

In collaboration with



ACADEMY OF FUTURE SPACE EXPLORERS

Atmosphere & Beyond

Living in Space

Planets & Moons

Rocket Science

Space Phenomena

Space Technology

Space Travel

Sun & Stars



ATMOSPHERE AND BEYOND

SUMMARY:

In Atmosphere and Beyond, children discover the properties of the air around us and explore the atmosphere of Earth, and those of planets beyond. Children are challenged to keep Army the Aquanaut dry during an underwater walk, and to recreate the optics of a sunset. After assembling the atmospheres of other planets, they build their very own Space Guide to follow the probes exploring our solar system from right here on Earth!

EDUCATIONAL VALUE:

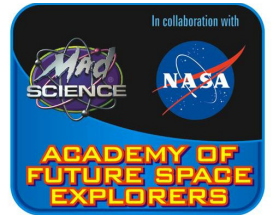
In this Earth-Science-focused program, children gain an understanding of the importance of our planet's atmosphere for life on Earth, and compare the composition of Earth's atmosphere with those of other planets in the solar system. They learn what it takes to make a planet viable for life as we know it, and explore the effects of atmospheric particles on the color of sunsets and rainbows. Finally, they have a chance to build a compact comparison chart of the atmospheres on the planets in our solar system, including images of the probes sent out to explore them.

TAKE HOME CONCEPTS FOR K-2:

- Air is all around us.
- The Earth's atmosphere supports life.
- Different planets have different atmospheres.

TAKE HOME CONCEPTS FOR 3-6:

- Air is all around us, and it takes up space.
- The Earth's atmosphere has five layers, and it supports life.
- Different planets have atmospheres made up from different gases.



LIVING IN SPACE

SUMMARY:

Children set out on a mission to experience life in space! Children will try out the special adaptations needed to live in space, learn about mission training techniques, and form a ground control to space mission team to repair a circuit in space. The children take part in a Spacewalk Mission that they can take home to practice!

EDUCATIONAL VALUE:

This class puts children in the boots of an astronaut. Children explore the various demands and challenges facing astronauts in space, and the Mission Control team who supports them from the ground. Children then investigate astronaut training, mobility, and life support, and experience astronaut life for themselves as they participate in a space station building mission.

TAKE HOME CONCEPTS FOR K-2:

- We created tools to help us live in space.
- We need to practice tasks on Earth before doing them in space.
- Living in space changes our bodies.

TAKE HOME CONCEPTS FOR 3-6:

- We built technology to live in space.
- Astronauts train on Earth before doing tasks in space.
- Living in low gravity affects our bodies.



PLANETS AND MOONS

SUMMARY:

In this class, children set off on a voyage to discover the Solar System. They impersonate the planets, recreate a solar and lunar eclipse, and establish the true size and distance ratio between the Earth and its moon. They examine the surface photos of planets and moons in our solar system and try to identify the ones showing our planet. The children learn about the speed of escape velocity and create a take-home gravity assist game to send probes across the solar system.

EDUCATIONAL VALUE:

In planets and moons, children use models to understand the relative size and distance of objects in our Solar System. They experiment with eclipses and learn how gravity plays a part in our exploration of outer space. The children experiment with a magnet-based gravity assist game to send steel marble probes across their Solar System playing board.

TAKE HOME CONCEPTS FOR K-2:

- There are eight planets in our solar system.
- The rocky planets are small. The gas planets are giants.
- Blocking out the sun makes an eclipse.

TAKE HOME CONCEPTS FOR 3-6:

- Our solar system has planets, moons, dwarf planets, asteroids and comets.
- Some planets are small and rocky. Some planets are ice or gas giants.
- The sun, moon and Earth can make solar and lunar eclipses.



ROCKET SCIENCE

SUMMARY:

Children will follow a detailed construction plan to build their very own model rockets while exploring the science of rocketry. The children will use their creative problem-solving skills as they take on the role of NASA engineers, and they will play a fun, educational game illustrating the four forces of flight. A model rocket launch will be part of the Rocket Science class.

EDUCATIONAL VALUE:

Children are provided with a valuable hands-on experience as they build a functional model rocket. As they move through the various stages of construction, children learn about the components of a rocket, and the role each plays in a rocket's flight. A hands-on engineering design challenge lets the children take on the role of NASA engineers as they try to solve a problem from an Apollo moon mission. Finally, the children will learn about the four forces affecting flight in lessons that will be reinforced with a fun game in which they race through space.

TAKE HOME CONCEPTS FOR K-2:

- Scientists use rockets to get into space.
- Each part of a rocket serves an important role.
- The four forces that affect flight are lift, thrust, gravity and drag.

TAKE HOME CONCEPTS FOR 3-6:

- Rockets send people and objects into space.
- All rockets have an engine mount, body tube, fins and parachute.
- The four forces that affect flight are lift, thrust, gravity and drag.



SPACE PHENOMENA

SUMMARY:

In Space Phenomena, children explore the phenomenal events that take place in the night sky. Children create impact craters and observe model meteors fall through a model atmosphere. Children watch a model comet form out of household materials right before their eyes and play a friendly game of satellite tag to learn about reflected light. After exploring the effect of lenses and mirrors on light rays, children make a telescope to search the skies for phenomena at home!

EDUCATIONAL VALUE:

Space Phenomena introduces children to phenomenal space events and the tools used to observe them. Children investigate asteroid impacts and meteors, learn to use lenses and mirrors to refract and reflect light, and explore the composition and nature of comets.

TAKE HOME CONCEPTS FOR K-2:

- We may see space objects in the sky.
- Some objects reflect the sun's light.
- Telescopes help us see things that are faint or far away.

TAKE HOME CONCEPTS FOR 3-6:

- We may see space objects in the sky. These are space phenomena.
- Some of the space objects we see shine from light reflected by the sun.
- The lenses and mirrors in telescopes help us see faint objects that are far away.



SPACE TECHNOLOGY

SUMMARY:

Space Technology starts with an exploration of space-related technologies used on Earth. Children will guide laser light through a maze, use principles of radar technology to discover hidden objects, and discover the importance of points of reference to depth perception. Children examine the potential threats to spacecraft and see the technological advances that improve our exploration of the universe. Children go home with a set of stereoscopic images transmitted from probes and rovers in space.

EDUCATIONAL VALUE:

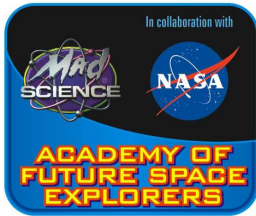
This after-school program introduces children to space-related technologies, including those used on Earth to aid space exploration and the very scientific principles of space travel. Engaging demonstrations and exciting hands-on activities will make this investigation of Space Technology a fun learning experience.

TAKE HOME CONCEPTS FOR K-2:

- We create tools to help us explore space.
- We need two sensors to help us see in 3D.
- We can use some space tools on Earth.

TAKE HOME CONCEPTS FOR 3-6:

- We built technology to study space.
- Technology with paired sensors lets us see depth.
- Sometimes space technology can be used on Earth.



SPACE TRAVEL

SUMMARY:

In Space Travel, children launch into an investigation of propulsion systems. They use the compressed air inside balloons to create thrust. The class will race balloon rockets and be challenged to design a balloon-powered rocket car. Experimenting with the fast-moving air expelled from a balloon, the children will build a unique Propulsion Lab to take home. For our grand finale, the children will witness a thrilling model rocket launch, and learn the meticulous preparations necessary to send up a rocket!

EDUCATIONAL VALUE:

In this class, children learn about the propulsion systems employed for space travel. The children will participate in inquiry-based discussions and multiple hands-on experiments designed to introduce children to the concepts of propulsion, thrust, action/reaction, aerodynamics, rocket construction, the stages of rocket flight, and more!

TAKE HOME CONCEPTS FOR K-2:

- We use propulsion to make things move forward.
- Propulsion makes a force called thrust.
- A rocket lifts off when we fire its engine.

TAKE HOME CONCEPTS FOR 3-6:

- There are many ways to propel an object forward.
- Thrust is the force that moves an object forward.
- A rocket engine creates the thrust to lift a rocket off the ground.



SUN AND STARS

SUMMARY:

In this class, children investigate our sun and other stars in our and other galaxies. They will follow stellar life cycles and view the stars from different angles of the universe. Children will learn the reasons for constellations and practice navigating by the stars. They bring home a Cosmic Disk showing views of our Sun at two different wavelengths of light.

EDUCATIONAL VALUE:

This after-school program introduces children to stars (including our own) and the galaxies they form. Children learn about the facts on our sun and examine various stellar life cycles. They construct a three-dimensional constellation to understand the location of stars in our and other galaxies. Children learn to navigate by the stars and bring home a Cosmic Disk to encourage their heliophysics studies

TAKE HOME CONCEPTS FOR K-2:

- Day, night, and seasons happen because of how the Earth moves around the Sun.
- The Sun is the star closest to us.
- The star patterns do not change. They shift in the sky throughout the year.

TAKE HOME CONCEPTS FOR 3-6:

- We get day and night and seasons because of how the Earth moves around the Sun.
- The Sun is one of millions of stars in the sky. It is our closest star.
- Constellations are groups of stars. We see different constellations as the Earth moves around the Sun.