

STAR TREK LIVE *Presented by Mad Science*



Friday, February 18, 2011

10:30am – 11:30am

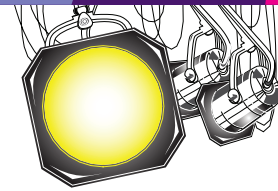


EDUCATION
takes center stage

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about the
SANDLER CENTER FOR THE PERFORMING ARTS



At the heart of every great city are its arts institutions – the centers of culture where residents and visitors can share great works of music, dance and theatre from the classics to the cutting edge. Now in its fourth season, the Sandler Center for the Performing Arts at Town Center provides these arts experiences to the students in Virginia Beach and beyond.

Expansive yet intimate, with not a bad seat in the house, the Sandler Center is the perfect setting for every kind of performance, from classical recitals and symphony concerts to modern dance and ballet, theatre and more. And while audiences of every kind are welcome, the Sandler Center offers a special invitation to the region's young people. With the ultimate goal of "every child, every grade, every year," the Sandler Center, in partnership with the Virginia Arts Festival's WorldClass® Education Department, presents specially priced student matinees and public performances making world-class artists accessible to school children in Virginia Beach. And the excitement reaches beyond the stage as well, as the Sandler Center brings these renowned artists into area schools for performances and master classes. For teachers, the opportunities are immeasurable, offering exciting new ways to inspire and enhance their classroom teaching as they weave the arts into their lessons on history, language arts, math and science.

Thank you for joining us this season as we spark your students' imaginations with the joy and power of the performing arts.



what to expect

MAD SCIENCE PRESENTS *STAR TREK LIVE*

Mad Science Productions proudly presents *STAR TREK LIVE* - an out of this world, interactive adventure based on the most popular science fiction franchise of all time.

Audience members join Starfleet Academy only to be unexpectedly whisked into an adventure steeped in the grand tradition of Star Trek itself. *STAR TREK LIVE* combines cutting-edge special effects, unmatched audience interaction, and cool science to create an exhilarating and unforgettable theatrical experience.

Eager to learn from Starfleet's best and brightest, Captain James T. Kirk and Vulcan Science Officer Spock, our cadets assemble, anxious to prepare for their first day at the Academy and an exploration of the legendary U.S.S. Enterprise. As we are introduced to the proud legacy of the most powerful and most advanced ship in the fleet, the Enterprise and Earth itself come under attack from alien forces, leaving the fate of the Federation in the hands of our cadets. Our cadets will have to quickly learn the intricacies of living and working in space, modern space travel, and the latest in communication and technology as they draw on the achievements of science in the 21st century. It will require all our knowledge, ingenuity, logic, and an exploration of science to discover what is happening and how to set things right before it's too late!

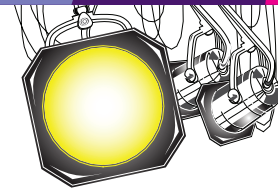


Star Trek the TV Show

Star Trek started out as a television series, airing for the first time in 1966. Its creator, Gene Roddenberry, told the television networks it would be a kind of Western set in outer space. What he really wanted was to create an adventure series that presented moral dilemmas, questions of right and wrong, and explored current issues. *Star Trek* episodes told the story of the human and alien crew of the Starship Enterprise, led by Captain Kirk. Through their encounters with other life forms, and their interactions with each other, the stories explored issues like war and peace, religion, human rights, and the role of technology. Its multi-racial cast was a big step forward for TV at that time.

Star Trek only played on TV for three seasons, but it made a huge impression that lives on today. Several movies continuing the *Star Trek* story were made, and a sequel series, *Star Trek: The Next Generation*, kept the story going. In the meantime, *Star Trek* fan clubs sprang up all over the country. These fans are called "trekkies," and they often attend *Star Trek* conventions to share their continuing affection for the show.

BIG NAMES IN ASTRONOMY



Astronomy [uh-stron-uh-mee] - noun

the science that deals with the material universe beyond the earth's atmosphere.

Aristotle was an ancient Greek philosopher. He believed that the Earth was the center of the universe, and that the sun, stars, and planets moved around the Earth.

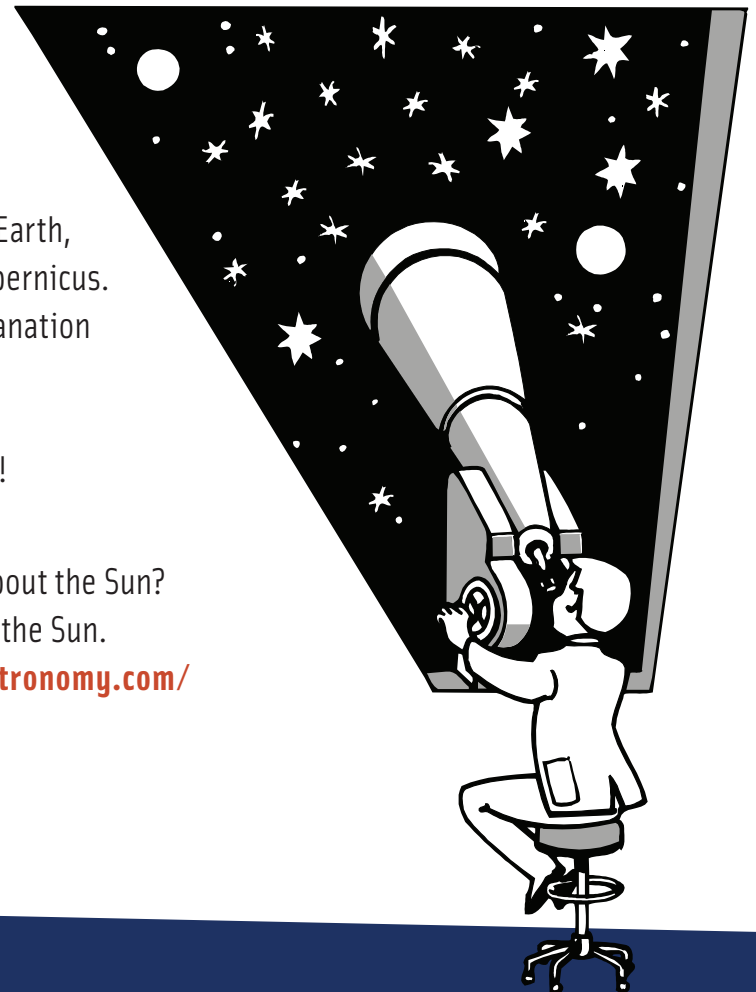
500 years after Aristotle, **Ptolemy** observed the planets and the stars. He was able to predict where the planets would be at any time. His system is now called the "Ptolemaic System."

Galileo is sometimes called the father of modern astronomy. He was the first person to prove that the Earth was not the center of the universe. He used telescopes to observe the planets and stars, and discovered that Jupiter has moons. These moons moved around Jupiter, which meant that not everything in the universe orbited Earth.

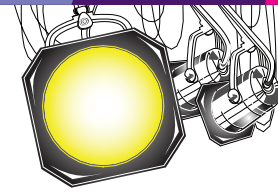
Many scientists of the 16th century believed that the Earth stayed still and other planets moved around it. But in 1543, the astronomer **Copernicus** said that all the planets, including Earth, moved around the Sun. Galileo agreed with Copernicus. Later, scientists proved that Copernicus's explanation was correct!

So the Sun was at the center of things all along!

- 📅 **Further Exploration:** What do you know about the Sun? Collect ten important facts about our star, the Sun. To get started, go to: <http://www.kidsastronomy.com/>



A SHORT HISTORY OF NASA



"An Act to provide for research into the problems of flight within and outside the Earth's atmosphere, and for other purposes."

With this simple preamble, the Congress and the President of the United States, Dwight D. Eisenhower, created the National Aeronautics and Space Administration (NASA) on October 1, 1958. NASA's birth was directly related to the pressures of national defense.

After World War II, the United States and the Soviet Union were the two most powerful countries on Earth, and were competing with each other in a race to get into space. The Department of Defense studied rocket building, hoping to establish American leadership in technology.

The first big step was a plan to send a scientific satellite into orbit in space. The Soviet Union soon developed a similar plan. In October of 1957, the Soviets launched Sputnik 1, the world's first artificial satellite. This inspired the American people to support increased spending on a space program, and the U.S. launched its first Earth satellite, Explorer 1, on January 31, 1958. The U.S. also began a series of scientific missions to the Moon and planets in the late 1950s and early 1960s.

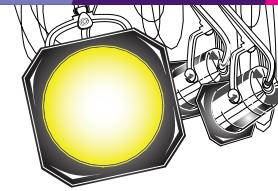
Early Spaceflights: Mercury & Gemini

In 1961, no one could be sure if a human being could survive space flight. On May 5, 1961, the United States sent astronaut Alan B. Shepard, Jr. into space in the Mercury capsule. In his 15 minute flight, that question was answered. Next, John H. Glenn, Jr. became the first U.S. astronaut to orbit the Earth on February 20, 1962. With six flights, Project Mercury achieved its goal of putting piloted spacecraft into Earth's orbit and retrieving the astronauts safely.

Project Gemini came next, building on Mercury's achievements and creating spacecraft built for two astronauts. Gemini's 10 flights also provided NASA scientists and engineers with more data on weightlessness, perfected reentry and splashdown procedures, and demonstrated rendezvous and docking in space. One of the highlights of the program occurred during Gemini 4, on June 3, 1965, when Edward H. White, Jr. became the first U.S. astronaut to conduct a spacewalk. The space race was on!



Image Credit: NASA



Fly Me to the Moon: Project Apollo

What's next? Sending a man to the moon! President Kennedy had set that goal in a speech he gave in 1961, and now it began to seem possible. Major challenges and some terrible failures were ahead, especially the January 27, 1967 fire in an Apollo capsule on the ground that killed three astronauts, Roger Chaffee, Virgil "Gus" Grissom, and Edward White Jr., but the program made amazing progress. In October 1968, NASA launched the successful Apollo 7 mission, which orbited the Earth and tested the redesigned Apollo command module. The Apollo 8 mission, which orbited the Moon on December 24-25, 1968, was another very important step on the way to the Moon.

July 20th, 1969: The Apollo 11 mission fulfills President Kennedy's challenge when

Neil Armstrong and Edwin "Buzz" Aldrin landed on the Moon. "That's one small step for man, one giant leap for mankind," Neil Armstrong said to the watching world who gathered around television sets to watch in total amazement. After taking soil samples, photographs, and doing other tasks on the Moon, Armstrong and Aldrin, along with their colleague Michael Collins made the safe voyage back to Earth.

There were five more Apollo missions that went well. Then came Apollo 13. An oxygen tank on board burst halfway to the Moon. The astronauts and crew on the ground worked together to figure out a way to end the mission safely. Apollo 13 never made it the Moon, but all the astronauts survived, which showed just how sophisticated the technology had become.

Twelve astronauts in all walked on the Moon during 6 Apollo lunar landing missions.

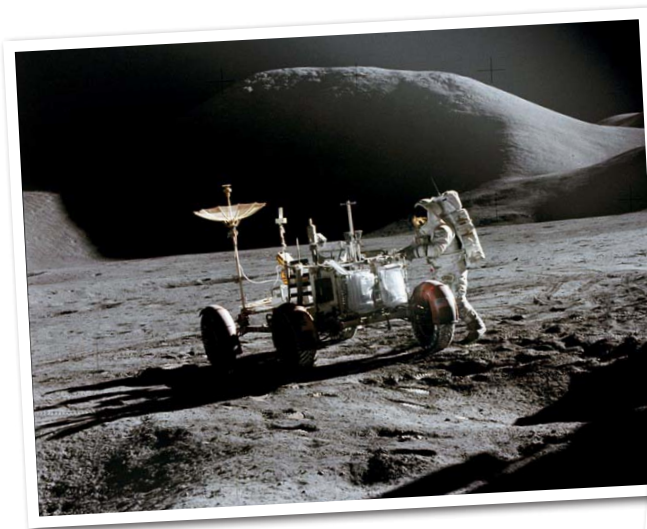
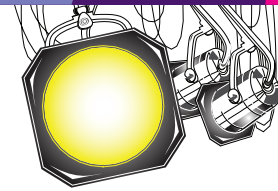


Image Credit: NASA



Other NASA Milestones:

- ✪ In 1975, NASA cooperates with the Soviet Union to achieve the first international human spaceflight.
- ✪ In 1981, the first Space Shuttle mission takes off on April 12, demonstrating that it could take off vertically, like a rocket, and glide to an unpowered airplane-like landing.
- ✪ In 1983, Sally Ride becomes the first American woman to fly in space.
- ✪ In 1993, Russia (a country originally part of the Soviet Union) joins with the U.S. and other international partners to build the International Space Station.
- ✪ In 2000, the Expedition One crew takes off for the International Space Station on Halloween, docking on November 2.
- ✪ In 2004, on January 14, President George W. Bush announces a new Vision for Space Exploration, including sending humans back to the Moon and on to Mars, retiring the Space Shuttle, and developing a new, multipurpose Crew Exploration Vehicle. Robotic scientific exploration and technology development are also part of this new vision.

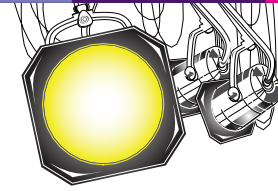
📖 **Further Exploration:** Choose an astronaut and compose a biography of him or her. What kind of an education did your astronaut have? What made him or her want to be an astronaut? Which missions has your astronaut flown? What qualities does your astronaut have that are required of a space sailor?

Go to: <http://www.nasa.gov/> to read more about NASA and space exploration.



Image Credit: NASA

IS THERE ANYBODY OUT THERE?

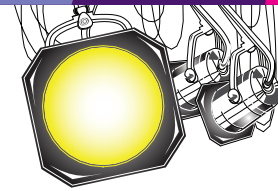


Over the years, NASA has continued to look for life beyond our planet. Not so much the little green people we see in cartoons, but essential elements for life to be possible, like water. In 1975, NASA launched the two Viking spacecraft to look for basic signs of life on Mars. The spacecraft arrived on Mars in 1976 but didn't find any signs of life there. In 1996, a probe from a spacecraft that was examining Jupiter and its moon, Europa, found that Europa may contain ice or even liquid water. NASA also has used radio astronomy to scan the heavens for potential signals from extraterrestrial intelligent life and to examine meteors from Mars to look for microbiological organisms. In the late 1990s, an "Origins" program to search for life using powerful new telescopes and biological techniques began. More recently, scientists have found more and more evidence that water used to be present on Mars.



Image Credit: NASA, ESA, A. Nota (ESA/STScI) et al

WHERE DO ASTRONAUTS COME FROM?



The word “astronaut” comes from two Greek words, “astro” meaning space and “naut” meaning sailor. An astronaut sails through space! The first U.S. astronauts were chosen in 1959, before anybody even knew if spaceflight was possible. NASA asked the military to recommend a list of men, age 25 to 40. They needed to be less than 5 feet 11 inches tall and have a bachelor’s degree from college. They had to have worked in the sciences for at least three years. NASA was also looking for applicants who had operated some form of craft: balloons, airplanes, or submarines. Oh, and they had to be brave! Astronaut candidates would have to show that they could handle the physical challenges and dangers of the job. In the end, President Eisenhower thought the best candidates would be active-duty military pilots, so that became the most important requirement. Today, NASA selects astronauts from a diverse pool of applicants with a wide variety of backgrounds. From the thousands of applications received, only a few are chosen for the intensive Astronaut Candidate training program. Including the “Original Seven,” only 339 astronauts have been selected to date.

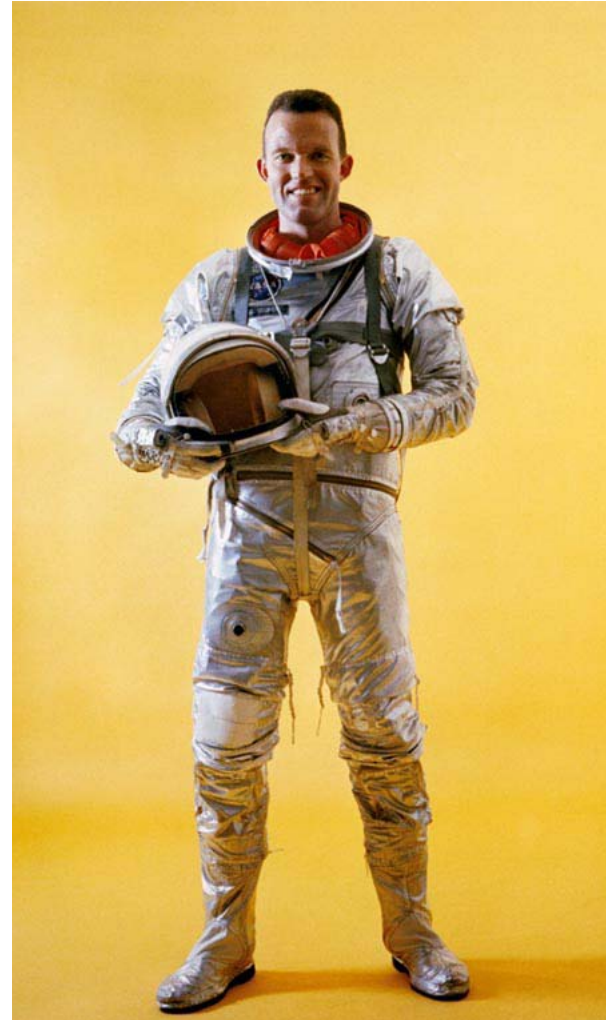
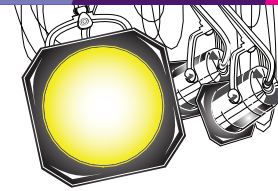


Image Credit: NASA

- 📖 **Further Exploration:** Do you have what it takes to become an astronaut? Would you want to become a space sailor? Go to: <http://www.jsc.nasa.gov/Bios/> to read about the lives of the real astronauts of today and yesterday.

a gravity experiment

THE EARTH'S BUT A SPINNING BALL



Did you know that there is no gravity in space? Did you know that there is gravity on the Moon? The gravity on the Moon is much weaker than the gravity that we have here on Earth. This is why moon walking for astronauts is very difficult.

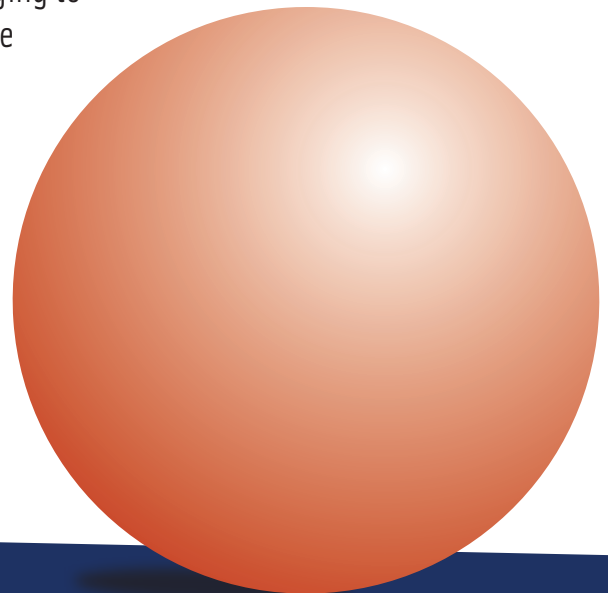
Materials you will need:

- Small rubber ball
- Flat table top surface
- Medium size wide-mouth canning jar (or something similar, like a large mayonnaise jar)

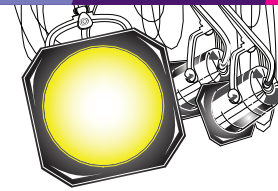
Steps:

1. Place the ball on top of the table
2. Place the jar over the ball so that the ball is inside the mouth of the canning jar.
3. Start spinning the jar around in a circular motion (keeping it on the table).
4. Once the ball starts spinning inside the jar lift it from the table top.
5. The ball is lifted from the table and will continue to spin inside the jar until it loses its speed.

This works because the ball spinning inside the jar is trying to escape but the jar itself forces the ball to stay inside the wall of the jar. Due to the force and speed of the spin, the ball will continue to spin until it loses its speed and gravity will pull it back to earth and the ball will fall from the jar.



a research project
OUR SOLAR SYSTEM



Mercury Venus Earth Mars Jupiter Saturn Uranus Neptune



Image Credit: NASA

Choose a planet from our Solar System and learn all about it. Present your findings on a colorful posterboard, with a rendering of your planet at the center, surrounded by vital facts you've uncovered. Include answers to the following questions:

What is the name of your planet and what does the name mean?

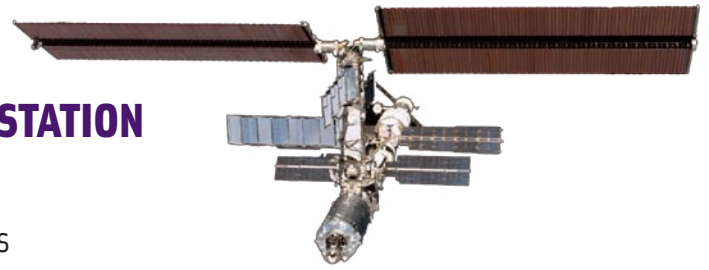
How far from the Sun is your planet?

How big is your planet compared to the other planets?

Describe the surface of your planet.

Does your planet have moons? If so, include them in your illustration.

Include at least three more interesting facts of your own!



LIFE ABOARD THE INTERNATIONAL SPACE STATION

Imagine living in a five bedroom house, 220 miles above the Earth. To get home from school would take two whole days! And your house would be continuously moving at more than 17,000 miles per hour! Fewer than 200 people have ever lived aboard the International Space Station in the 10 years since the first crew arrived on board. Most stay for less than six months.

In that time, you would have to get used to moving around without crashing into things. The space station seems to be free of the pull of gravity, but it's really that the station is continuously falling toward Earth. In orbit, things are weightless simply because they are falling at the same speed. Computers and other equipment are attached to the walls with Velcro pads. With practice, you would eventually be able to fly down the length of the station without touching anything, except with your fingertips.

Your work day would be intense. You are awakened by music piped in by the crew on the ground. From then on, almost every hour is scheduled. Your primary job would be in research, conducting experiments that take advantage of the unusual conditions on board. Explorations in human research, space medicine, life sciences, physical sciences, astronomy, and meteorology are all done on board. Your busy crew works all day, coming together for meals.

Eating in space can be tricky. You pick out your menus in advance of travel, with the help of a dietitian. You won't have much of a sense of smell or taste, so you'll want to choose spicier foods. Most of your food will be frozen or canned. You'll mix your drinks from powdered drink mixes and water, and sip them through straws stuck in plastic bags. You'll eat solid food with a knife and fork attached to a tray with magnets to prevent them from floating away!

Want to take a shower? Forget about it. All that water spraying everywhere! Baby wipes it is. And at bedtime, you may want to strap a pillow to your head so you'll feel like you're lying in bed. Hook a sleeping bag to the wall and hopefully you'll drift (literally) off to sleep.

And think of the view! The whole Earth outside your window! And you'll be orbiting it 16 times a day. That's 16 sunrises and 16 sunsets every day!

- Further Exploration:** What would you bring along on your trip into space? Make a packing list of the things you would bring. Stop at ten. Now, decide which things are needs, and which are wants. Which are things you couldn't live without?

FEEDBACK FORM

We need your feedback to make our Education Programs even better! Please take a moment to complete this form and either return it to the **Sandler Center Education Department at 440 Bank Street Norfolk, VA 23510**, fax it to **(757) 282-2787** or e-mail your answers to **education@sandlercenter.org**.

1. Complete form
2. Attach or include student work (optional)
3. Return both to Sandler Center Education Department by mail, fax, or e-mail.

Education Event: _____
(please check) Matinee In-School Performance/Master Class

How did your students respond to the performance?

How did you prepare your students for this performance? Did you use the Education Guide? Which activities did you use? Were they helpful? Did students enjoy the materials?

How did this performance contribute to experiential learning in your classroom?

What role do the arts play in your school community? In your classroom?

If you could change one thing about your experience, what would it be?

Please include student work with this form, including letters, artwork, activity responses, and anything inspired by the performance.

(Optional)

Name: _____

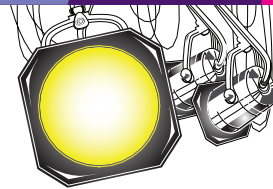
School: _____

City: _____

Would you like to be part of our database? Yes No



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STAR TREK LIVE

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EDUCATION
takes center stage

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Student Education Guides Team

Christine Foust

education director

Lisa Hartz

research and writing

Lisa Dagley

page design and layout

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