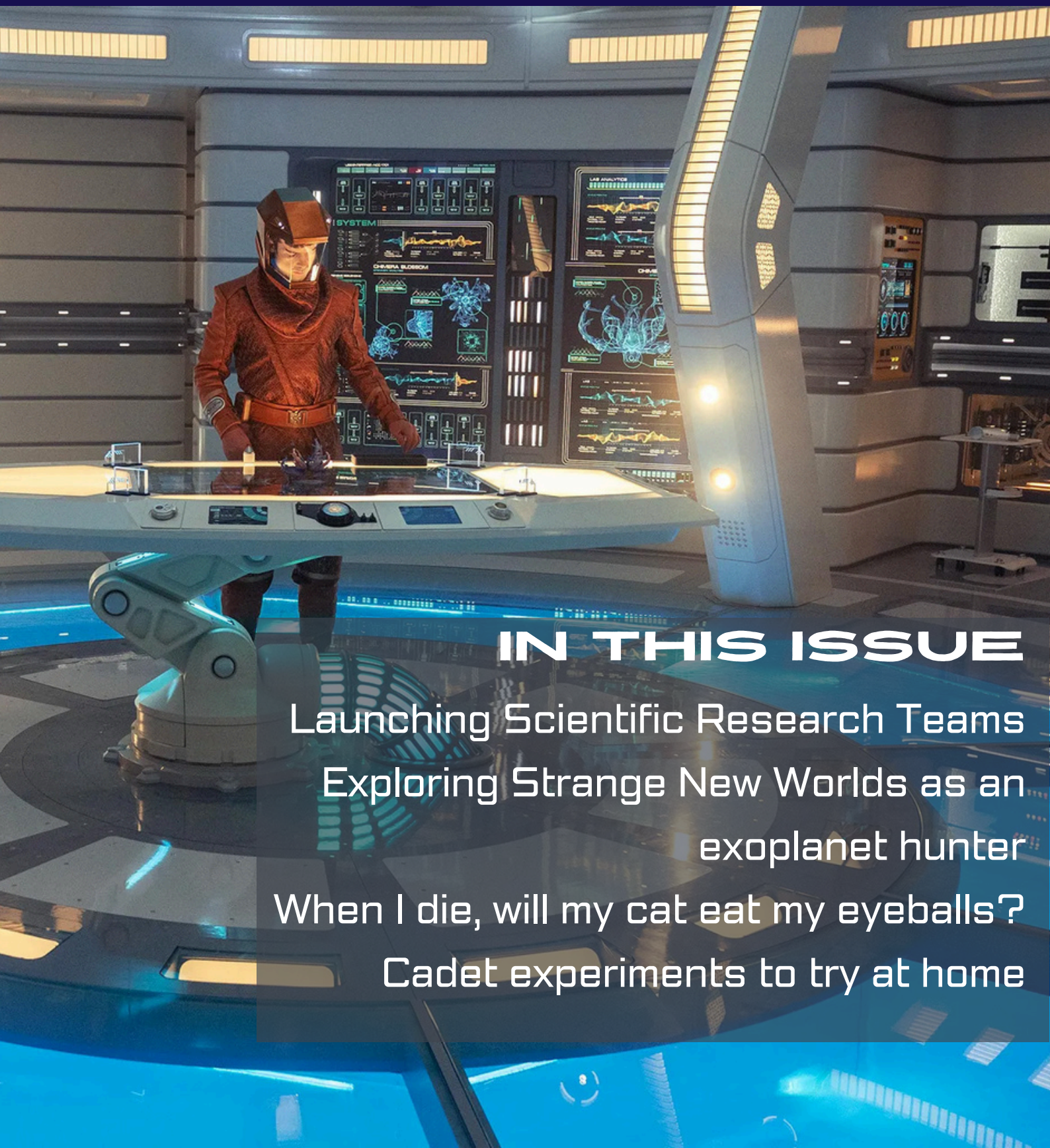
Issue 3. January 2025

Event Horizon

The magazine of STARFLEET Sciences



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Event Horizon is edited by CAPT Pam Kingsley. Deputy editor CAPT Patrick Litton.

Submissions are welcomed - please send them to **sfsci-eheditor@sfi.org**

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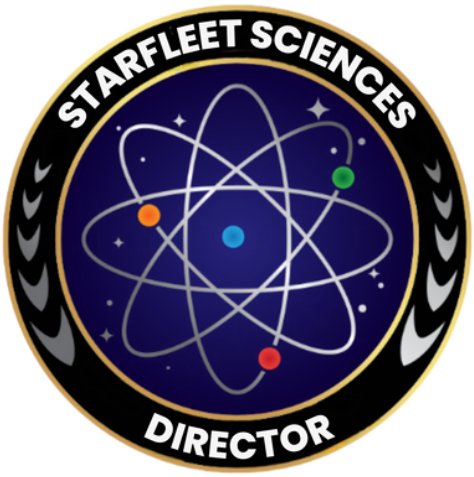
Cover image: Screencap from *Strange New Worlds* season 2

"What is a scientist after all? It is a curious man looking through a keyhole, the keyhole of nature, trying to know what's going on."
Jacques Yves Cousteau, French oceanographer

From the Director's Office



Happy New Year!

What a whirlwind of a year we had in 2024! I took the reins as Director on June 1st, an amazing staff seemed to materialize as though they were beamed in from another dimension, and we rolled up our uniform sleeves and dug in to finally attain Permanent Status as an Auxiliary in STARFLEET.

Because of the incredible effort of our staff (past and present), Pam, David, Yolonda, Matthew D., Monica, Aspen, Ed, Cheryl, Mike, and Patrick, we launched a new website, The Event Horizon magazine, Sciences Academy Challenge, the Sol Speaker Series, and the Sciences Specialization program. And we participated in the 2025 SFI VIC, which was a blast. This was no small feat and I want to thank my staff for their beautiful spirits and dedication to our Auxiliary. They are the best in the Fleet!

2025 promises to be another stellar year as we are kicking it off with the new Scientific Research Team (SRT) program, a monthly Sciences trivia game, and continuing our popular Sol Speaker Series for a second season. Our regular programs will continue to daze and amaze! As always, we are here to serve you and are open to any and all suggestions!

Wishing all of you a Happy New Year from the staff of STARFLEET Sciences!

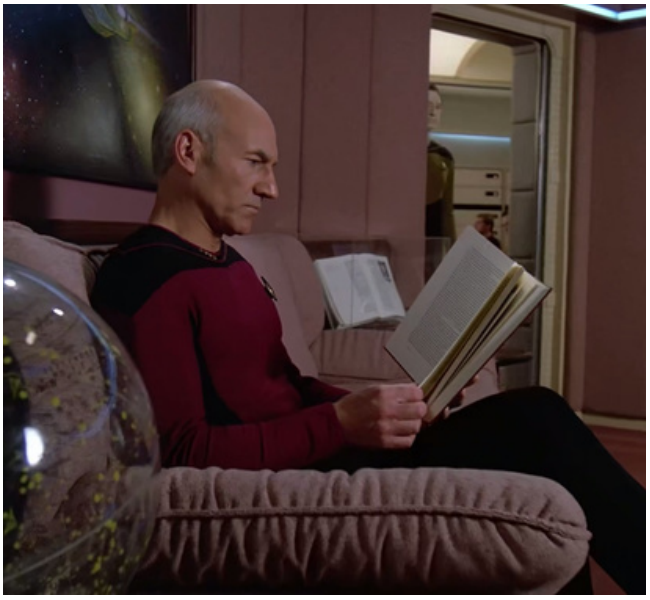
Fleet Captain Barb Barton

Director of STARFLEET Sciences

From the Editor's Desk

Welcome to the first *Event Horizon* of 2025!

In this issue we have articles on NASA and exoplanet hunting, our continuing series on astrophotography and electronics, an experiment to try at home (thanks to the SFMC for sharing their resources), and updates from the various departments within STARFLEET Sciences as well as the usual recommendations, cadet pages, and an update on what Stamets, our mascot, has been doing!



This issue seems to be rather space-oriented, and I am aware that there is a lot more to science than space - even if we are in STARFLEET! If you have a particular interest and would like to share something with other members of Sciences, please get in touch. It could be as short as a paragraph on a book you recommend or a full article on your area of expertise.

Speaking of books, one of the more unusual articles this month, and one of my favourites, was "When I die, will my cat eat my eyeballs?" courtesy of LTJG Janet Livingston, who has a particular interest in forensics. Yes, she does answer that question in the article, and it's not as gruesome as you'd think!

I hope you enjoy reading this issue, and, as always, if you have any comments, feedback, suggestions or content you would like to contribute, please send it to **sfsci-eheditor@sfi.org**

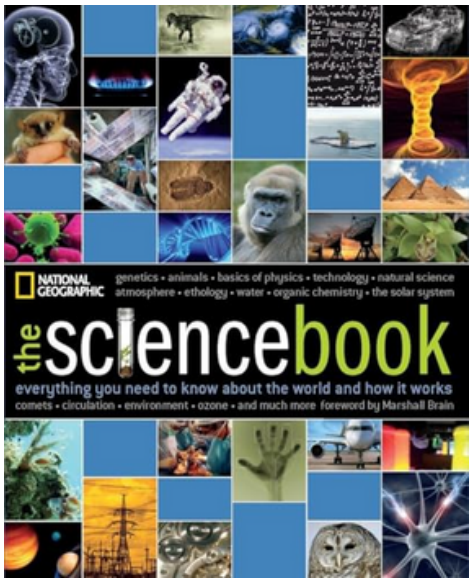
Captain Pam Kingsley

Deputy Director of STARFLEET Sciences & *Event Horizon* editor

SFSCI recommends...

Each issue members of STARFLEET Sciences will share some of their favourite science-themed websites, books, equipment, places, podcasts, etc. from the past quarter.

The Science Book: Everything you need to know about the world and how it works by National Geographic



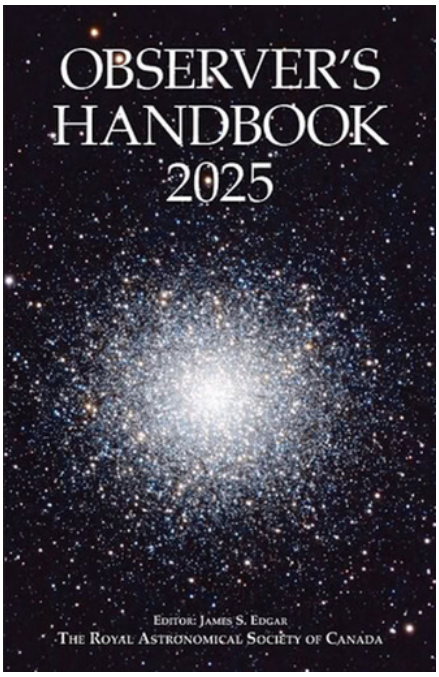
"I found a really cool book at a library book sale – 'The Science Book: Everything you need to know about the world and how it works,' published in 2008. I like finding things like this. I like to compare what we know now with what was known then. That wasn't so long ago so there probably won't be any major differences. The fun ones are the really early ones where you almost can't believe they used to believe those things."

RAdm. Janice Graham, CSCO USS Renegade, R1

North Carolina Arboretum, Asheville, NC

The USS Alaric visited North Carolina Arboretum's Winter Lights event in December. The Arboretum grounds were damaged by the late September Hurricane Helene storm system. The facility's nature trails were still closed due to tree damage, but they were able to effect repairs sufficiently to host this year's annual Christmas light event, which we thoroughly enjoyed.

Adm Richard Heim, R1 Chief for Sciences



The Royal Astronomical Society of Canada's Observer's Handbook

The RASC Observer's Handbook is a fabulous resource. It tells you everything that's going to be happening in the sky that year. My local astronomy club places a group order every year.

To order a copy visit **www.rasc.ca/handbook**

ENS Elizabeth Calhoun, Deputy Chief of Staff

CHRISTMAS LECTURES from The Royal Institution supported by CGI

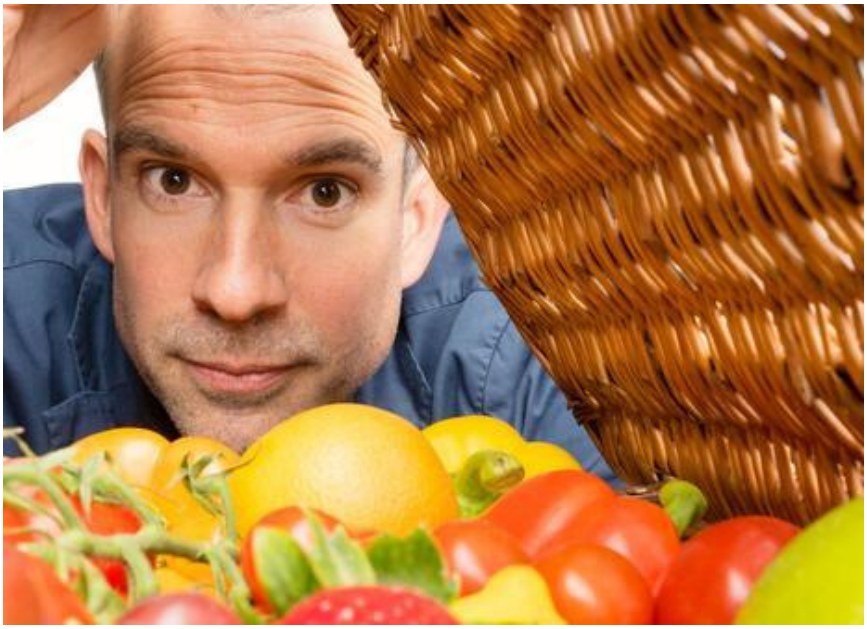
The Royal Institution Christmas Lectures

The Christmas lectures have been held annually since Michael Faraday's first talk in 1825. The talks were started to engage and educate young people about science. They are aimed at an audience of 11-17 year olds, however they are accessible for people of all ages (my 8-year-old really enjoyed watching them) and all levels of scientific knowledge, and they can be very entertaining to watch!

This year Dr Chris van Tulleken took a closer look at what happens inside our bodies when we eat.

Lectures both recent and historic are available to watch on the **Ri website**.

CAPT Pam Kingsley, Deputy Director



Hello from STARFLEET Sciences Education!

We have had an exciting end to 2024 with a large turn out for our final Sciences Challenge on the subject of oceanography.

Some items we are looking at for the New Year include:

- Monthly Sciences Trivia via Kahoot
- Four Quarterly Science Challenges
- Continuing the Sciences Specialization Program
- Supporting the Sol Series
- Expanding on STEM Resources for Parents/Guardians for our Cadets

There's a lot of things we have planned but we are always looking for suggestions. I hope everyone has a safe and wonderful Holiday and a Happy New Year!

Captain Yolonda Whitworth, SFMD
SFSCI Chief of Education

STARFLEET SCIENCES AUXILLIARY

PRESENTS

SCIENCE TRIVIA NIGHT

(KAHOOT)

QUIZ

18 JAN

SATURDAY

MULTIPLE CHOICE

UNUSUAL FACTS

TEST YOUR KNOWLEDGE

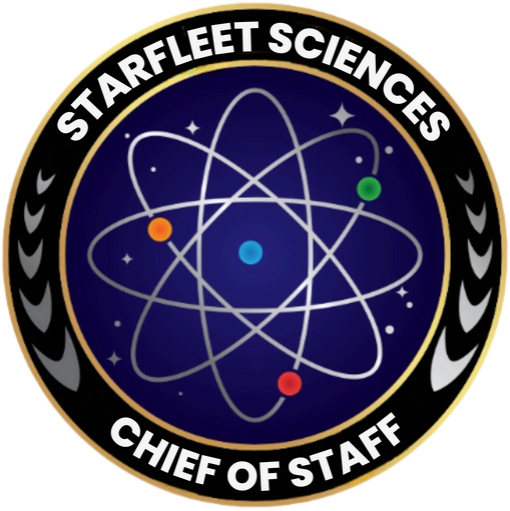
GAME BEGINS AT 19:00 GMT 14:00 EST

SIGN UP VIA EMAIL BY FRIDAY, JAN 17TH 8PM EST TO PARTICIPATE:
SFSCI-CHIEFEDU@SFI.ORG

Winter Weather Edition

AWARDS GIVEN FOR WINNERS

From the Office of the Chief of Staff



We are pleased to announce the appointment of Ensign Elizabeth Calhoun as Deputy Chief of Staff.

As we embark on another exciting year in the Sciences, we invite you to immerse yourself in the wonders of space and science at the Smithsonian Institution's National Air and Space Museum, located on Jefferson Avenue in Washington, D.C.

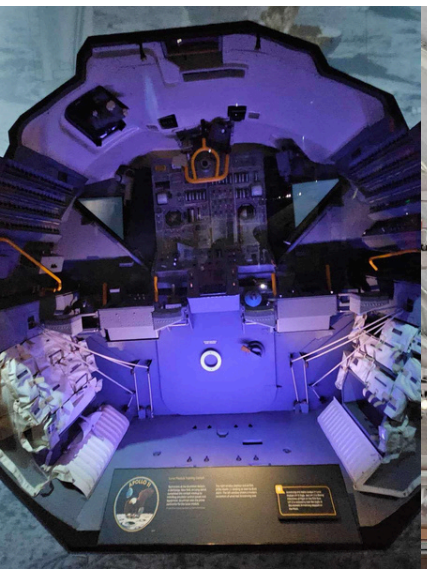
The museum offers a captivating experience with exhibits such as the Apollo Lunar Module "Eagle," the first spacecraft to land on the moon, and the Apollo 11 Command Module "Columbia," which safely transported Neil Armstrong, Buzz Aldrin, and Michael Collins to the moon and back.

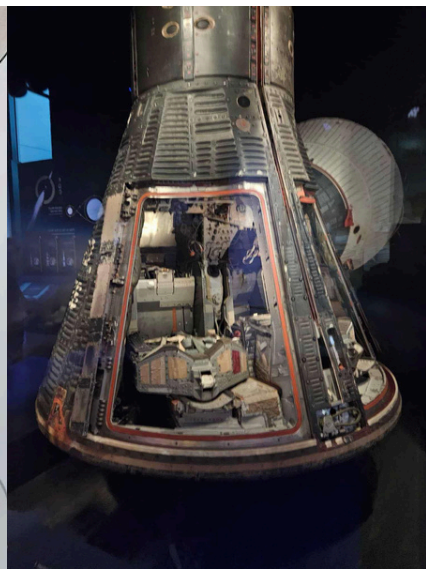
Additionally, visitors can marvel at the filming model of the USS Enterprise NCC-1701 from the original 1966 series.

We encourage you and your family to explore these and many other fascinating exhibits as you journey through "Space, The Final Frontier."

Live Long and Prosper.

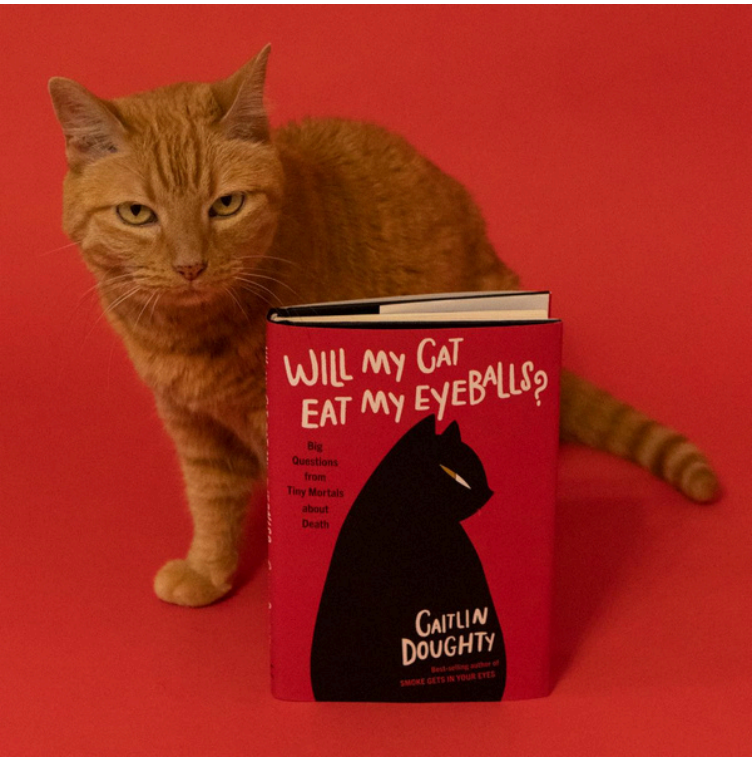
Lt. Commander Aspen James SFMD
Chief of Staff, STARFLEET Sciences





When I Die, Will My Cat Eat My Eyeballs?

R3 Sciences Liaison LTJG Janet Livingston shares her love of forensics and an intriguing reading recommendation...



My favorite science is forensics, which explains my January article. Mortician Caitlin Doughty answers this question in her 2019 book "Will My Cat Eat My Eyeballs?", along with many others posed by children. If you have cats in your home, you'll be relieved to learn the answer is no, at least not right away. According to Doughty, if your cat gets hungry enough he's likely to eat your softer parts like lips and eyelids first.

Other thought provoking questions youngsters asked Doughty include:

- What would happen to an astronaut's body in space?
- Will I poop when I die?
- Will my body sit up or speak on its own after I die?
- Can we give Grandma a Viking funeral?

Although my mom didn't have pets in the house, she did live alone. She told her neighbors if they saw the daily newspaper still in her driveway by late morning, someone needed to check on her.

(A bit of history about the American newspaper: Once upon a time newspapers were printed on paper, rolled and bagged or rubber-banded, and delivered by real people every day to the subscriber's home.)

This did happen, and the neighbors took immediate action. They called the funeral home they knew I worked for, only to be told I didn't work there! The funeral home had 4 locations, so the person who took this call apparently hadn't been trained to look at all locations, she just knew I didn't work in the same building she did. It took until early afternoon for the police department to track me down at home (my office closed at noon due to the following day being a holiday). My husband and I took care of what needed taking care of that afternoon, and were grateful to mom for having a plan.

Dealing with death is incredibly difficult, but learning about death can be fascinating. Authors like Doughty, Mary Roach, and SFA Director of the College of Mortuary Science, Katie Moncelsi, make learning about it entertaining as well as educational.

Are you curious about the answers to the above questions? You'll have to read the book!

Learn more at the College of Mortuary Science at
https://es.sfi.org/academy/course/index.php?categoryid=246
(You will need to be logged in to access the page.)

Exploring Strange New Worlds: What I Do for NASA

By Ensign Vince Ceraso
USS Challenger NCC-1676-D

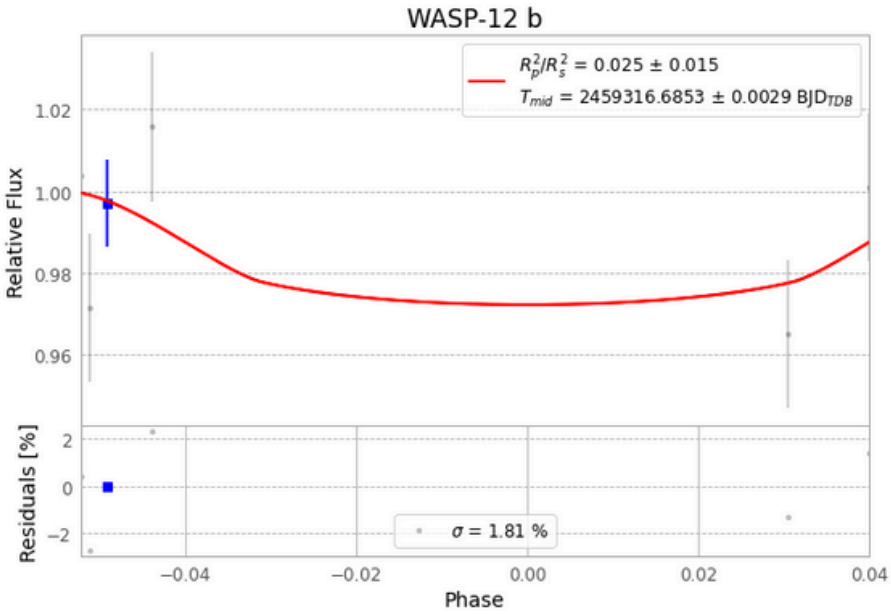
In December 2023, I took a trip to the National Air & Space Museum in Washington D.C. where I learned all about the historic accomplishments of ordinary people who have made some of the biggest strides in the history of astronomy.

One such story was of a woman who, alone, carefully studied data from a telescope that lead her, and NASA, to discover the existence and approximate location of an exoplanet—a major celestial body outside our solar system. When I got home, I started researching exoplanets.

At the time of my trip to the museum, I could hardly contain my newfound passion and interest for Star Trek; just beyond the front doors lies a screen-used original USS Enterprise, restored to its former galactic glory. Eventually, I sought out ways to be involved in furthering astronomy research in the real world.

This would lead me to becoming a volunteer with Exoplanet Watch, a "citizen science project" by NASA dedicated to studying and observing exoplanets. To briefly sum up what I do, I produce light curves using telescope images that are converted into data using a software called EXOTIC. A light curve determines the size/mass of a planet, the time it takes to pass a host star, and more. For more information, please check out **Exoplanet Watch** on NASA's website.

Each time I finish analyzing data, I submit my results to the American Association of Variable Star Observers (AAVSO), of which I am a member. My data and results then show up on NASA's website for the world to see, under my anonymous "observer code". Scholars and astronomers may then use my observer code (or real name) to credit me in their research papers.



What makes this work so important is that the data we gather and submit to NASA will still be studied decades — perhaps centuries — after we're all gone. For example, my data for WASP-12 b, classified as a "doomed planet", might aid deep space explorers in the distant future if humanity achieves faster-than-light travel. So far, there are 5,000+ confirmed exoplanets. In addition, many thousands of candidates are still awaiting confirmation by NASA.

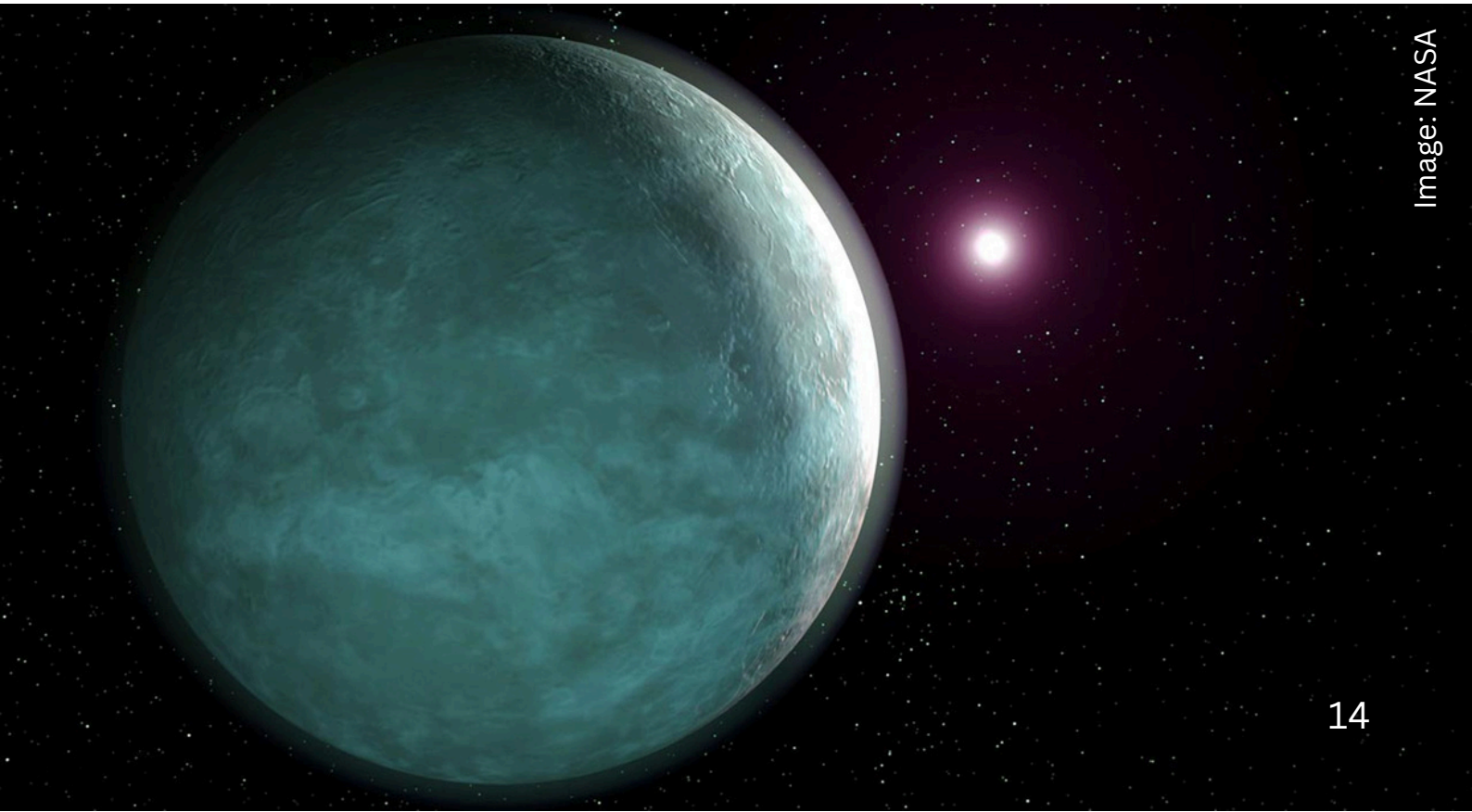


Image: NASA

That's why I invite interested Starfleet officers on board! In the spirit of exploring strange new worlds and contributing to the future of humanity in space, I highly recommend you inquire about citizen science projects such as Exoplanet Watch, and many others that are offered.

For those who want to ease into things, check out **Citizen ASAS-SN on Zooniverse**. Citizen ASAS-SN is a helpful tool that educates people on how to identify light curves. Zooniverse is a people-powered research platform that has more than a dozen other active space projects you can get involved with. All using real scientific data.

In 2017, mechanic and amateur astronomer Andrew Grey from Australia sifted through thousands of pages of data from Planet Hunters on Zooniverse, leading to his discovery of a star system with four "super-earth" planets.

You don't need to possess special qualifications, or years of experience, or innate academic knowledge, to contribute to our future. Whether you submit a new light curve, or discover a whole new planet or system, I assure you, your contributions will go a long way.

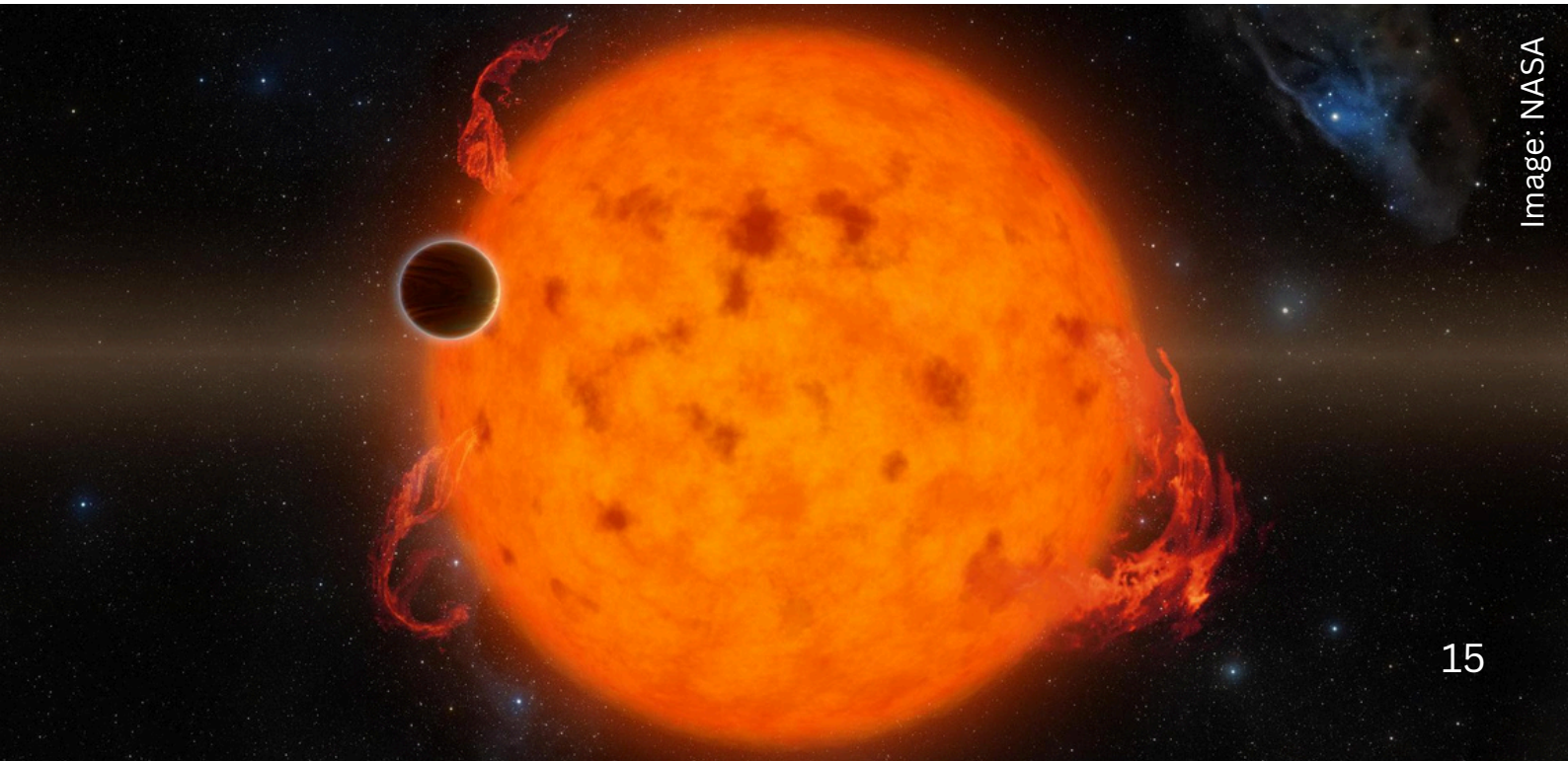


Image: NASA

Astrophotography Part 2 – Light

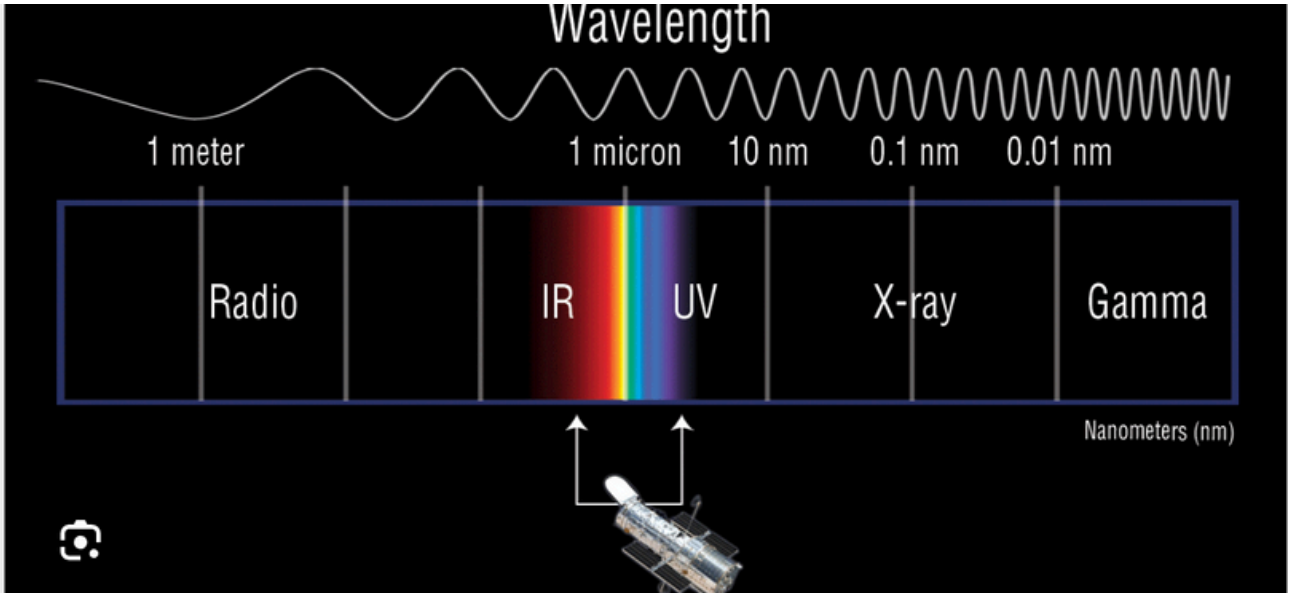
by Fleet Captain Barb Barton, R13

In the last issue of the Event Horizon, we looked at the different types of set-ups one can use to take photos of the night sky. In Part 2 we will begin to explore light – what we can see with our eyes, the light spectrum, and how that relates to astrophotography.

You may have taken some photos of the Pleiades, but when you looked at images, all you saw were stars. Where was the blue nebulosity that swirls around the Seven Sisters? There are several steps to bringing out all the beautiful colors of nebulas, the exquisite depth of galaxies, and the dust clouds of dark nebulas. Let's start with a primer on light.

The targets we select to image are hundreds to millions of light years away and are very faint. We have one goal in mind – to collect lots and lots of data to create the most beautiful and detailed image we can. To collect enough data to create an image, we need to gather enough photons (light) on our camera sensor to give us an image. The larger the aperture of the telescope, the more light it lets in. The longer the exposure time, the more data you collect. The more images you take, the more data you collect because the exposure time accumulates (you add it all together through a process known as stacking).

When you take your first image of a deep sky object, you may be very puzzled when you look at the raw image. You will likely see only stars. That is because you are shooting something in very low light levels, like just about the lowest you can get. We have to increase the light levels to make them visible to us, a process known as stretching. We will dive more into processing in upcoming articles. Let us focus now on the fascinating subject of light.

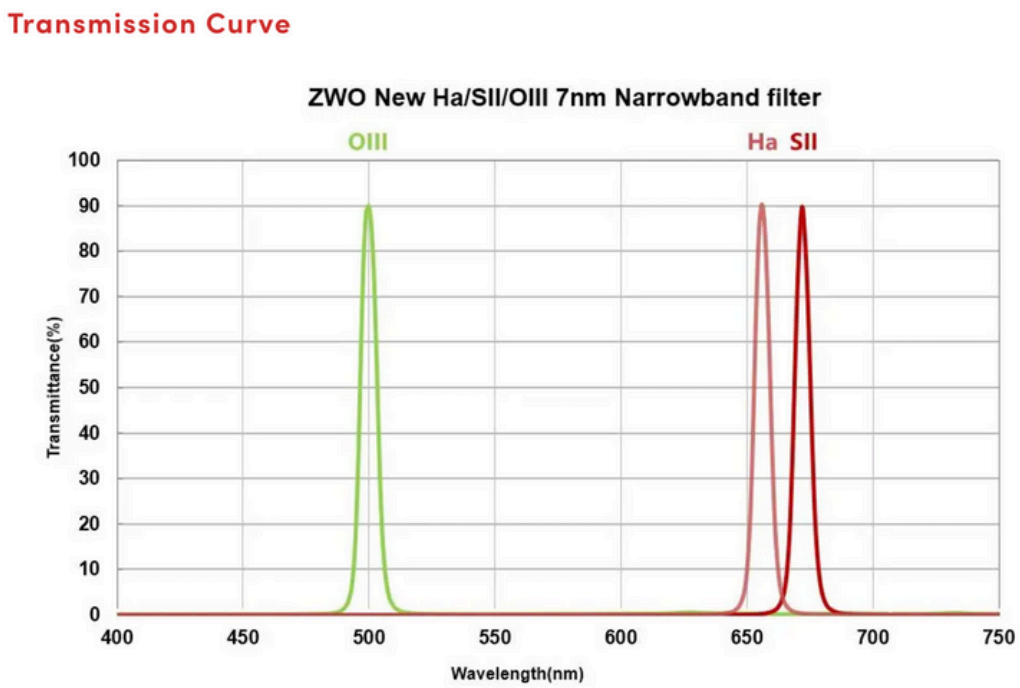


We humans can only see in the visible light spectrum, a very small portion of the electromagnetic radiation range. Radio waves, microwaves, infrared, ultraviolet x-rays, and gamma rays are also part of this range. In astrophotography, the light we see with our own eyes or from using different filters is in the visible light spectrum range.

HUMAN VISIBLE LIGHT SPECTRUM	
Color Range	Light Wavelength (nanometers or NM)
Red	625-740
Orange	590-625
Yellow	565-590
Green	520-565
Cyan	500-520
Blue	435-500

As children, most of us were taught how to make any color by using red, green, and blue, otherwise known as RGB. Most of our computer monitors, cameras, and printers use the RGB scale which breaks up the light paths into these three colors.

The same holds true for color astrophotography cameras (CMOS) and DSLRs - the analog signals are converted to digital signals in RGB. Mono astrophotography cameras, which are considerably more expensive, are 4x more precise than color cameras. With mono cameras, you add red, green, and blue filters on your telescope to block out all light except a very narrow range 3nm-12nm wide, and collect a set of images for each color, then combine them to create the same image as a color camera would, but at 4x the quality.



How do we know what filters to use for which targets? In Astrophotography Part 3, we will explore the origin of the colors in the deep sky objects, and how to use filters to bring them out in our images

SOL SPEAKER SERIES

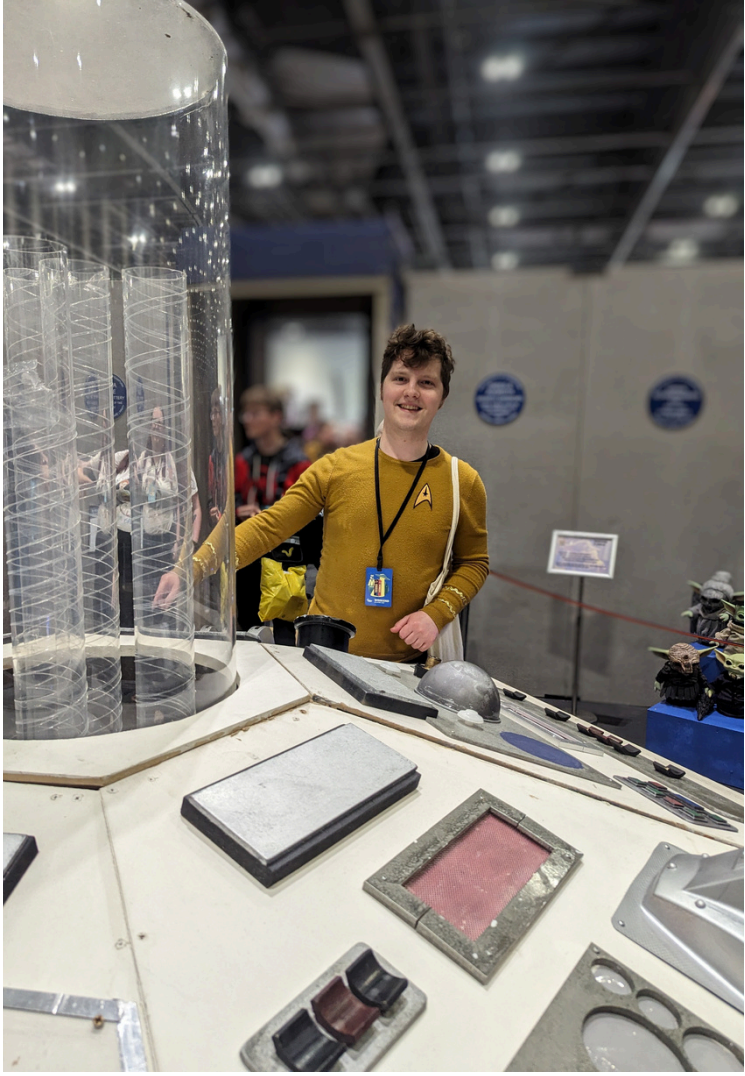
January 16th 2025, 8pm GMT/ 3pm EST
“The Universe Through Geordie's VISOR”
Dr Alfredo Carpinetti

Italian astrophysicist, science journalist, and science communicator Dr Alfredo Carpinetti has a Ph.D. in Astrophysics and an M.Sc. in Quantum Fields and Fundamental Forces from Imperial College, London, and a bachelor degree in Physics and Astrophysics from Rome’s first university La Sapienza.

February 20th 2025, 8pm GMT/ 3pm EST

“Power generation and warp drive”

Douglas Johnston



Douglas Johnston is a manufacturing technician at Oxford Instruments in the UK. He has a background in physics with renewable energy science and has carried out academic research on Galian Arsenide solar panels, which are often used on satellites. He has been a Star Trek fan ever since watching Enterprise with his dad as a child, and has fallen in love with the many shows and films since.

In his talk, "Power generation and warp drive", he will discuss Star Trek's fictional engines in relation to real life fusion and matter/antimatter physics, as well as taking a look at the Alcubierre drive - a speculative warp drive idea according to which a spacecraft could achieve apparent faster-than-light travel.

The Sol Speaker Series lectures are a monthly online event free to SFI members bringing interesting and inspiring presentations on a variety of science topics - with the opportunity to ask questions at the end of the talks. To participate or watch live, you need to get the link by registering **here**.

If you have any suggestions for topics or speakers for future talks, email **sfsci-director@sfi.org** If you miss a live event, recordings are posted on SFI’s YouTube Channel here.

March 8th 2025, 11am EST/4pm GMT
"From the Depths of the Ocean to the Edges of the Cosmic Shore"
Sarah Treadwell

Sarah is a professional Science Communicator with an interest in astrobiology. She holds a Master's of Science in Communications from the University of Wisconsin - Whitewater and is currently pursuing a PhD at the University of North Dakota in Communications.

She also is a research science affiliate in the science communication and education track with Blue Marble Space Institute of Science. Sarah served as an on-board communications officer on Expedition 399 from April to June 2023 aboard the JOIDES Resolution, an NSF funded ocean core drilling research vessel. The crew drilled and fluid sampled around the Lost City Hydrothermal Field, a unique location crucial to astrobiology research.

She received funding over the past year from NASA to continue her outreach for communicating the science of the Lost City in a partnership with NASA funded OpenSpace to design a planetarium show connecting the importance f ocean research to space research.

Sarah's talk, entitled *From the depths of the ocean to the edges of the cosmic shore,* will share her experiences of connecting ocean exploration and why it is so important to NASA missions such as Clipper. She also will share her background and why astrobiology has truly changed her life.

Introducing...

Scientific Research Teams

One of the really cool things about STARFLEET is that every chapter is its own entity, has its own focus. For some, it's a focus on live action role-play... others focus on costuming... many lean more towards the military side, going the Marine or SpecOps route. You'll see a lot of chapters hone in on starship operations, mimicking the departmental division of duties reflected in the Star Trek series and movies, such as Operations and Engineering. Two of the more popular departmental concentrations (other than the chapter prerequisite Command department) are Medical and Sciences. SFI offers lots of options for folks to get involved in those and the Sciences Auxiliary is thrilled to roll out the latest.

How often have members of your chapter gone out on a field trip to a museum or checked out a science display or put together a table at a convention showing futuristic tech? If this is something you enjoy doing but sometimes have trouble coming up with cool ideas to do, then

joining the Science Aux's Scientific Research Team (SRT) program could be the resource you're looking for.

The Scientific Research Team (SRT) is the smallest unit in the STARFLEET Sciences Auxiliary. They are chapter-based, and size can vary, consisting of a single member or dozens. The primary purpose of the SRT is to serve as an informational and communications resource for the chapter in all things science. Its secondary mission is to share this information and communication with other like-minded individuals through the STARFLEET Sciences Auxiliary via the Region Science Liaisons. Its third mission is to foster participation in science-related activities at chapter, Region, and Fleetwide levels.

To learn more and find out if this is something you and/or your crew would be interested in, head to the SRT section of the Sciences website at **https://sciences.sfi.org/scientific-research-teams/**. If this sounds like something right up your alley, then it's time to start an SRT!

Go to **https://sciences.sfi.org/srt-application-form/** to get the process going. We look forward to you joining us!

FADM Mike Malotte, SRT Coordinator
sfsci-srtcoord@sfi.org

The Basics of Batteries

By Lt Col Michael Stelzer, USS Oklahoma, R12

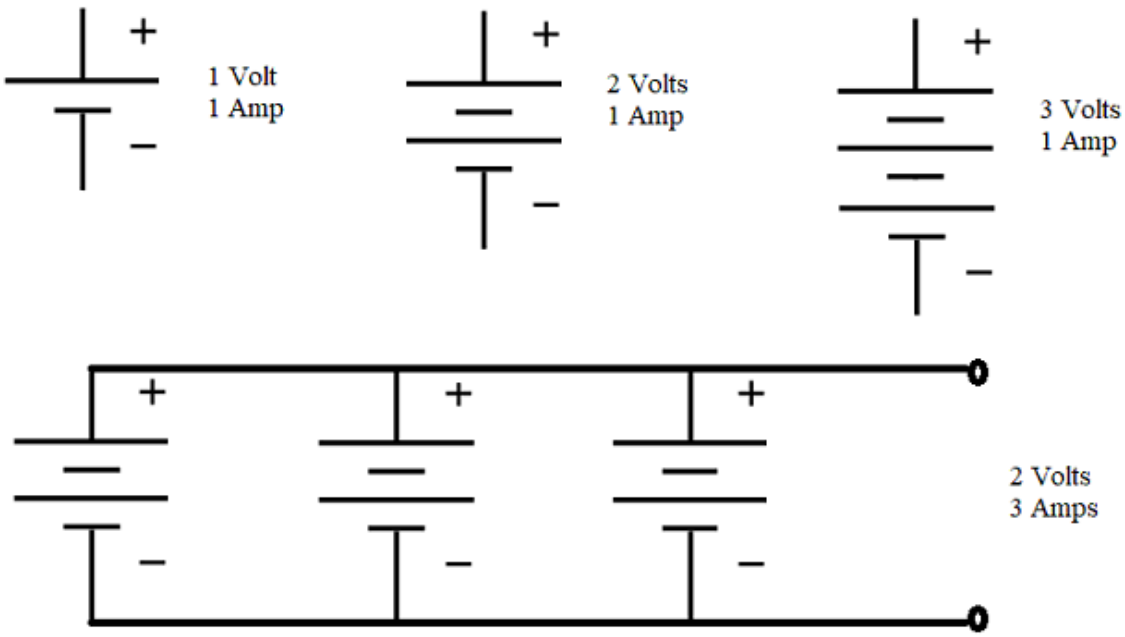
Part 2 of our series by Michael Stelzer, who holds a Ph.D. and professional engineering license in electrical engineering.

A battery is a device that converts chemical energy directly to electrical energy. The battery consists of one or more electrochemical cells with external connections for powering electrical devices. The positive terminal (+) of the battery is the cathode and its negative terminal (-) is the anode. The anode supplies the source of electrons that flow through an external electric circuit to the positive terminal.

Primary (a.k.a. single-use or "disposable") batteries are used once and discarded, as the electrode materials become irrevocably changed during discharge. However, secondary (rechargeable) batteries can be discharged and recharged multiple times.

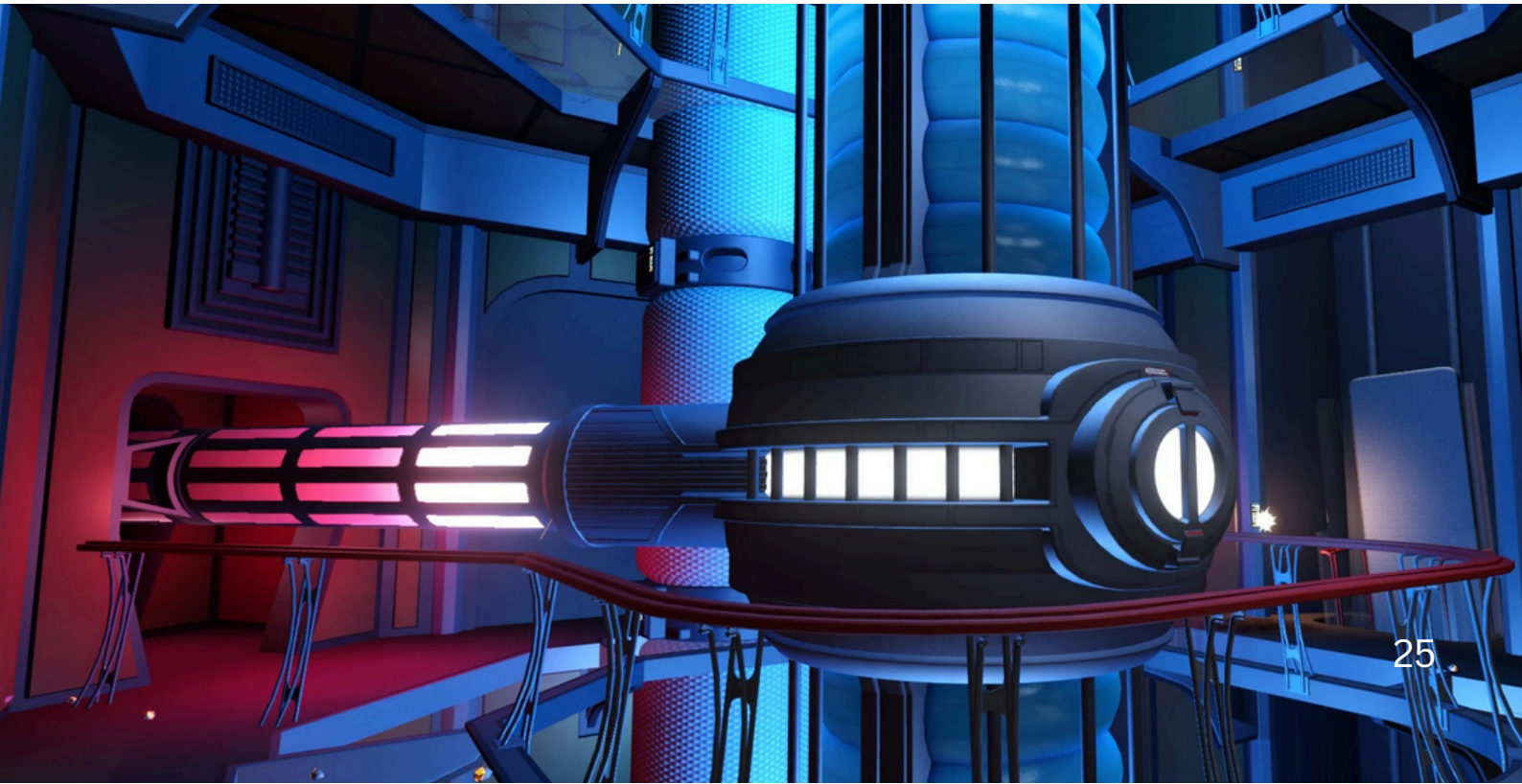
Each battery is rated for a voltage, current, and Amp/hour rate. By placing the batteries in series, (such that the anode of one battery terminal touches the cathode of the other) a greater voltage level may be obtained (see the figure below). By placing the batteries in parallel, the voltage remains constant but the current level raises. This however presents an unsafe condition because if not all the batteries are at the exact same voltage level, the battery at the lower voltage acts as a load for the current and can be damaged.

A battery's capacity (measured in Amp-hour (A·h)) is the amount of



electric charge it can deliver at the rated voltage. For example, a battery rated at 100 A·h can deliver five Amps of current over a 20-hour period at room temperature.

Batteries provide direct current (DC) and voltages, which means that under a constant load, neither the voltage nor current change as a function of time.



A Personal History of NASA

Lt. David Lyons, CScO USS Ronald E. McNair, R1

Not long after the end of World War II, the U.S. Government created a new organization called NACA, the National Advisory Committee on Aeronautics.

After his service in the U.S. Army Air Forces, my grandfather joined NACA as his post-military career. After a few years, NACA was reorganized into what we now know as NASA. Over the decades, NASA focused equally on aircraft flight designs as well as a push toward space exploration.

My grandfather, Gwynne Gould, spent several decades working for NASA at the Langley Research Center in Hampton, VA. The facility built a large outdoor structure that was used to train astronauts for their future missions to the Moon, to teach them how to land on the surface. It stands to this day and is still very much used.

Picture from NASA

A command center was constructed to control space flight operations, and it was here that the team of mathematical geniuses helped take America to space. If you have seen the movie *Hidden Figures*, you no doubt recall Dr Katherine Johnson and the ladies who did the calculations when computers did not exist.

In the late 1960s, the push to go to the Moon prompted NASA to build a new Mission Control headquarters, and that's when Flight Control moved to Houston. NASA Langley has a sister location on the eastern shore at Wallops Island which is still used to send rockets into space.

Persian Gulf (Nov. 5, 2005) – An F-14D Tomcat, assigned to the "Tomcatters" of Fighter Squadron Three One (VF-31), conducts a mission over the Persian Gulf-region. U.S. Air Force photo by Tech. Sgt. Rob Tabor (RELEASED)

My grandfather retired in 1974, after working on multiple aircraft designs, which included the Tomcat and F-15 Eagle, in the wind tunnels. He often talked about the seeming impossibility of getting a plane to break the sound barrier until they realized that the fuselage needed to be narrowed slightly and winglets added to the wing tips, which made it possible.

We Want YOU to Science!

The winter has been a busy time of year and with the new year fast approaching, much more is gearing up here in the Science Auxiliary!

The Sol Speaker Series lectures are currently in full swing, captivating audiences with their blend of enlightenment and entertainment! This remarkable series of science lectures offers attendees a unique opportunity to delve into various scientific topics presented by experts in the field. Each lecture is designed to be both informative and engaging, ensuring that participants not only learn but also enjoy the process. *(See pp18-19 for more details - Ed)*

In addition to the lectures, we have had an amazing year filled with our 6-week Science Academy Challenges. These challenges cover a wide array of scientific fields, ensuring that there is something for everyone, whether you are a budding scientist or a seasoned expert.

Expect each challenge to stimulate your mind and spark your curiosity, encouraging you to explore new concepts and ideas. By participating, you can earn a certificate upon completion, which serves as a testament to your dedication and newfound knowledge.

For more details, visit sciences.sfi.org/challenges/ and look out for posts on our Facebook pages announcing each new week of the challenge.

Our Science Certification and Specialization programs are thriving and gaining momentum! By enrolling in these programs, you can become a recognized Specialist in your STARFLEET Science career, earning prestigious titles such as Research Assistant, Scientist, Senior Scientist, and many more! (Please note that title requirements are currently under review). Excitingly, new science specializations will be introduced every month, allowing you to continually expand your expertise. Currently, there are 14 Specializations in total due to be released, with even more on the way. For more information on how to get involved, please visit: sciences.sfi.org/specialist-training/

The Science Auxiliary is always on the lookout for innovative ways to grow and exceed the expectations of its dedicated members. We encourage you to check out all the available resources and programs for participation. If you're not a member yet, we warmly invite you to join us at sciences.sfi.org/join-us/

Stay tuned for new programs and events that will be unveiled soon! We are excited for you to look forward to engaging chapter-led scientific missions, thrilling community projects, hands-on home experiments, and loads of fun activities. Moreover, our Monthly Live Science Quizzes will kick off this January! This is your chance to flaunt your knowledge and quiz-solving prowess while having a blast at our first quiz event!
We Want YOU to participate, enjoy, and engage with the wonders of science.

And I can’t sign off without whetting your scientific curiosity. Here's a glimpse of the latest, groundbreaking REAL science happening right now! Check out the links provided below to learn more and immerse yourself in the fascinating world of scientific discovery.

Universe expansion study confirms challenge to cosmic theory

New observations from the James Webb Space Telescope suggest that a new feature in the universe -- not a flaw in telescope measurements -- may be behind the decade-long mystery of why the universe is expanding faster today than it did in its infancy billions of years ago.

Astronomers find the smallest asteroids ever detected in the main belt

Astronomers have found a way to spot the smallest 'decameter' asteroids within the main asteroid belt. They used their approach to detect more than 100 new asteroids, ranging from the size of a bus to several stadiums wide, which are the smallest asteroids within the main belt detected to date.

New ocean predator discovered in the Atacama Trench

Characterized by darkness and intense pressure, the ocean's hadal zone seems uninhabitable, yet dozens of unique organisms call it home. Each species discovered there adds a crucial piece to the puzzle of how life has evolved and even thrives in one of Earth's most extreme environments. The newly named *Dulcibella camanchaca* crustacean is the first large, active predatory amphipod from these extreme depths.

How fast is your brain aging? Proteins in blood offer clues
Biomarkers could monitor aging in the brain, revealing ways to treat dementia and other age-related brain disorders.

Human body's ageing 'clock' ticks faster after heat stress
Preliminary study suggests possible link between long-term heat exposure and molecular markers of aging.

We are committed to making the Science Auxiliary the best it can be so we welcome your feedback on what you'd like to see more of. Your thoughts and suggestions are invaluable to us and we encourage you to reach out with any questions or suggestions you may have. And don't forget to say hi to our amazing mascot, Stamets, when you visit! He is always eager to meet new friends and share in the excitement of science.

Looking ahead, the Starfleet Science Auxiliary remains dedicated to expanding the frontiers of scientific knowledge, exploring the unknown, and inspiring the next generation of explorers. Together, we can push the boundaries of what is possible.

The universe is filled with wonder, the unknown and a limitless potential, mirroring the potential within each of us. With endless curiosity, profound wonder, and a thirst for knowledge, when we engage as a community committed to positive change there are no limits to the impact we can have on the world and our society. And, we get up to so much fun here!

ENS Monica Butt, R20 Science Liaison

The Adventures of Stamets

SFSCI's tardigrade mascot Stamets has had an exciting last few months! In December he made several new friends(?!), including a very excitable elf, which encouraged him to fly high on the back of an eagle!

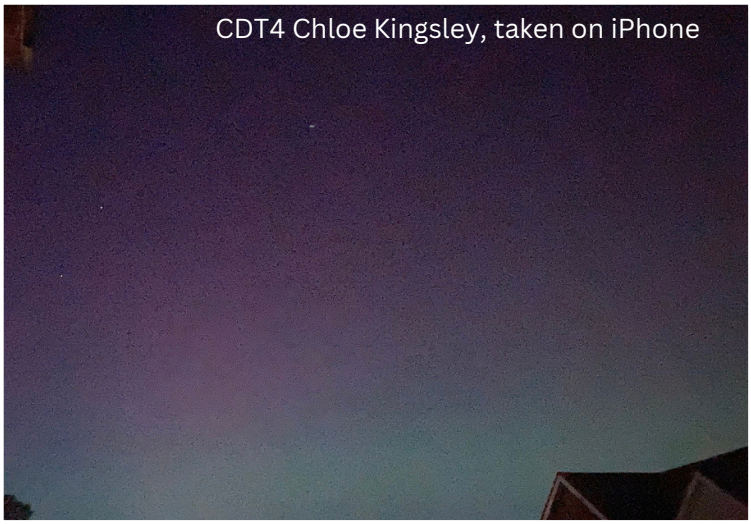
He was very excited to try out the Director's new solar telescope (don't look straight at the sun, Stamets, use the filter!), and then went on a road trip to Indiana with the Chief of Education.

Stamets is now looking forward to seeing what adventures 2025 will bring...

Seeing the Aurora

By CDT4 Chloe Kingsley, age 8, USS Mercia, R20

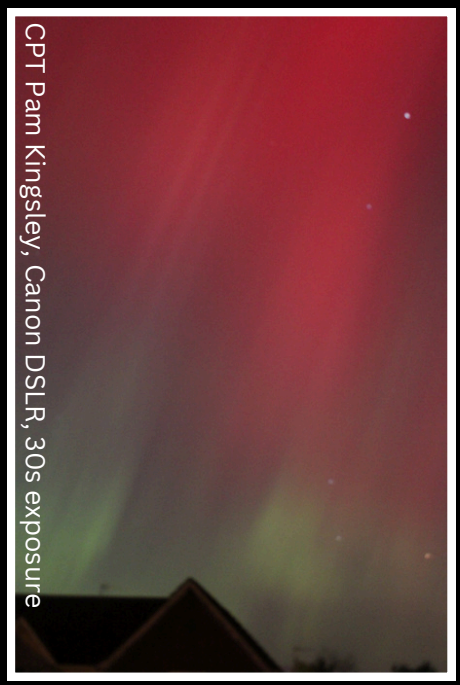
My mum went outside and she used her phone camera to take pictures of the night sky and she figured out there was an aurora.



CDT4 Chloe Kingsley, taken on iPhone

Then she told me to go outside and take pictures of it myself using her camera.

I loved it! My favourite part was seeing the aurora on the camera and zooming in to look at it closer. It looked a lot different from the sky in eye sight.



CPT Pam Kingsley, Canon DSLR, 30s exposure

We could see bluey green, red-pink and purple in the sky. The aurora is made when the waves come from the sun and it goes past the Earth into the atmosphere. It works with the magnetic field to make the colours.

I loved it. I recommend going out too to see if you can see it on your phone camera. It was amazing to take photos of the aurora.

If you would like to share any pictures, experiments or places you have visited, please send them to sfsci-eheditor@sfi.org If you are under 18 please get your parent/guardian's permission.

12TH BRIGADE DECEMBER CADET STEM PROJECT

VOLCANO ORNAMENTS

A lot of fun was had with the S'Mores Convection Oven STEM challenge so for this month, we will be looking at the science behind creating volcanos out of Christmas ornaments!

Remember, this activity is to be shared with parents/guardians for safety reasons.

MATERIALS NEEDED

- Plastic Globe Ornament with removable top
- Baking Soda
- Vinegar
- Container to catch fizz
- Turkey Baster or Eye Dropper
- Funnel for filling ornament
- Optional: Glitter, Sequins, Food Coloring
- Plastic drop cloth or newspaper to help with mess control

How does Baking Soda and Vinegar Reaction work?

An acid-base reaction occurs when baking soda (sodium bicarbonate) and vinegar (acetic acid) combine. The vinegar is an acid, and the baking soda is a base.

When they are mixed, the acid and base react, producing carbon dioxide gas. The release of carbon dioxide gas creates fizzing and bubbling, creating the eruption.

Directions

1. It is highly recommended to either use a party serving tray or egg carton to hold the ornament(s) in place for this experiment.
2. Place 2 tablespoons of baking soda in each ornament, adding glitter and/or sequins if you wish. The funnel makes this part really easier.
3. Mix a big container of vinegar with food coloring.
4. Protect the area you are doing this experiment on by placing plastic or newspaper down, this will also help with clean up.
5. Using a turkey baster, transfer some vinegar to the ornaments and watch the chemical reaction!
6. Parents, be prepared for the kids to want to do this over and over as the fizzy eruptions are a lot of fun. This is useful for practicing fine motor skills in the younger cadets while going over the chemical reaction showcased by the vinegar and baking soda.

Atmosphere Wordsearch

Can you find all the words relating to the atmosphere in the grid?

E	W	J	V	O	Y	V	E	T	E	H	G	R	E	E	R	C	S	T	E
L	G	W	P	Z	Y	F	Q	R	D	N	I	R	I	Y	X	H	S	R	J
W	O	B	N	I	A	R	K	F	E	A	E	N	O	K	X	T	U	V	Z
O	J	Q	G	A	S	E	S	G	R	H	Y	Z	V	Z	R	T	Z	H	N
P	S	A	N	I	B	T	O	W	P	E	P	T	V	A	S	G	M	V	C
Y	G	B	T	S	Y	R	O	S	E	S	C	S	T	I	C	N	U	K	K
G	R	R	M	E	T	X	O	A	Z	A	X	O	O	N	F	G	F	N	E
P	B	O	N	I	Y	M	L	D	R	O	S	M	L	P	R	N	O	S	L
M	G	D	N	G	T	C	R	B	J	P	I	I	X	A	O	I	D	H	A
F	E	H	E	A	T	U	O	D	H	Z	R	U	V	G	T	R	D	Y	E
K	R	N	Z	I	O	N	C	E	U	H	T	I	R	U	D	I	T	D	R
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K	H	L	U	I	A	E	C	B	R	Y	L	L	Y	U	O	N	A	O	H
A	P	G	N	I	N	T	H	G	I	L	O	C	D	V	X	O	D	G	P
U	S	I	X	W	R	E	Z	W	C	P	B	I	O	L	I	L	U	E	S
R	O	Y	C	W	O	Z	O	G	A	L	E	R	Z	T	D	C	S	N	O
O	N	H	F	F	T	L	L	D	N	V	S	D	O	W	E	Y	T	C	X
R	O	Q	W	X	F	E	B	R	E	I	Y	K	N	V	F	C	G	M	E
A	I	K	J	A	E	R	E	H	P	S	O	S	E	M	O	G	B	B	H
H	N	O	I	T	A	I	D	A	R	W	L	J	I	G	G	W	Q	Q	

AIR
AURORA
CYCLONE
EXOSPHERE
GASES
HYDROGEN
MESOSPHERE
OXYGEN
RADIATION
STRATOSPHERE

ARGON
CARBON
DIOXIDE
FOG
GRAVITY
IONOSPHERE
MOISTURE
OZONE
RAINBOW
TORNADO

ATMOSPHERE
CLOUD
DUST
GALE
HURRICANE
LIGHTNING
NITROGEN
POLLUTION
SMOG
TROPOSPHERE

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