: The Exploding Lunch Bag!

Be prepared to be blown away! You will need adult supervision and safety goggles—and be sure to do this outside, or at least in a kitchen sink!

You will need:

- One small (sandwich size) zip-lock bag.
- 3 Teaspoons baking soda
- 1/4 Cup very warm water
- 1/2 Cup vinegar
- Measuring cup
- A tissue



Mixology:

- Put your safety goggles (or sunglasses) on and once you are outside or over a sink, pour 1/4 cup of very warm water into the bag.
- Next add 1/2 cup of vinegar to the water in the bag.
- Next put 3 Teaspoons of baking soda into the middle of the tissue and wrap the baking soda up by folding the tissue around it.
- Time to work fast now! Partially zip the bag closed but leave enough space to add the baking soda tissue. Put the tissue with the baking soda into the bag and quickly zip the bag completely closed. Make sure it's zipped tight!
- Put the bag in the sink or down on the ground (outside) and step back. The bag will start to expand bigger and bigger until...POP!

What's Really Happening?

When the baking soda and the vinegar eventually mix (the tissue buys you some time to zip the bag shut) they create an ACID-BASE reaction, and the reaction creates a gas (carbon dioxide – the stuff we breathe out)! Gasses need a lot of room to expand and the carbon dioxide starts to fill the bag and keeps filling the bag until the bag cannot hold any more gas...and POP!

Hypothesis:

Would a smaller bag create a faster pop? Will colder water affect how fast the bag inflates?

Don't forget to check out our [previous newsletters](#) on the website for more fun family science experiments to do over spring break!