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I AM AN ASTRONAUT

What to Know About This Kit

Astronauts are people who are trained to fly into space as a crew member of a spacecraft. In order to become an astronaut in the United States, you must have a degree in engineering, biological science, physical science, computer science, or mathematics. You must also know how to fly a jet aircraft and have good physical health.

By participating in the activities in this kit, children will learn about the skills an astronaut needs, including STEM based skills and physical activity to stay fit and healthy. Through role play, they can pretend to be an astronaut repairing a robot on their mission, or study the sky in preparation for their flight. They will use math to explore the phases of the moon. Children will also learn ways to stay active and fit for their future as an astronaut with NASA.

The chart below shows the five major activities included in this kit that explore being an astronaut. Each activity offers one or more activities that highlight science, language, and math literacy skills. Hands-on activities included in the kit also provide suggested vocabulary, fun facts, and further reading.

In addition, the activities in this kit offer opportunities to incorporate the practices of singing, playing, talking, reading, and writing into your child's learning experience. *Current early literacy research has shown that regularly sharing these five practices with young children can help them to become ready to read by the time they start school. *(from "Every Child Ready to Read," 2011)

Activity #1	Activity #2	Activity #3	Activity #4	Activity #5	Activity #6	Activity #7
Get Fit	Oreo Moon Phases	Robot Repair	Project Your Own Home Planetarium	Count the Stars	Explore Our Sky	Helmet & Jetpack Craft

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#1: Get Fit

SUMMARY:

Astronauts need to be physically fit to survive the strain of take-off and re-entry. And, astronauts living in space have to exercise every day to make sure their muscles do not get weak. Because there is no gravity in space, muscles do not have to work as hard as they do on Earth. On Earth, you exercise your muscles even when you are standing still. Gravity pushes down on you and you push against it to stand up straight. In space, you have to exercise harder to keep strong.

WORDS TO USE:

Exercise - Anything you do to keep fit.

Exhale - Breath out

Gravity - is what makes things stay on the ground. It is a force that pulls toward the earth.

Lift-off - is when a rocket leaves the ground.

Muscles - are the parts inside your body that you use when you move.

Weightlessness - when there is no gravity and you (and other objects) can float in space.

MATERIALS NEEDED:

- Busy Bodies: Gross Motor Exercise Cards
- Work-out clothes (not included)

ACTIVITY:

- **Practice breathing.** Breathing is important to exercise. Put one hand on your chest and one hand on your stomach. Inhale deeply through the nose and feel your chest and stomach rise. (Do not raise your shoulders when you breathe in!) Exhale through the mouth while keeping the mouth and tongue relaxed.
- **Warm up** Stand with your back straight and feet shoulder width apart. Spread your arms out to the side and hold them perpendicular to the floor. Count to twelve. Bend head forward and count to twelve. Stand on tippy toes and count to twelve.

- **Lay out the Exercise cards by color** Green bordered cards have easy exercises. Yellow borders have exercises that are a little harder, and the red bordered cards are the most challenging.

Green bordered cards—Beginner Level

- **The Airplane** Stand with your feet shoulder-width apart. Stretch out your arms to the side until they are parallel to the floor. Keep your arms out and bend at the waist to the left then to the right. Remember to say “Zoom, zoom, zoom” and pretend you are on the Space Shuttle. Return to an upright position and repeat five more times.
- **Puppy Patting** Stand with your feet shoulder-width apart. Bend forward at the waist with your back straight and put one hand on your knee. Reach out and pat the pretend puppy saying, “Good space doggy, good space doggy”. Repeat five times.
- **The Frog** Stand with your feet shoulder-width apart and toes pointing out. Make your hands into fists and stretch your arms back, bending at the elbow. Bend knees until you are in a semi squat position. Jump two feet forward, bringing your arms forward as you jump. Remember to say “ribbit, ribbit ribbit” while you jump. Repeat 5 times.
- **Stair Climbing** Start with your feet shoulder-width apart, and make two fists, bending your arms up at the elbows. Raise one leg up, bending the knee. Pause with one foot in the air. Return foot to the ground and then lift the other foot. Pretend you are climbing the stairs to the top of your rocket. Repeat five times.
- **Up, up and away.** Start with your feet side by side. Raise your arms above your head. Lift one foot up bending your knee. Remember to say “We have lift-off” as your rocket flies into the sky. Return your foot to the ground and lower your arms. Lift up your arms and your other foot. Repeat five times.

Yellow bordered cards—Intermediate level.

- **The Elastic Band.** Start with your feet shoulder-width apart and your arms by your side. Raise your hands up to the sky and stand on your tippy toes. Stretch out as long as you can go and then relax back into a normal standing position. Pretend that you are no longer being held down by gravity. Repeat ten times.
- **The Band Leader.** Start with your feet shoulder-width apart. Bend your arms at the elbows. March in place while swinging your arms up and down. Pretend you are walking in your space suit. March in place twenty times.
- **The Flamingo.** Stand with your feet shoulder-width apart. Bend one knee with your foot extending to the back (keep your thighs parallel). Make fists and swing your arms back and forth two times while balancing on one foot. Lower your foot and lift the other foot. Repeat five times.
- **The Balance Bridge** Stand with your feet together and toes pointing out. Raise one leg and place your heel on your knee. Raise your arms straight out to your

side, parallel to the ground. Hold in place for a count of five. Lower leg and relax arms. Raise other foot and lift your arms out to the side. Hold in place for a count of five. Pretend you are docking at the space station. Repeat 5 times.

- **Ball catcher** Practice throwing a ball in a low gravity environment. Stand with feet shoulder-width apart. Raise elbows up and away from the body. On the count of three, push arms out and straighten the elbow as if throwing a pretend beach ball. Count to three and then pretend catching the same ball. Repeat 10 times. Say “Swoosh” each time you throw or catch the ball.
- **The Grasshopper.** Pretend to push off on your first space walk! Stand with your feet shoulder-width apart. Bend at the knees and waist until you are in a squatting position. Touch the ground with your hands. On the count of three, spring up and push off into space. Repeat five times.

Red bordered cards—Challenge level.

- **The Draw Bridge.** Pretend you are a robotic arm extending into space. Start with your feet together and place your hands on your hips. Keep your legs straight and bend at the waist. Pretend you are a robot arm reaching out into space. Straighten up and reel your equipment back in. Repeat 10 times.
- **Soccer Kick.** Start with your feet side by side. Stretch arms out to the side. Pull your foot back, bending your leg at the knee and kick sharply out like you are kicking a ball. Repeat 10 times.
- **The Hamster Wheel.** Pretend you are exercising on the tread mill in the space station. Make your hands into fists and bend your elbows. Pump your arms and jog on the spot for twenty seconds.
- **The Lay Up.** Shoot a pretend basketball. Bend legs slightly at the knees, and put your right foot in front of your left. Hold arms up as if holding a ball. Extend arms up and pretend to push the ball towards the hoop. Switch positions of feet and shoot again. Repeat 5 times.
- **Splish Splash.** Pretend to touch back down on Earth. Extend arms straight out to your sides. Lift one leg at the knee. While on one leg, hop as high as you can. Remember to say “touch down” when you hit the ground. Alternate hopping leg and repeat. Repeat five more times.

OBSERVATIONS:

- How did your body react to exercise?
- Were you out of breath?
- Did you get tired?
- Did you get sweaty?
- If you do this activity every day for a week, did it get easier?

DID YOU KNOW?

- Astronauts living in space have to spend 2 ½ hours a day exercising so their muscles do not get weak.
- You are taller in space since gravity is not pressing down on you.
- In space, sweat does not drip off your body. It just stays in a ball on your skin or drifts off into the cabin. Ewww.
- During lift-off, astronauts are pressed down into their seats for a few minutes while the rocket's speed is increasing. This makes it difficult to breathe. Astronauts practice inhaling and exhaling slowly to make breathing easier.

SUGGESTED READING:

- J629.442 C *Living in Space*
- J 629.45 G *How Do You Burp in Space? And Other Tips Every Space Tourist Needs to Know*
- J 629.45 H *Astronaut Living in Space*

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#2: Oreo Moon Phases

SUMMARY:

The Moon produces no light of its own. It shines by reflecting sunlight. As the Moon orbits, it seems to change shape from night to night. These shapes are called phases. They complete a cycle nearly every month. When the Moon lies between Earth and the Sun, the Moon's far side is lit, and we cannot see the Moon from Earth. This phase is called the new moon. As the Moon moves in its orbit, the angle of sunlight on it changes. First it appears as a thin crescent. When the Moon is 90 degrees from the Sun it is in the first-quarter phase. When it lies opposite the Sun, the Moon is lit fully—the full moon. Then the Moon wanes (appears to get smaller). When the Moon again reaches 90 degrees from the Sun, it is in the last-quarter phase. The crescent continues to wane until it again reaches its new-moon phase.

WORDS TO USE:

New Moon – When the moon is invisible from earth.

Waxing Crescent – The moon is less than one quarter lit by the sun, but is in the phase that it is increasing in illumination every night.

First Quarter – When the moon is one half lit and is increasing in illumination every night.

Waxing Gibbous – The moon is more than one half lit by the sun, but not completely illuminated and is increasing in illumination every night.


Full Moon – When the moon is completely visible.

Waning Gibbous – When the moon is more than one half illuminated by the sun, but is decreasing in illumination every night.

Third Quarter – The moon is one-half lit by the sun, but is decreasing in illumination every night.

Waning Crescent – The moon is less than one quarter lit by the sun and is decreasing in illumination every night.

MOON PHASES DIAGRAM

			
New Moon	Waxing Crescent	First Quarter	Waxing Gibbous
			
Full Moon	Waning Gibbous	Last Quarter	Waning Crescent

MATERIALS NEEDED:

- Chocolate sandwich cookies (Oreos) - You will need 7 cookies to make all eight phases (not included)
- A popsicle stick or other tool for scraping the frosting (not included)
- Moon phases diagram (included in this binder)

ACTIVITY:

- Slowly twist the cookies to maximize the amount of frosting on one side when you separate the halves. Your first cookie will make both the New Moon (no frosting) and the Full Moon (full circle of frosting)
- Use the popsicle stick to create the phases of the Moon out of the frosting.
- Arrange the phases of the Moon in order.

For younger children, you can simplify the activity by making only four phases of the Moon. One cookie can make both the New Moon and Full Moon. Two more cookies can be used to make First Quarter and Last Quarter Moons.

OBSERVATIONS:

- Go outside with your child on a clear night to take a peek at the sky. If the Moon is out, point it out to your child and compare it with the Moon phases diagram. (Moonrise, moonset, and Moon phase calendars can be easily found through an internet search. Ask a Librarian if you need help.)
- Explain that the Moon produces no light of its own. It shines by reflecting sunlight.
- Explain that the moon travels around the Earth, taking about one month to get all the way around. The Moon's phases are caused by this movement around the Earth.

DID YOU KNOW?

- The Moon averages about 238,600 miles from Earth.
- The Moon moves away from the Earth about 2.8 cm every year.
- The gravity on the Moon is 1/6th the gravity of the Earth. That means if you weigh 36 pounds on Earth (the average weight of a four-year-old), you would only weigh 6 pounds on the Moon!
- Only 12 humans have walked on the Moon.

SUGGESTED READING:

- ICR J 523 D The Sun and the Moon
- ICR J 523.3 N The Night Sky

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#3: Robot Repair

SUMMARY:

Beep! Boop! Robots are machines that do tasks without the help of a person. Some robots can see, hear and feel, others can do jobs, some are very smart, they come in all different sizes. The Design & Drill® Robot is a simpler robot that introduces those 3+ to STEM learning through basic engineering and construction play. You can snap, screw, and decorate your rockin' robot pal with tools that all little builders can easily compute!

WORDS TO USE:

Robot - Can be a machine that can do tasks without the help of a person.

Robots do not always look like people and can only do what a person has built them to do.

Screwdriver - A hand tool with a flattened, cross-shaped, or star-shaped tip that fits into the head of a screw to turn it.

Bolt - A threaded pin that screws into a nut and is used to hold things together.

Nut - A flat piece of metal, typically square or hexagonal, with a threaded hole through it for screwing onto a bolt to hold things together.

MATERIALS NEEDED:

- Design & Drill Robot, screwdriver and bolts

ACTIVITIES:

Learn to Use a screwdriver:

Practice using the screwdriver, which helps develop hand0eye coordination and fine motor skills.

- Show your child how to hold the screwdriver.
- Teach your child about how turning the screwdriver different ways helps to loosen or tighten screws. Left- loose (lefty loosey) Right- Tight (righty tighty)
- Show your child what a bolt is and how you can place bolts into the holes and use the screwdriver to attach them.

Match colors:

- Ask your child to separate the bolts into matching color sets.- Red, Green, Blue, Grey
- Ask your child to attach matching bolts to various parts of the robot.

OBSERVATIONS:

- Did the screwdriver help you attach the bolts to the robot?
- Did the robots arms come off?
- Do you think the robot can do something on its own?

DID YOU KNOW?

- Robots date back to ancient Greece and China, and were called “automatons”.
- Old robots did not use electricity or batteries to move, but could be moved by using steam, air, water or falling weighs.
- Some of the first robots in the modern world were used to play or write music.
- Computers allow robots to do many things without the help of humans.
- Many robots are used in factories, to help load, move and unload things.
- Robots help do work that is dangerous for humans to do.

SUGGESTED READING:

- | | |
|-------------------|---|
| • ICR J 629.892 F | <i>Guinness World Records: Remarkable Robots</i> |
| • JGN 741.5952 S | <i>Leave it to PET: The Misadventures of a recycles super robot</i> |
| • E Staniszewski | <i>Power Down, Little Robot</i> |
| • E Timmers | <i>Franky</i> |

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#4: Project Your Own Home Planetarium

SUMMARY:

Planetariums allow us to experience the night sky in a very personal way. You can sit in a large room and see all the constellations, planets, and important stars. Projecting a small version of this onto the walls and ceilings of your home gives you and your child an even more personal experience of astronomy. This context can help your child make new connections and ask more detailed questions, as s/he explores the night sky at his/her own pace.

WORDS TO USE:

Astronomy—the science of studying planets, stars, and other things in space

Astronaut—a traveler in a spacecraft, or a scientist who goes into outer space

Galaxy—a very large group of stars and planets; there is more than one throughout the universe

Orbit—to circle around something

Planet—a large thing in space that moves in orbit around the sun, but is not a comet, asteroid, or satellite

Planetarium—a special type of theater for presenting educational and entertaining shows about astronomy and the night sky

Solar System—the group of a sun and the planets, moons, and other things that orbit around it

Star—a large round thing in outer space that shines by its own light

Sun—a huge star, with planets and other things orbiting around it

MATERIALS NEEDED:

- Shining Stars Projector

ACTIVITY:

- Place the star projector into the stand that comes with it.
- Insert one of the discs (yellow, orange, or green) that comes with the star projector into the open slot on the top of the projector, until it clicks into place.

- Press the power button on the back of the projector, and point the lens of the projector at a wall or ceiling in your home. It will be easier to see the projected images if you project them onto large blank areas.
- Slowly twist the yellow lens at the front of the projector until the image comes into focus.
- Look carefully at the image projected and discuss what you see with your child, using the observation questions below.
- To view the next image on the disc, turn the disc in the top of the projector until it clicks again and you see a different image.
- Turn that disc 7 times to see all 8 images. Then pull it out and replace it with another disc. Continue until you have viewed all 8 images on each of the 3 discs (24 images total).
- When you are finished viewing the projected images, or if you need to take a break in between images or discs, turn off the projector using the power button at the back. Note that the projector will automatically turn off after 15 minutes without use.

OBSERVATIONS:

- Green Disc (#1):
 - Look closely at each of the different planets. What do you notice that is the same and different about each planet?
 - Which of the 8 planets is your favorite?
 - What do you notice that seems really special about Earth, compared to the other planets?
- Orange Disc (#2):
 - Have you ever seen pictures before of the Earth and its moon, or the surface of the moon? Do the images on this disc show anything that surprises you?
 - What do you imagine it would be like to be an astronaut on the surface of the moon? What might you see, hear, smell, taste, and touch? What emotions would you feel? Is this something you would ever want to do?
 - Have you ever seen a solar or lunar eclipse? When you view the image of the eclipse on this disc, what do you notice about the light from the sun, behind the moon?
- Yellow Disc (#3):
 - What do you imagine it would be like to be an astronaut in space, attached to your ship, but floating around? What might you see, hear, smell, taste, and touch? What emotions would you feel? Is this something you would ever want to do?
 - Some astronauts live at the International Space Station for a very long time. What do you imagine that would be like? Would you ever want to live there, or even on another planet?

- One of these images is of the Little Dipper constellation. On a clear night without a lot of clouds, go outside after dark and look for that same group of stars in the night sky. Can you also find the Big Dipper near it?

DID YOU KNOW?

- Over 1 million planet Earths could fit inside the sun!
- It takes about 8 minutes for light from the sun to reach Earth.
- Only 12 people have ever walked on the moon.
- The moon has no wind, so you can't fly a kite on the moon.
- The color of a star depends on its temperature. Blue stars are the hottest of all.
- The light from some stars, such as those in our neighbor galaxy Andromeda, takes millions of years to reach Earth. So when you look at those stars, really you are looking back in time!
- There can be no life on Mercury because of how close it is to the sun. It is too hot to support life.
- Mercury is the smallest of the planets in our solar system. It is just slightly larger than Earth's moon.
- The hottest planet in our solar system is Venus (at over 850° Fahrenheit).
- Earth is the only planet that has liquid water on its surface. Earth is made up of at least 70% water.
- The tallest volcano in our solar system is located on Mars.
- The Great Red Spot on Jupiter is actually a storm that has been raging for hundreds of years.
- Of all the planets in our solar system, Jupiter spins the fastest.
- Saturn is the only planet that could float in water (but of course there's no container of water large enough for this!).
- Uranus is the only planet that rotates on its side.
- The planet with the strongest winds in our solar system is Neptune.
- Pluto used to be considered a planet. Now we know that it is actually a dwarf planet, so it has a lower classification than the rest of the planets in our solar system.

SUGGESTED READING:

- ICR J 523.8 B *Stars and Galaxies*
- J 520 L *A Day at Work with an Astronomer*
- J 520.92 S *Explore the Cosmos Like Neil DeGrasse Tyson: A Space Science Journey*
- J 523.8 K *Stargazing*
- J 523.8 R *Looking Up! The Science of Stargazing*
- J 523.8 S *Night Sky*

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#5: Count the Stars

SUMMARY:

Constellations are a group of visible stars that when connected with imaginary lines form a pattern and can be viewed from Earth. Patterns include shapes of animals, people or even everyday objects.

WORDS TO USE:

Astronomy – study of stars, planets and space

Constellation - a group of stars that forms a particular shape in the sky and has been given a name

Orbit – the path of a planet or other object around the Sun

Orion – the largest constellation and often called “The Great Hunter”

Stars – a huge ball of very hot, glowing gas that gives off both heat and light

MATERIALS NEEDED:

- Constellation Cards
- Wooden Stand
- Flashlight
- Paper (not included)
- Crayons (not included)

ACTIVITY:

- Select one constellation card and place in the wooden stand.
- Place the stand on a table about five inches from the wall
- Shine the flashlight onto the card
- Move back slowly until the spots on the wall are clear enough to count.
- Have your child count the stars in the constellation.
- Using paper, have your child draw the constellation shapes

OBSERVATIONS:

- Can you tell what shape the constellation creates?
- Which constellation has the most number of stars?
- Can you sort the constellations into different groups based on the number of stars or type of object?
- Take time to observe the night sky with your child. Observe the night sky over several evenings in a row and notice the changes. Remember to ask your child what they see. What changes do you and your child observe?
- Print out a Star Finder for each month of the year to further the observation of constellations. NASA Space Place: Make a Star Finder:
<https://spaceplace.nasa.gov/starfinder/en/>

DID YOU KNOW?

- Stars in the sky are grouped into 88 constellations.
- Constellations seem to move across the sky during the night but it is the rotation of Earth. As Earth turns, the constellations appear to travel across the sky.
- The shape of each constellation never changes. This is because the stars in the constellation do not change their position in relation to each other.
- In ancient times, stars helped track time and acted as a calendar and were often based on mythology.

SUGGESTED READING:

- | | |
|-------------|-----------------------|
| • E Elliot | <i>Henry's Stars</i> |
| • J 520 G | <i>Stargazers</i> |
| • J 523.8B | <i>The Big Dipper</i> |
| • J 523.8 K | <i>Constellations</i> |

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#6: Explore our Sky

SUMMARY:

A telescope is a tool you can use to help you see objects that are far away. Astronomers use telescopes to watch the stars, the moon and the planets. They use very powerful telescopes to look for new things in the sky and to study some of the planets up close. You can use less powerful telescopes to help you see things like the surface of the moon more clearly.

WORDS TO USE:

Astronomer - A person who studies space.

Magnification - The act of making something look larger than it is.

Moon - Any natural satellite of a planet.

Planet - Large natural object that travels around a star.

Star - Ball of gas that appears to be a point of light in the night sky.

Telescope - An instrument that allows people to see distant objects.

Tripod - A three legged stand that supports a telescope or camera.

MATERIALS NEEDED:

- Big View Telescope

ACTIVITY:

Practice using the telescope with a game of I Spy. Look for things that are easy for children to find, such as the mailbox, a pet, or a flower.

- Set up the telescope together.
- Show your child how to adjust the knob to focus the lens.
- Give your child clues to help him or her guess what you have spied. For example, if you would like your child to discover the red tulip, you could say, "I spy something red."
- Invite your child to find the object with the telescope.

Look at the Moon:

Spotting the moon is one of the simplest ways to get young children excited about looking at our sky.

- Go outside together or stand at a window with a good view of the sky on a cloudless night during the full moon.
- Help your child spot the moon. Talk about how far away the moon is from earth.
- Ask if he or she can see whether the moon's surface looks smooth or bumpy.
- Set up the telescope and use it to look at the moon again. The telescope helps you get a closer look at the moon's surface.
- Ask your child what the moon's surface looks like through the telescope.

OBSERVATIONS:

- Did the telescope help you see things that are far away more easily?
- Is the moon's surface bumpy or smooth?
- Can we touch the moon?
- Can we see the moon during the day?

DID YOU KNOW?

- The moon's light is a reflection from the sun.
- The moon is in the sky all the time, but we usually can't see it during the day.
- When people are on the moon, they have to wear special suits and helmets. Oxygen is pumped into the suit to help them breath.
- The moon is 238,855 miles from the earth.
- Experts say you should never look at the sun through a telescope. The sun is so bright that you could damage your eyes.

SUGGESTED READING:

- E Lehrhaupt *Chicken in Space*
- J 522.2 R *Telescopes*
- J 523.3 G *The Moon Book*

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#7: Helmet and Jetpack Craft

SUMMARY:

Dramatic play is a fun and complex way to enhance early literacy skill development. By using their imaginations to role play various scenarios, children expand and apply their knowledge of the world around them, and build their vocabulary. Crafts are a great way to expand a child's imagination, transforming materials into something entirely different for play. Whether you simply use the astronaut jumpsuit in the kit for dramatic play, or you add the helmet and jetpack craft, give your child to freedom to explore the world of being an astronaut!

WORDS TO USE:

Helmet - protects the head and vents oxygen to the astronaut

Snoopy Cap - a cap with earphones and a microphone worn inside the helmet

Spacesuit - a special suit that protects astronauts in space

In Suit Drink Bag - a bag filled with water attached inside the suit with a straw that reaches near the astronaut's mouth

Gloves - made of special fabrics so the astronauts can hold things and use tools in space

Life - Support Backpack –holds oxygen tanks for the astronaut to breathe and a battery for power

Tethers - special ropes that keep astronauts from floating away in space

Jetpack - a special backpack with jet thrusters that allows astronauts to move around in space

MATERIALS NEEDED (Not Included in Kit):

Find more information here -

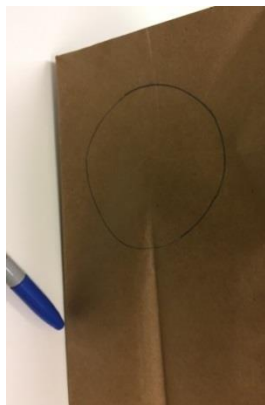
https://www.nasa.gov/audience/foreducators/spacesuits/home/clickable_suit_nf.html

- One large paper bag
- One medium paper bag
- 2 empty 2 liter soda bottles
- 2 Popsicle sticks
- Ribbon or tissue paper
- Tape
- 2 rubber bands
- Stickers
- Scissors
- Poster board

ACTIVITY:

Jetpack Backpack

- Cut the handles off the bag.
- Cut the front of the paper bag down the middle from the top of the bag to the bottom edge.
- Cut a 6 inch circle in the middle of the bottom of the bag.
- Mark and cut a 4 inch circle near the top on both sides of the bag.
- Tape the two soda bottles together side by side.
- Twist a rubber band around the opening of each bottle.
- Cut multiple pieces of ribbon or tissue paper for flames and secure them under the rubber band.
- Once all of the ribbon and tissue paper have been secured under the rubber bands tie a ribbon over the rubber band to secure.
- Tape a Popsicle stick to the back top of each bottle leaving the bottom half of the stick free (see photo).
- Cut a poster board piece the same size as the back of the bag.
- Fold the poster board in half and lay it on the back of the bag with the folded edge 3 inches from the top of the bag.
- Lay the soda bottle jetpack on top of the poster board and mark the poster board where the Popsicle stick meets the poster board.
- Cut 1 inch half-moon shapes at the marks.
- Set the jetpack aside and attach the poster board to the paper bag with duct tape leaving the half-moon spaces open.
- Attach the jetpack to the vest by sliding the Popsicle sticks into the poster board slots.
- Decorate with stickers, markers or paint.



Space Helmet

- Cut the handles off the bag.
- Cut a visor shaped opening out of the front of the bag near the top.
- Try the helmet on. Trim the top edge that rests on the shoulders if adjustment is needed.
- Decorate with stickers, markers or paint.



OBSERVATIONS:

- Do you think 2 liter bottles make a good jetpack?
- What else could you use to make a jetpack?
- What else could you make from 2 liter bottles?

DID YOU KNOW?

- The gloves that astronauts wear in space have heaters in the fingertips to keep their hands warm.

SUGGESTED READING:

- <https://www.nasa.gov/suitup>
- https://www.nasa.gov/audience/foreducators/spacesuits/home/clickable_suit.html
- J 629.441 K *Space Academy: How to Fly Spacecraft Step by Step*
- J 629.45 H *Astronaut: Living in Space*
- J 629.45 H *Astronaut*