

TEXAS

AVIATION STEM MAGAZINE

Girls In Aviation Day
September 21st

Texas Giving Day

Journey Through Pandora's Cluster

Raptor Row

JEAN M. WALLACE, MAED

Cover image of Amelia Earhart

September 2024
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Our mission: Encourage curiosity, investigation, inspiration, creativity, and innovation; the foundations of every career passion.

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Journey Through Pandora's Cluster

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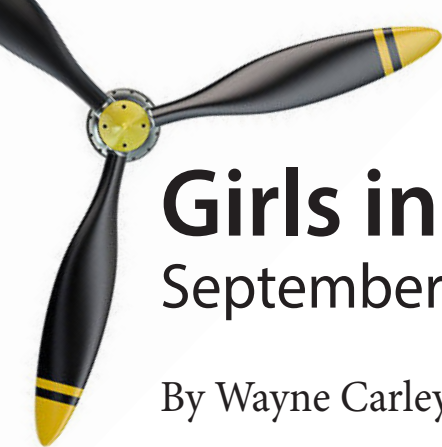
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Girls in Aviation Day

September 21, 2024

By Wayne Carley

*G*irls in Aviation Day 2024 is a global celebration of girls and women of every age. Museums, airports and supporting organizations across Texas, the U.S. and the world are planning their unique and thrilling events to honor the past achievements of women in aviation and spark new excitement in girls who are new to aviation and the hundreds of career pathways in aviation and aerospace.

Many of these events will offer participants the chance to meet female pilots, engineers, air traffic controllers, and other professionals in the field who will be eager to answer any questions and perhaps even mentor you.

Simply do a [Google search](#) on: “Girls in Aviation Day 2024” to search for the nearest event in your region. It’s not just a one day focus, but all month and beyond if you’re interested. In the meantime, let’s look back on ten of avi-ations most revered and accomplished women in aviation history.

Being a pilot was first seen as a male occupation, however, these amazing female aviators proved that wrong.

10 – **Betty Skelton Erde** – The First Lady of Firsts



Known to many as ‘the first lady of firsts’, or perhaps as ‘the fastest woman on earth’, Betty’s credentials are more than impressive.

“First solo flight at just
12 years of age”

A three-time national aerobics champion, Betty set multiple speed records on both airplanes and automobiles. The multi-talented risk taker proved from early on in her life that nothing would hold her back from flying, taking on her first solo flight at just 12 years of age despite laws forbidding it. She debuted the inverted ribbon cut before going on to break the light-weight plane altitude record – twice – and set an unofficial women’s air speed record of 421 mph before her engine exploded. She landed safely and was undeterred, living a long life before passing away in 2011 at age 85.

J - **Jacqueline Auriol** – French Speedster

Jacqueline Auriol’s autobiography ‘I Live to Fly’, is all about her exciting life in the aviation business. The daughter of a prosperous shipbuilder, she married Paul Auriol whose father would go on to become the President of France.

Not long after obtaining her pilot license in 1948, she experienced a



tragic accident as a passenger in a plane crash. She would spend the next three years in hospitals, but far from being emotionally scarred by the incident, she spent this time studying to obtain an even more advanced pilot certification. Over the next several decades, she joined a handful of women to break the sound barrier and chalked up another five world speed records.

S - **Eileen Collins** – First Female Space Pilot

From a young age it was obvious that Eileen was a gifted individual. Earning a reputation for being an incredibly



7- **Elinor Smith** – Youngest Pilot on Earth

With an actor for a father and a singer for a mother, a sense of ambition was instilled in Elinor Smith from a young age. It didn't take long for Elinor to discover her own passion in life, falling in love with aviation after her first flight at age six.

talented mathematician, she became a flight instructor before aiming for the stars.

In 1995 she achieved a dream by piloting the Space Shuttle of STS-63. In 1999 Eileen made history again as she became the first woman commander of a shuttle mission, a feat she repeated six years later. A true woman pioneer in the aviation industry, the New Yorker was inducted to the Nation Women's Hall of Fame forever cementing her legacy.



At the age of ten she was taking regular flying lessons on her way to become the youngest U.S. government licensed pilot in the world.

During her flying years, Elinor broke Light-plane record reaching an altitude of 11,889 feet. She would also go on to break speed and endurance records, and is still remembered as being the only person to fly underneath all four of New York's East River bridges – something she did whimsically on a dare.

6 - **Sophie Blanchard** – First Woman to Fly Solo in a Hot Air Balloon

Sophie Blanchard (Sophie Armant), first got a taste of fame when she married respected inventor Jean-Pierre Blanchard. Jean-Pierre was an innovator in the balloon industry, and it wasn't long before his new wife began to share his interests.

It was Sophie's gender that led to her first hot air balloon journey as it was believed that having a female host would increase interest in a money-raising event. Sadly, her husband-Jean-Pierre suffered a heart attack mid-flight and Sophie decided to continue his work. She was later declared 'Aeronaut of the Official Festivals' by Napoleon.



5 - **Amy Johnson** – Long-Distance Record Setter

Amy Johnson truly loved aviation and set various records across a multitude of journeys during her time as a pilot. Born in Kingston upon Hull, England, she would sometimes fly with husband Jim Mollison, yet she broke several records for solo flights.

Traveling from one side of the world to the other, Amy was the first woman to make the journey from London, England

to Australia and set notable speed records via Japan and South Africa's Cape Town. A brave and adventurous woman, her life controversially ended on a flight during World War II with many speculating that she was in the middle of a secret mission. This suggests that there may have been female pilots during World War II.

4 - **Bessie Coleman** – African American Pioneer

Born in Texas in the late 19th century, it is very clear why Bessie Coleman's groundbreaking achievement is so impressive. Widespread bigotry was still a massive problem when Bessie managed



to become the first African American woman to secure an International Pilot's License, a huge step for both women in aviation and African Americans in general. After failing to gain entry to flight schools, Bessie mastered the French language and traveled to Paris to learn how to fly.

On June 15th, 1921 she earned her license and returned to America where she became a popular figure, attending air shows regularly and fighting for equality.

3 - **Harriet Quimby** – First Female U.S. Pilot

At a time when there wasn't a single female licensed pilot in the whole of the US, Harriet Quimby opened the door to future generations of women when she earned hers in August 1911. Harriet became the first American woman to fly solo across the English Channel, an achievement somewhat tarnished by the unfortunate news that the RMS Titanic had sunk just a day earlier.

Quimby became the first woman to fly across the English Channel merely using a small hand compass for navigation. Although Quimby lived only to the age of 37, she had a major influence upon the role of women in aviation by opening the door to women.

In September 1912, she wrote an article that was published by Good House-keeping that extolled the value of aviation as the ideal sport for women.

“There is no sport that affords the same excitement and enjoyment, and exacts in return so little muscular strength,” she wrote. “It is easier than walking, driving or automobiling; easier than golf or tennis... Flying is a fine, dignified sport for women... and there is no reason to be afraid so long as one is careful.”

2 - **Jacqueline Cochran** – WASP (Women’s Airforce Service Pilots) Advocate

Jacqueline Cochran earning her pilots license in 1932. Jacqueline demonstrated her entrepreneurial spirit by using this to promote her own line of cosmetics - ‘Wings’, but she soon went on to make a much more significant impact on society.

Lobbying with Eleanor Roosevelt, Jacqueline convinced General Henry Harley “Hap” Arnold to permit women to fly for military purposes. This led to the development of the Women’s Airforce Service Pilots Program or WASP, earning her both the Distinguished Service Medal and Distinguished Flying Cross.

One of her most memorable achievements came on this day in 1953 when



she became the first woman to break the sound barrier. On 18 May, 1953, Cochran took off from Rogers Dry Lake, California, accompanied by Air Force Captain Charles “Chuck” Yeager, who six years earlier became the first person to break the sound barrier.

In an F-86 Sabre plane, borrowed from the Royal Canadian Air Force, Cochran surpassed Mach 1. Over the course of her flight, she averaged speeds of 652,337mph (1049,834637kph).

To date, she holds more speed and distance record than any pilot – male or

or female, dead or alive (this even after not flying for her first 30 years).

Cochran's achievements include being the first woman to reach Mach 2, the first woman to take off from an aircraft carrier, the first woman to make a blind instrument landing, and the first woman to be inducted into the Aviation Hall of Fame.

✍ - **Amelia Earhart** – First Woman Pilot to Fly Solo Across the Atlantic

There have been and will continue to be a host of amazing women in aviation, perhaps the most familiar to most is Amelia Earhart. She is widely known for being the first woman to fly solo across the Atlantic Ocean non-stop, and also across North America, but at the time she was also known for being the first female passenger across the Atlantic Ocean – a feat achieved at a young age that no doubt spurred her on.

When 10-year-old Amelia Mary Earhart saw her first plane at a state fair, she was not impressed. "It was a thing of rusty wire and wood and looked not at all interesting," she dismissively said. It wasn't until she attended a stunt-flying exhibition, almost a decade later, that she became seriously interested in aviation. A pilot spotted Earhart and her friend, who were watching from an

isolated clearing, and dove at them.

"I am sure he said to himself, 'Watch me make them scamper,'" she exclaimed. Earhart, who felt a mixture of fear and pleasure, stood her ground. As the plane swooped by, something inside her awakened.

"I did not understand it at the time," she admitted, "but I believe that little red airplane said something to me as it swished by." On December 28, 1920, pilot Frank Hawks gave her a ride that would forever change her life. "By the time I had got two or three hundred feet off the ground, I knew I had to fly."

Although Earhart's convictions were strong, challenging, prejudicial, and financial obstacles awaited her, but the former tomboy was no stranger to disapproval or doubt. Defying conventional feminine behavior, a young Earhart climbed trees, "belly slammed" her sled to start it downhill, and hunted rats with a .22 rifle.

She also kept a scrapbook of newspaper clippings about successful women in predominantly male-oriented fields, including film direction and production, law, advertising, management, and mechanical engineering.





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Texas Giving Day

North Texas Giving Day is an 18-hour online giving event designed to empower every person to give back to their community by supporting local nonprofits and causes they care about in one easy-to-use platform. Whether you're a business, a nonprofit, or an individual or family, there's a way for you to make a difference. Since its inception in 2009, North Texas Giving Day has transformed from an idea to help local people give wisely, to a movement that has ignited a broad culture of community-wide giving.

The Morris-Oestricher Archives at The Fort Worth Aviation Museum plays a crucial role in educating future aviation professionals by preserving and showcasing artifacts and documents. In the past two and a half years, our efforts have been greatly supported by renting climate-controlled space and hiring a professional archivist. We have successfully completed the initial organization of our materials, with all boxes sorted by type and section.

The archive contains over 712 boxes of

materials, over 5900 cataloged archival items, over 190 framed art pieces, over 300 posters and over 470 Unframed Prints. We are now making significant progress in the final stages, which include cataloging all items into a digital database.

Funding from our previous North Texas Giving Day has supported the work we've accomplished so far, but additional financial assistance is needed to share Fort Worth's aviation history with a wider audience. Each week, we receive new artifacts and documents that stretch our archival resources.

These items, like the globe awarded to Oscar Smith for his 5,000 hours flying the B-36, tell crucial stories. His son wanted to ensure this history was preserved rather than lost. Now we have the opportunity to go beyond simply preserving and share those stories with audiences beyond our doors, and we need your support to continue this vital work.

The Morris-Oestricher Archives has already preserved the collections of several Local people who contributed to the history of Aviation. With your help we can share these stories with those who cannot necessarily visit the museum.

Phil Oestricher was a test pilot for General Dynamics in the F-16 program. Before the F-16, he was an engineer on the B-36, flew the F-4D Skyray in the Marine Corps, and flew the F-111 as a test pilot. His collection documents his test pilot career at General Dynamics and in the Marine Corps. Oestricher flew the first flights of the prototype YF-16. The collection includes both his flight suit that he wore on these flights and the test reports he wrote at the time.

This mix of documents and artifacts allow both visitors and researchers unique access to learn Fort Worth aviation history. This access was made possible by the donation of these materials by the Oestricher family, and the organization work done by our archives staff.

Robert R Goodrich was born in Oklahoma but spent the majority of his life in Fort Worth. During World War II he flew SB2-C Helldiver dive bombers in the US Navy and served in the Pacific Theater.



As a pilot he was part of the force that sunk the Imperial Japanese Battle-ship Yamato. For this action Goodrich earned the Navy cross, which George and Kathryn Denkowski donated to us. After the war, he returned to Fort Worth where he led a lengthy career as a lawyer. The medal and other items from Robert Goodrich allow us to tell the story of Robert and all of the other men and women in Fort Worth who took up the call to fly in service of our country.



Robert L Brown was born in Hoisington, Kansas, but spent much of his life in the Dallas-Fort Worth area and worked at Vought aircraft as a tool worker. He learned to make wind tunnel models at Vought and became a model maker. Brown pioneered the model making technique of foam filled models. He went on to build many models for LTV, Bell, and Aerospatiale. His daughter Margaret Brown Coates donated a collection of his models, pictures, and molds. Included in the collection was a model of an Aerospatiale helicopter. The archive's preservation of this collection will ensure that the artistic component of the aerospace industry is remembered.

With your support we can undertake actions to further preserve the collections we have and facilitate the public's access to our collections. Your support this year could allow us to purchase scanners to digitize some of our most requested collections and provide more remote reference.

We also could purchase dehumidifiers to more carefully control the environmental conditions our materials reside in. This action would extend the life of our materials enhancing our ability to continue preserving the stories of the aviation pioneers of Fort Worth for decades to come. Thank you in advance and visit us soon.

To understand STEM...

...you must DEFINE STEM, but you cannot define an acronym using the words it stands for; you must define the words the acronym represents.

Universities and organizations around the world continue to debate what a STEM career is. There is no doubt that “every career” uses STEM skills and this observation remains the focus of STEM Magazine.

Science: “The systematic accumulation of knowledge” (all subjects and careers fields)

Technology: “The practical application of science” (all subjects and careers)

Engineering: “The engineering method: a step by step process of solving problems and making decisions” (every subject and career)

Math: “The science of numbers and their operations, interrelations, combinations, generalizations, and abstractions” (every career will use some form[s])

For a moment, set aside any preconceived notions of what you think a STEM career is and use the above dictionary definitions to determine the skills used in any career field you choose.

These definitions are the “real” meaning of STEM and STEM careers.

A Journey Through Pandora's Cluster

How a Multi-disciplinary Team Combined Art and Science to Transport Visitors into Deep Space

By Bryant Maxwell, Katrin Ludwig and Jancy McPhee



Imagine this...

What if you could travel on a futuristic spacecraft to the farthest reaches of the universe? You're strapped in tightly, the countdown begins, and the vibrations and hum of the engines shake your body. Before you know it, you're launched into the vastness of space. Your destination?

The awe-inspiring Pandora's Cluster, a stellar marvel 4 billion light-years away. To put that in perspective, 4 billion light-years is roughly 23.5 trillion miles! It's like looking 4 billion years into the past, long before our solar system even formed. While we can't travel such distances, this is your chance to imagine the ultimate space adventure.

Reality Check: The Power of Space Telescopes

Now, back to reality! The James Webb Space Telescope (JWST) was launched on the Ariane 5 rocket and is stationed about a million miles from Earth. This amazing telescope collects data from deep space, giving us detailed images and information about places we can't yet reach. JWST acts like the ultimate space photographer, equipped with a giant, golden eye capable of peering deep into space and time, capturing the universe's secrets in incredible detail. It's like a time machine that lets us see the light from the earliest galaxies, helping scientists understand the universe's birth.

The JWST is designed to see in the infrared spectrum, allowing it to peer through cosmic dust and capture images of ancient galaxies. Its enormous, segmented mirror, over 21 feet across, collects faint light from the distant universe.

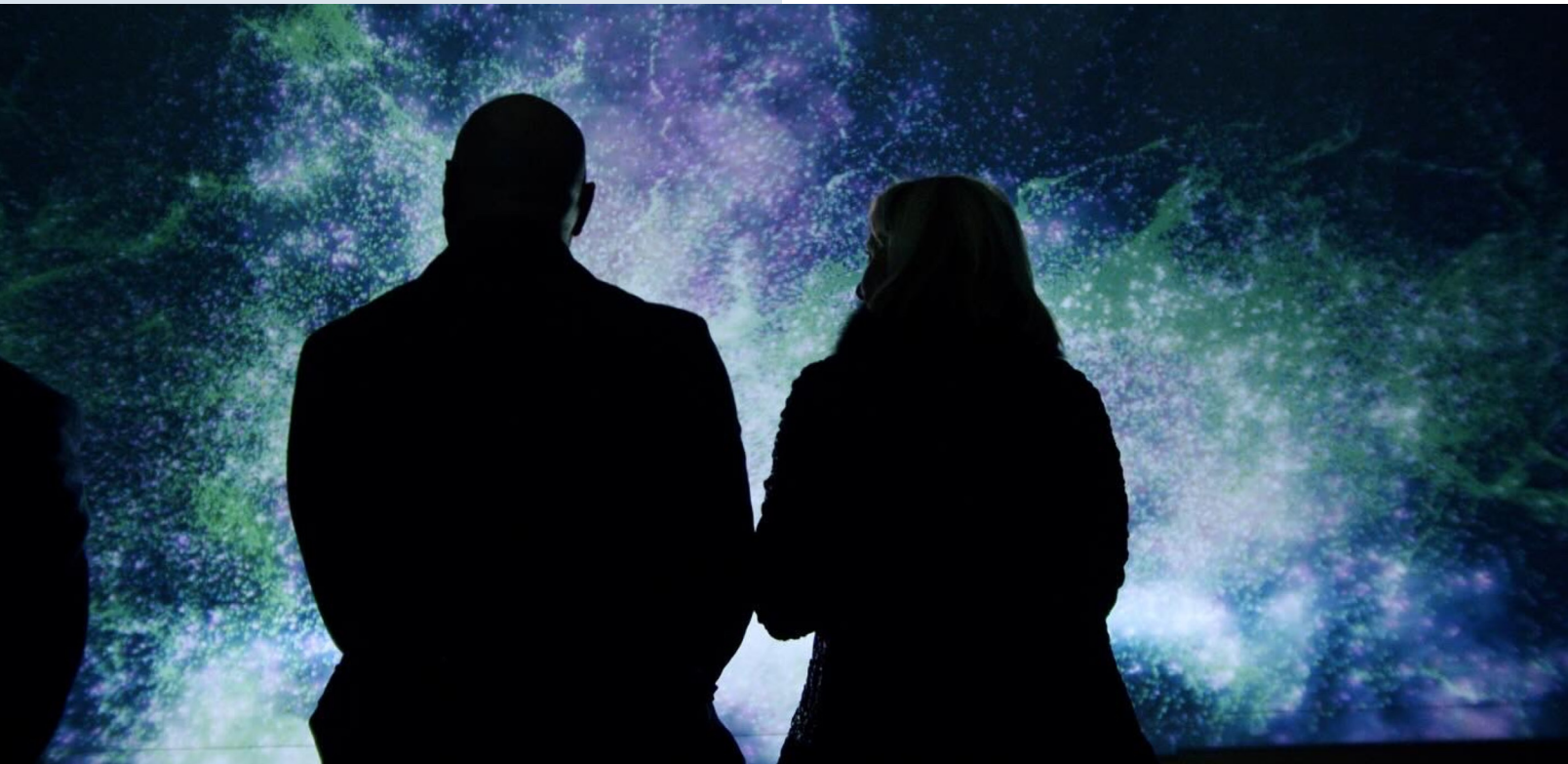
The Hubble Space Telescope, launched in 1990, sees primarily in visible and ultraviolet light and has provided some of the most detailed images of space, like the famous Pillars of Creation. The Chandra X-ray Observatory focuses on X-rays, revealing high-energy phenomena such as black holes and supernovae. Each telescope offers a different perspective, working together to give us a complete picture of the universe.



James Webb Space Telescope (Getty Images)

A Multisensory Experience: Pandora's Cluster Installation

What exactly is Pandora's Cluster, or Abell 2744? Imagine a galactic traffic jam, where multiple galaxy clusters collide in a spectacular deep space pile-up. This cluster is one of the most complex and chaotic regions of space, revealing the universe's dramatic beauty and turbulent history.



SciArt Exchange's Sensing Deep Space: Pandora's Cluster multi-sensory installation, which had a limited run at the Eisemann Center for Performing Arts in January 2024, allowed audiences to experience this distant galaxy cluster without leaving Earth. Visitors stepped inside and were surrounded by towering screens displaying stunning projections of the universe. Future iterations of this immersive experience are already

being discussed, promising more awe-inspiring journeys through space.

These visuals weren't just pretty pictures—they're derived from real data collected by the James Webb, Hubble, and Chandra space telescopes. You're not just observing the universe; you're interacting with it. This immersive installation was a fusion of science and art, thanks to artist Ben Heim.

Using generative art—art created through algorithms and data—Heim transforms complex astronomical information into a symphony of sights and sounds. Using a touchscreen, you could layer different types of data—infrared, visible light, X-rays—and create your own unique visual and auditory experience. It's like painting with stardust and composing music with the very waves of light that travel across space.

The Science Behind the Art

Ben Heim carefully encoded telescope data into visual and musical artwork to preserve the scientific data's essence. He used particle simulations to create three-dimensional visual representations, assigning different colors and movements to various data sources.

Ben Heim



For instance, infrared data from JWST was given a low frequency and warm hues, reflecting its long wavelengths. Visible light data from Hubble added vibrant colors, while X-ray data from Chandra brought high-energy visuals

with sharp, intense features. Heim's approach ensured that the art was not just visually stunning but also scientifically meaningful, allowing viewers to grasp the scale and complexity of the universe.

The installation's auditory component was equally thoughtful. Heim translated the light's wavelength frequencies into sound frequencies, creating a soundscape that mirrored the visual data. Infrared light, with its low frequency, was assigned deep, resonant tones, while higher-frequency visible light was matched with brighter, more piercing sounds. This careful encoding helped preserve the scientific data's meaning, making the experience both informative and emotionally impactful.

The Value of Interdisciplinary Collaboration

This installation was more than just sounds and visuals. It's a collaboration between Heim and top scientists, including Dr. Carol Christian from the Space Telescope Science Institute, and from the University of Texas at Dallas Dr. Roger Malina, Dr. Lindsay King and their students. Heim's art, influenced by the intricate data from JWST, bridges the gap between scientific discovery and human creativity.

By combining the expertise of scientists, artists, and technologists, the

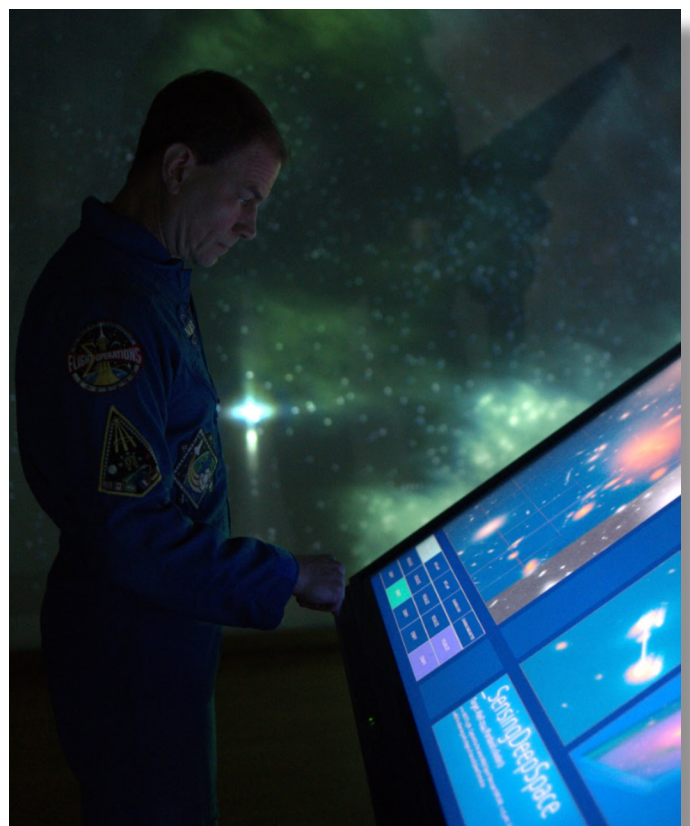


project brought together the precision of science and the creativity of art. This synergy not only made the installation visually stunning but also educationally enriching, helping visitors understand complex astronomical concepts through an immersive experience.

Scientists study regions like Pandora's Cluster to understand how galaxies form and evolve. This cluster is a chaotic collision of multiple galaxy clusters, providing insights into dark matter, the distribution of galaxies, and the dynamics of such massive structures. By studying these regions, scientists hope to uncover the secrets of the universe's past, present, and future, helping us understand our place in the universe and potentially unlocking new technologies and scientific advancements.

Through this blend of art and science,

“Sensing Deep Space: Pandora's Cluster” ignites a passion for discovery that transcends traditional learning. So, whether you're on an imaginary rocket to the stars or stepping into an installation that brings those stars to life, remember this: space is cool. Go out, share the wonder, and tell the world!



SciArt Exchange fosters the fusion of space, STEM and the arts, inspiring future generations to engage in innovative and meaningful ways. Our goal is to ignite curiosity, creativity, and a passion for discovery through projects like this one, bridging the gap between scientific inquiry and artistic expression. This installation demonstrates the value of interdisciplinary collaboration and the powerful impact of integrating STEM with the arts, providing a platform for creative exploration and learning. Learn more about SciArt Exchange at www.sciartex.net.

Sensing Deep Space: Pandora's Cluster was conceived and produced by SciArt Exchange. The installation was funded by Eisemann Edge Initiative at Communities Foundation of Texas, City of Richardson Cultural Arts Commission, Texas Commission on the Arts, and SciArt Exchange.

Bank of America Hall at the Eisemann Center (Ben Heim)



Embracing a New Framework:

Integrating Rules and Precepts in Modern Education

By Shelly A Munoz
STEM CEO and Consultant

In the rapidly evolving landscape of modern education, the balance between maintaining order and fostering empathy has never been more critical. As artificial intelligence (AI) and technological advancements reshape our world, the need to cultivate empathetic, responsible, and ethical individuals

“Raise your hand to speak,” and “Complete your homework on time” are essential for maintaining discipline and preventing chaos. They offer students a clear understanding of acceptable behavior and the consequences of not adhering to these guidelines.

“Education is not the learning of facts, but the training of the mind to think.”

- Albert Einstein

becomes paramount. One effective approach to achieving this balance is by integrating traditional rules with guiding precepts, creating a holistic framework that not only enforces discipline but also encourages deeper understanding and personal growth.

The Importance of Rules

Rules are the backbone of any educational environment. They provide structure, set clear expectations, and ensure a safe and orderly space where learning can flourish. Traditional rules such as “No running in the hallways,”

However, while rules are necessary for order, they often lack the depth needed to foster intrinsic motivation and ethical behavior. This is where precepts come into play.

The Power of Precepts

Precepts are broad principles or values that guide behavior beyond the confines of specific rules. They emphasize the “why” behind actions, encouraging students to internalize positive values and think critically about their behavior. For example, a precept like “Move safely and respectfully” complements

the rule “No running in the hallways” by promoting an understanding of the importance of safety and respect. Explaining the “why” behind rules helps students grasp the underlying principles and encourages them to adopt these behaviors willingly rather than out of fear of punishment. Understanding the reasons for rules fosters a sense of ownership and responsibility, leading to more meaningful and lasting behavioral changes.

Bridging the Gap: Rules and Precepts in Action

Here are some examples of how traditional rules can be paired with precepts to create a balanced educational framework:

Traditional Rules

No running in the hallways.
Raise your hand to speak.
Complete your homework on time.
No bullying or teasing.
Keep your hands to yourself.
Follow the dress code.

Be on time for class.
No cheating on tests.
Clean up after yourself.
Listen to the teacher.



Precepts

Move safely and respectfully.
Respect others' opportunity to be heard.
Take responsibility for your learning.
Treat others with kindness and empathy.
Respect personal space and boundaries.
Dress in a way that shows respect for yourself and others.
Value your time and the time of others.
Uphold honesty and integrity in your work.
Take pride in your environment.
Show respect and attentiveness.

The Importance of Explaining the “Why”

Explaining the “why” behind rules and precepts is crucial for helping students understand the significance of their actions. When students comprehend the rationale behind a rule, they are more likely to follow it willingly and internalize the associated values. This understanding fosters intrinsic motivation, encouraging students to behave ethically even when not being directly supervised.

For instance, explaining that “Move safely and respectfully” helps prevent accidents and shows consideration for others can make the rule “No running in the hallways” more meaningful. Similarly, understanding that “Take responsibility for your learning” pro-

motes personal growth can enhance the importance of “Complete your homework on time.”

By providing the “why,” educators can help students see the bigger picture, promoting a sense of accountability and personal growth. This approach nurtures critical thinking and empowers students to make informed, ethical decisions throughout their lives.

As Albert Einstein wisely stated, “Education is not the learning of facts, but the training of the mind to think.” This quote emphasizes the importance of fostering critical thinking through precepts. When students understand the reasons behind their actions, they develop the ability to think critically and make better decisions, a crucial skill in today’s complex world.



Addressing Post-Pandemic Behavioral Challenges

Since the pandemic, there has been a significant increase in complaints from teachers and schools regarding student behavior. The disruptions caused by the pandemic have affected students' social and emotional development, making it more challenging to maintain discipline and order in classrooms. Traditional rules alone may not be sufficient to address these complex behavioral issues.

Integrating precepts into the educational framework can provide a more comprehensive approach to managing behavior. Precepts encourage students to understand and internalize positive values, promoting empathy, responsibility, and ethical thinking. This deeper understanding can help mitigate behavioral issues by fostering a more respectful and considerate school environment.

Fostering Empathy in the Age of AI

In a world increasingly influenced by AI, the role of empathy in education cannot be overstated. AI can handle many tasks, but understanding and responding to human emotions is a uniquely human capability. By emphasizing precepts that promote empathy, we help students develop the emotional

intelligence necessary to navigate a technologically advanced world with compassion and ethical awareness.

For instance, the precept “Treat others with kindness and empathy” goes beyond the rule “No bullying or teasing.” It encourages students to understand the impact of their actions on others and to act with compassion. Similarly, “Respect others’ opportunity to be heard” complements “Raise your hand to speak,” promoting active listening and consideration for others’ perspectives.

Precepts and a STEM-Driven Future

Integrating precepts into the educational framework is particularly beneficial in preparing students for a STEM-driven 21st-century future. STEM education emphasizes critical thinking, problem-solving, creativity, and innovation—all skills that are enhanced by understanding and internalizing precepts.

- **Encouraging Innovation:** Precepts such as “Take responsibility for your learning” and “Uphold honesty and integrity in your work” inspire students to take initiative and pursue innovative solutions. By fostering an environment where ethical considerations are paramount, students are more likely to develop creative and

responsible approaches to problem-solving.

- **Promoting Collaboration:** Precepts like “Respect others’ opportunity to be heard” and “Treat others with kindness and empathy” emphasize the importance of teamwork and communication. These skills are essential in STEM fields, where collaborative efforts often lead to groundbreaking discoveries.
- **Fostering Ethical Thinking:** As technology advances, ethical considerations become increasingly important. Precepts guide students to think critically about the implications of their work and to prioritize ethical solutions, ensuring that technological advancements benefit society as a whole.

Rethinking Behavior During Summer

As summer approaches, teachers and administrators are given a valuable opportunity to reflect on and rethink their approach to student behavior. This period of planning and preparation is the perfect time to consider integrating precepts alongside traditional rules. By doing so, educators can ensure that the upcoming school year is grounded in both discipline and empathy, setting the stage for a more supportive and understanding school environment.

Conclusion

Integrating rules with precepts provides a balanced approach to education that fosters both discipline and empathy. This framework helps students understand the reasons behind their actions, promoting intrinsic motivation and ethical behavior. As we prepare students for a future intertwined with AI and technological advancements, it is essential to cultivate empathetic, responsible, and thoughtful individuals. By embracing this holistic approach, we can create a more compassionate and understanding world, one student at a time.

Shelly A Muñoz is an award-winning educator, 20 year veteran of the classroom, staff development instructor, and university professor. Her numerous recognitions include being named Teacher of the Year twice and California Golden Bell award winner twice.

She has been privileged to teach science from 5th- 10th grades and has been chosen for many prestigious opportunities such as Space Camp for Educators (Honeywell) Zero G’s (Northrop Grumman) NASA Ambassador and MAVEN ambassador, EarthWatch Ambassador, National Geographic Educator, just to name a few.



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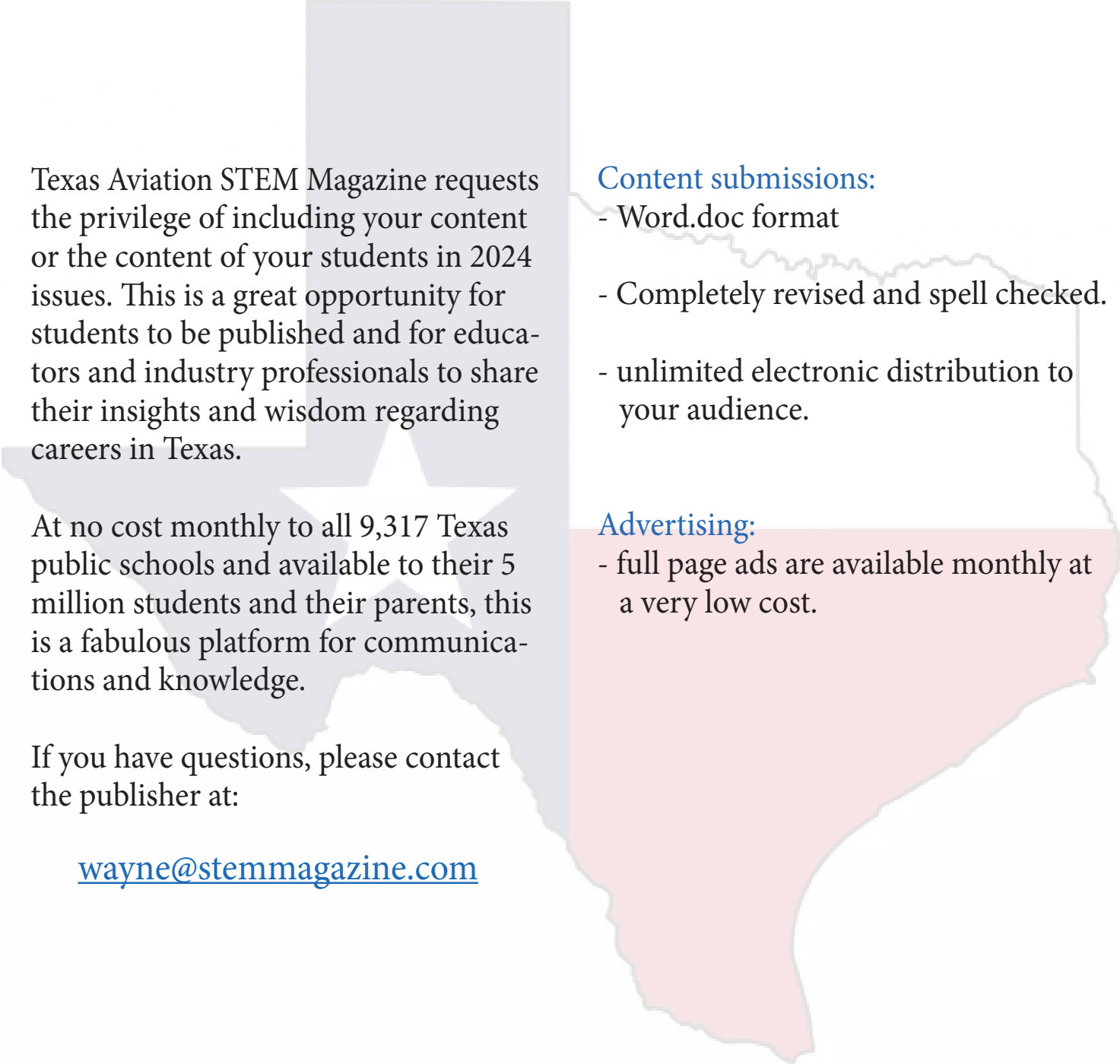
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Raptor Row

Rehabilitating Wildlife, Educating the Future

By Jean M. Wallace, MAEd

There is no such thing as a values-free education. Environmental education, especially, requires us to instill in the next generation not only an understanding of how the environment works, but also a duty to preserve, protect and, yes, value the role each living organism plays in a functioning ecosystem. The environment supports both humans and non-humans, alike. Therefore, the most effective educational programs help students look at how their own actions can either add to environmental problems or help to solve them.

Bringing real-life issues to learning allows students to interact with problems in tangible ways. More importantly, issues-driven education requires students to think critically about their role in the ecosystem and become part of the solution to identified problems. This requires not only a higher level of critical thinking, but also a thorough

and complete understanding of the underlying ecological principles to ensure proposed solutions are based on sound science.

Scientists and government agencies will often emphasize the big picture of “Saving the Planet.” This is an enormous and overwhelming task of which none of us can successfully address, yet alone a 4th grade student. When engaging students in real-life issues, focusing on an individual species and its role in a local ecosystem can both focus the problem to something understandable and narrow a solution to something doable. Students learn the value of that species in their own life and, as a result, are more motivated to take action to protect it.

Teachers are masters at questioning students to evoke higher-level thinking but can often feel challenged when it comes to the scientific concepts of how

the environment works. No wonder, there are millions of species on Earth that occupy specific roles within a diversity of ecosystems. And there are even more ecosystems within those ecosystems! The complexity of ecosystem interactions can impede teachers from diving deeper into environmental issues with students.

However, this can easily be overcome when schools partner with experts. For example, the Marine Science Center (MSC) in Volusia County Florida provides the scientific expertise to support teachers and students by providing essential information about local wildlife, identifying challenges they encounter, and proposing realistic solutions to these challenges.



Alfred - Red-shouldered Hawk

Bubba - Great Horned Owl



Welcome to Raptor Row! Raptor Row is dedicated to the housing of raptor residents of MSC. Due to a permanent injury, these birds can never be returned to the wild. Funded by a Volusia ECHO Grant, the American Rescue Plan Act, and community donations through the Friends of Marine Science Center, the exhibit features screech owls, red-shouldered hawks, red-tailed hawks, Cooper's hawks, peregrine falcons, and great horned owls.

What exactly makes a raptor a raptor?



“Jett”

According to the Raptor Center at the University of Minnesota, raptors are carnivorous birds that share at least three main characteristics: keen eyesight, eight sharp talons and a hooked beak. Raptors, also called birds of prey, have been on Earth for 50 to 75 million years with approximately 482 species of raptor worldwide. As with other species, human activities have taken a toll on raptors and humans have a responsibility to minimize that toll.

At MSC, in addition to the permanent residents unable to be released, the Center's rehabilitation hospital cares

for over 1100 sick and injured birds that are brought to the Center each year. On a recent visit to the Center, a friend and I enjoyed a behind-the-scenes tour of the hospital and spoke with several of the rehabilitation specialists about the plight of raptors and the injuries they sustain.

One rehab specialist recalled the day she was hooked on this type of work. “It was the day the Center put me in a cage with a kestrel.” She loved this first encounter and decided that she never wanted to do anything else. Most injuries to birds that are rehabbed occur from either being hit by vehicles or entangled in fishing line. All the rehab specialists agreed that releasing birds back into the wild is the best feeling, while also understanding that, as hard as they try, not all injuries are fixable.

Equally important to rehabilitation are the outstanding educational opportunities Raptor Row provides to local schools and the entire Volusia County community. Raptor Row directly supports education through field trips, summer camp and outreach. Field trips to the Center offer for direct and ongoing partnerships with local schools. As just one example, through the Raptors Live Program, classes meet one of the resident raptors and learn about its unique adaptations including its amazing eyesight, sharp beak, and

strong talons. Classes also learn about the threats to raptors, why resident raptors are non-releasable, and what students can do to help conserve native raptors and their habitats.



Following the raptor presentation, school groups dissect owl pellets and identify the bones of different prey animals. By dissecting owl pellets, students learn which prey species are abundant in different areas and then use this knowledge to indicate the health of local ecosystems.

During a five-day camp experience at MSC, campers take a boat ride out on the estuary to improve their observational skills and ask questions of a Florida Master Naturalist about the local

environment and the animals that live there. Campers practice binocular skills on an Eco Walk to the observatory and identify different species of birds commonly found in the area. Once back at the Center, the campers meet a resident raptor and learn about its unique adaptations, its role in the food web, the importance of protecting and conserving this species, and what makes this permanent resident non-releasable. One way that campers have an immediate impact on resident raptors is by creating bird enrichment toys out



of recycled materials and then see their toys added to one of the permanent raptor's enclosures.

Along with hosting schools and camp, trained staff and volunteers provide outreach programs bringing resident raptors and artifacts to other locations in the community, including schools and libraries. This is a win-win, as this not only reaches a larger audience but also provides necessary enrichment for the resident birds. Various groups learn about different species of raptors, what the public can do to help them, and how MSC rehabilitates a wide range of injured or sick birds.

As an educator, involved in guiding and supporting successful environmental education programs for more

than two decades, I always love learning about quality programs and organizations; especially those finding ways to reach, and effectively teach, the next generation.





Raptor Row staff member Tracy and students

With that, I will end with a favorite quote by Baba Dioum: “In the end, we will conserve only what we love; we will love only what we understand, and we will understand only what we are taught.” I couldn’t have said it better myself.

About the author:

Jean Wallace is the retired CEO of an award-winning K-8 public charter school in Philadelphia, PA. During her tenure as CEO, the school and its teachers were recognized locally, regionally, nationally, and internationally for the school’s innovative approach to environmental science learning and its excellent student academic achievement.

Prior to her work in public education, Jean served as the Director of Education for Earth Force, Inc. (www.earthforce.org) where she supported hundreds of teachers and thousands of students in student-directed, service learning and civic action projects focusing on local and regional environmental issues.

In her spare time, Jean writes for various publications and volunteers with Brookline Labrador Retriever Rescue (brooklinelabrescue.org). She thoroughly enjoys the company of two loveable rescued labs.

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