

ISSUE 08

SWEET

ASTRONOMY



SOLAR SYSTEM BRACELET



SALLY RIDE



BLACK HOLES



OUR TEAM

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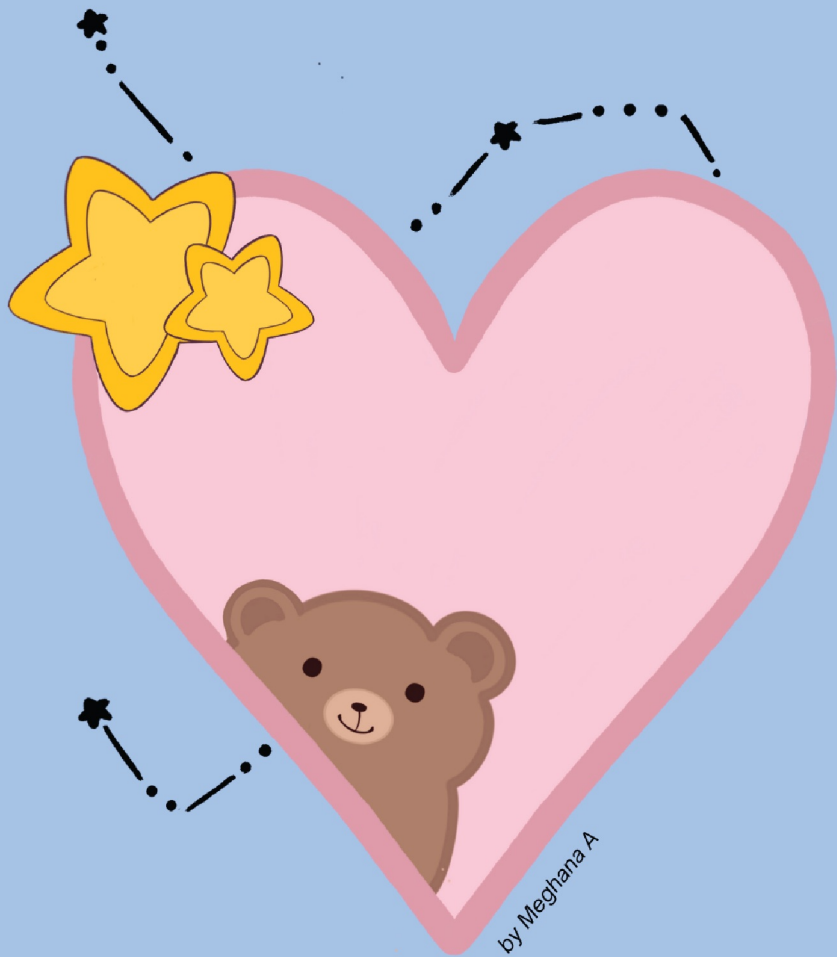
ABOUT

SWEET (Science
with Exciting
Experiments &
Tips) is a zine that
aims to spark
curiosity and
empower the next
generation of girls
in STEM through
hands-on
experiments, fun
lessons, and
games.

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THANK YOU!



Dear Readers,

Welcome to the eighth issue of SWEET!

Are you ready to explore the world outside of Earth? With the help of astronomy, discover everything about the solar system, astronauts and even mysterious black holes together.

Put your astronaut helmet on, and let's blast off into the wonderful world of astronomy!

Happy exploring,

Chloe

AMAZING

ASTRONOMY



Have you ever looked up at the night sky and felt like it just never ends? Space is exciting because no matter how much we learn, there's always something new waiting to be discovered. That's what makes astronomy so exciting.

WHAT IS IT?



Well, what is it exactly? Astronomy is the science of studying everything in space. It helps us understand how the universe works, how planets form, and even how our own Earth came to be.

PLANETS, STARS, & MORE!

Here are a few space objects you'll hear about a lot:



Stars are massive balls of gas that produce light and heat. Our Sun is a star, and not even a very big one!

Even though black holes are invisible, they create dramatic effects outside their event horizons. When gas and dust get pulled toward a black hole, they form a swirling ring called an **accretion disk**.

This disk gets extremely hot and bright as it spins faster and

faster.

Black holes can also "bend" light from stars behind them, acting

like cosmic magnifying glasses. This effect is called **gravitational lensing**, and it helps astronomers spot black holes from far away.

In some cases, black holes shoot out powerful jets of energy and particles that can stretch across entire galaxies. Strangely, these jets don't come from inside the black hole. They actually form just outside the event horizon where magnetic forces twist and spin.

So... are they dangerous for us? There are no black holes

anywhere near Earth, so we're completely safe. Even if we flew

close to one (with a very brave crew!), a black hole doesn't "suck things in" like a vacuum cleaner. You'd have to get extremely close before its gravity became strong enough to pull you in.

WHY DO THEY MATTER?



Black holes help scientists understand the laws of the universe. By studying them, astronomers learn about how galaxies form, how stars live and die, how gravity really works, and what happens to matter under extreme conditions. They even teach us things about space-time, which is the idea that space and time are woven together like a stretchy fabric.

One of the biggest mysteries is what happens inside a black hole. No one knows exactly how matter behaves once it crosses the event horizon, and that's one of the reasons black holes are so cool: there's still so much to discover.

Black Holes

THE STRANGEST PLACE IN SPACE

Imagine an object so powerful that nothing, not even light, can escape from it. Imagine something that bends space and time like a bowling ball stretching a trampoline. These mysterious cosmic objects are called black holes, and they're some of the most fascinating features in our universe.

WHAT & WHERE ARE THEY?

A black hole is an area in space where gravity is extremely strong. **Gravity** is the force that pulls things together, like how Earth pulls you toward the ground. But the gravity near a black hole is millions (or even billions) of times stronger. Once something gets too close, it can't escape: not planets, not gas, and not even beams of light.

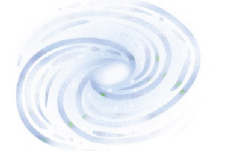
Most black holes begin their lives as stars much bigger than our Sun. When a massive star runs out of fuel, it collapses under its own gravity. If the leftover material is heavy enough, it gets squeezed into a tiny, incredibly dense point called a singularity, surrounded by a boundary known as the event horizon. The **event horizon** is like the "point of no return", and anything that crosses it can't come back out.

Planets are worlds that travel around a star. Some are rocky, like Earth, and some are giant balls of gas, like Jupiter.



Moons orbit planets. Some moons have craters, mountains, or even hidden oceans under ice.

A **galaxy** is like a giant "city" of stars. Our galaxy, the Milky Way, has over 100 billion stars.



WHAT DO ASTRONOMERS DO?

Astronomers are scientists who study space. They're like cosmic detectives! Here are some things they do:



- Use telescopes to observe stars, planets, and galaxies
- Take pictures of distant objects using space telescopes
- Discover new planets around other stars
- Study how stars are born and how they die
- Send spacecraft to explore planets and moons
- Look for signs of water or life in other places

Some astronomers work in observatories, some work with computers and data, and some help design space missions.

lost in space

It all started with a **BANG!** The Big Bang, to be exact. Around 13.8 billion years ago, the universe exploded into existence, tiny particles formed atoms, stars ignited, galaxies spun into shape, and eventually, planets like Earth appeared. Now it's your turn to create your very own planet!

Instructions

- Imagine a brand-new planet in a faraway galaxy.
- Draw it in the area below
- Give it some fun features, like mountains, oceans, rings, clouds, or even alien creatures!
- Pick a planet name and write it above your drawing.

Welcome to _____

DIY Solar System

By Chloe Dreu &
Melody Alduy-Berman

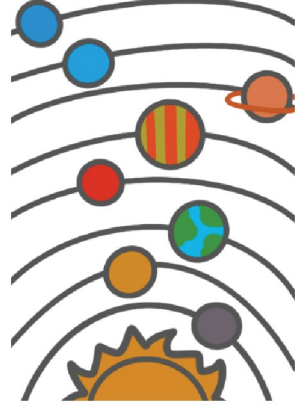
Activity

Are you ready to transform your world into space? Embark on a voyage of discovery to explore the world around you, including our home, Earth.

Our **Solar System** is made up of the Sun and everything that **orbits** (moves around) it, including planets, moons, asteroids, and comets. The planets travel around the Sun in paths that are shaped like stretched-out circles, called **ellipses**.

There are eight planets in our **solar system**, and each one is unique:

- Mercury: closest to the Sun and very small
- Venus: Earth-sized and extremely hot
- Earth: our home with life and water
- Mars: cold and red
- Jupiter: largest planet
- Saturn: famous for its rings
- Uranus: tilted, pale blue
- Neptune: farthest planet with strong winds



In 1983, Ride became the first American woman to travel up to space as a crew member. On the Space Shuttle Challenger, she was responsible for operating the shuttle's robotic arm, deploying satellites, and conducting experiments. Her career inspired many to pursue space exploration and science careers. After her first adventure, she returned to space again in 1984 for another mission, to deploy the Earth Radiation Budget Satellite.

Beyond NASA, Sally Ride co-founded Sally Ride Science in 2001 promoting STEM education for children, with an emphasis on young girls. Ride's commitment to education, equality, and innovation makes her a role model for future generations.

"Science is fun. Science is curiosity. We all have natural curiosity."



Sally Ride was a trailblazer in space exploration and astronomy. She became the first astronaut inducted into the National Women's Hall of Fame and the Astronaut Hall of Fame. After passing, Ride received multiple awards including: The Presidential Medal of Freedom, one of the United States' highest civilian honors.

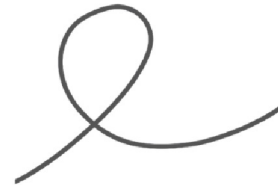
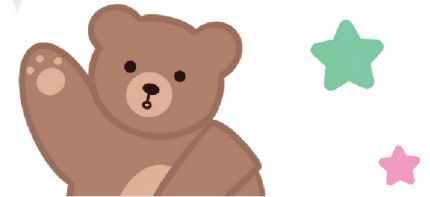
Sally Ride inspired and empowered both girls and women with her achievements, teaching them that there are no boundaries to what they can accomplish in science.

MATERIALS

- Beads and string
- Sidewalk chalk
- A ruler (in cm) or a measuring tape
- Optional: cardboard, tape, scissors

INSTRUCTIONS

You can wear your solar system like a necklace or hang it up as a decoration.



1

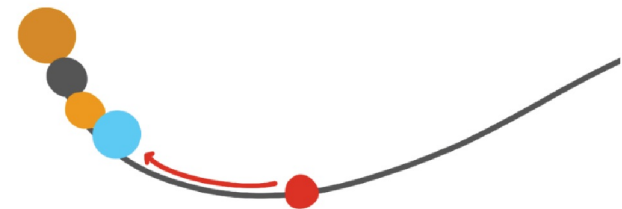
Cut a piece of string long enough to fit comfortably around your neck or the space where you'll hang it (about 60 cm extra is helpful).

2

Tie a large yellow, orange, or red bead to one end using a double knot. This is the Sun.



Slide on each planet bead, tying a small knot after each one to keep it in place.

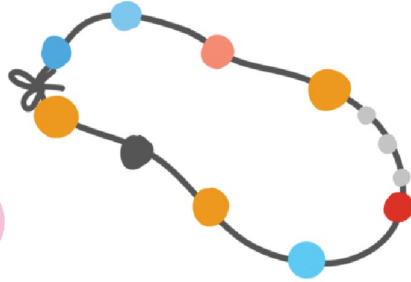




SHARE IT WITH SWEET!

What kind of solar system did you build? Send us a photo of your space-tacular creation at sweetsscience@gmail.com for a chance to be featured on our social media. We can't wait to see your masterpiece!

4



When all the planets are added, tie the two ends of the string together securely. Now your solar system is round, just like real planetary orbits!

3

Now, add the asteroid belt. Leave extra space between Mars and Jupiter (about twice the distance between the other planets).

Optional: Add tiny grey beads to represent asteroids!



Sally Ride grew up in Los Angeles, California and attended Westlake School for Girls before earning her degree in physics and English at Stanford University, and later a PhD in physics. Her curiosity and academic achievement made her a standout applicant to NASA.

Sally Ride broke gender barriers to become the first American woman in space. Alongside four men, Ride made great contributions to astronomy during and after her trip. Having Ride attend the trip changed the face of NASA's space program. At first, Ride was unsure if she wanted to become an astronaut. She grew up loving science and dreamed of playing professional tennis, but after taking a physics course, she answered an ad in the Stanford student newspaper seeking astronauts. She was chosen in 1978 from thousands as one of six women to attend the program. Her success opened doors for women in STEM, and changed the perception of who could go to space.

By Aleena Wong

1951-2012

Sally Ride

Women in STEM