HOW TO DRAW ARTEMIS

NASA'S EXPLORATION EXTRAVEHICULAR MOBILITY UNIT

xEMU

WHEN THE FIRST WOMAN AND NEXT MAN STEP FOOT ON THE MOON IN 2024, THEY WILL BE WEARING THE EXPLORATION EXTRAVEHICULAR MOBILITY UNIT, OR xEMU, THE NEXT GENERATION OF SPACE SUITS DESIGNED TO GIVE ASTRONAUTS ENHANCED MOBILITY TO ACCOMPLISH THEIR EXPLORATION TASKS ON THE LUNAR SURFACE!

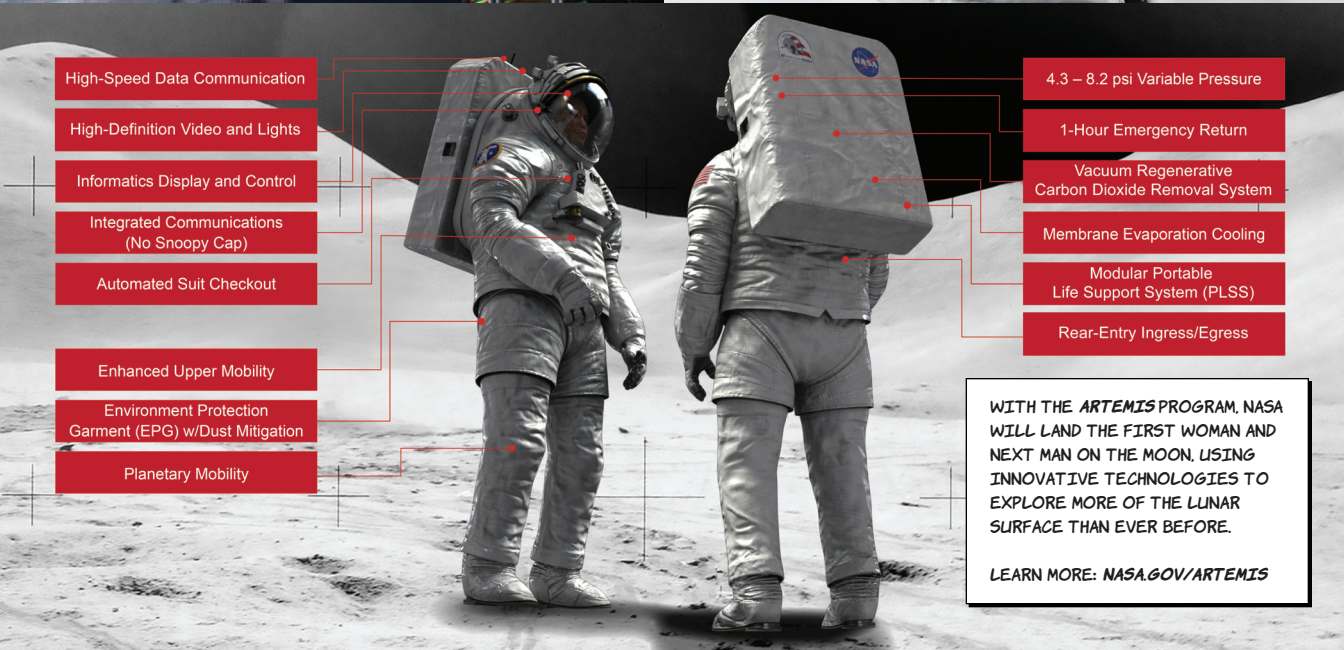
National Aeronautics and Space Administration

NASA

WE ARE GOING!

ARTEMIS GENERATION SPACE SUITS

xEMU HELMET AND TORSO



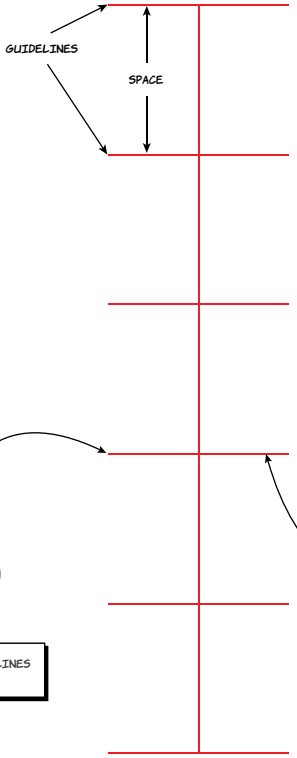
- High-Speed Data Communication
- High-Definition Video and Lights
- Informatics Display and Control
- Integrated Communications (No Snoopy Cap)
- Automated Suit Checkout
- Enhanced Upper Mobility
- Environment Protection Garment (EPG) w/Dust Mitigation
- Planetary Mobility
- 4.3 – 8.2 psi Variable Pressure
- 1-Hour Emergency Return
- Vacuum Regenerative Carbon Dioxide Removal System
- Membrane Evaporation Cooling
- Modular Portable Life Support System (PLSS)
- Rear-Entry Ingress/Egress

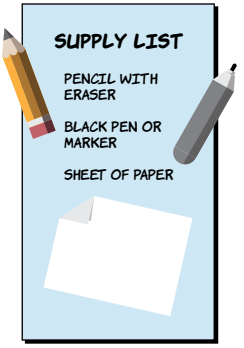
WITH THE *ARTEMIS* PROGRAM, NASA WILL LAND THE FIRST WOMAN AND NEXT MAN ON THE MOON, USING INNOVATIVE TECHNOLOGIES TO EXPLORE MORE OF THE LUNAR SURFACE THAN EVER BEFORE.

LEARN MORE: *NASA.GOV/ARTEMIS*

1. LET'S DRAW THE xEMU

THE xEMU CAN BE DRAWN USING SIMPLE SHAPES. THE TRICK IS USING CORRECT PROPORTIONS. USING YOUR PENCIL, START BY DRAWING A VERTICAL CENTER LINE. DRAW HORIZONTAL LINES TO DIVIDE THE VERTICAL LINE INTO 5 EQUAL SPACES. THIS WILL HELP KEEP YOUR xEMU SUIT PROPORTIONAL.





THIS ACTIVITY REQUIRES A *PENCIL* AND A ***BLACK PEN*** OR A ***MARKER***. YOU WILL USE THE PENCIL TO DRAW THE GUIDELINES AND THE MARKER TO DRAW THE FINAL SHAPES. FOR EVERY STEP, THE CURRENT SHAPES TO BE DRAWN ARE SHOWN IN ***RED***. THESE PROPORTION GUIDES WILL BE SHOWN IN GREEN, AND OTHER GUIDELINES WILL BE SHOWN IN BLUE.

FUN FACT

xEMU IS NASA'S NEXT-GENERATION SPACE SUIT FOR THE 2024 LUNAR SURFACE MISSION.

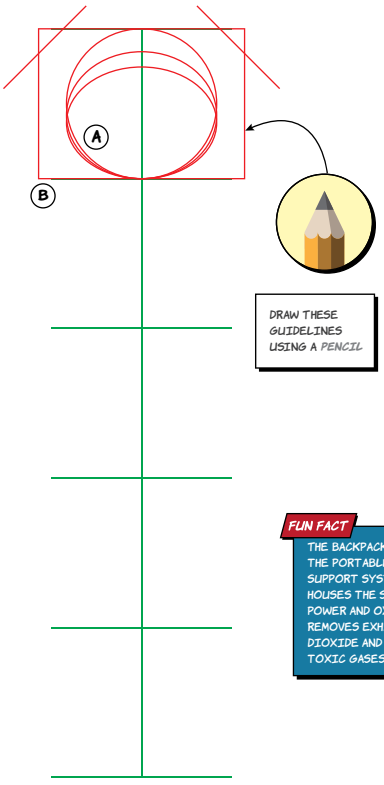
FUN FACT

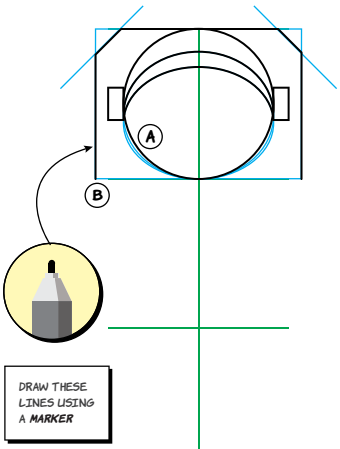
THE SUIT PROVIDES MOBILITY FEATURES SUCH AS BEARINGS IN THE LEGS THAT ALLOW THE ASTRONAUT TO WALK ON THE MOON.

2. DRAW THE HELMET AND BACKPACK

IN THE TOP SPACE, USE THE PENCIL TO DRAW A CIRCLE FOR THE HELMET. ADD TWO SHORTER OVALS AS SHOWN TO DEFINE THE HELMET FACEPLATE AND RIM. USE YOUR MARKER TO DRAW THE CIRCLE AND THE TOP HALF OF THE TWO OVALS. ADD A SMALL RECTANGLE ON EACH SIDE FOR THE FACEPLATE HINGES. THIS IS THE HELMET.

WITH YOUR PENCIL, DRAW A RECTANGLE FROM THE TOP GUIDELINE DOWN TO THE SECOND GUIDELINE. THIS RECTANGLE SHOULD BE WIDER THAN THE HELMET. ADD A DIAGONAL LINE AT EACH TOP CORNER. THIS WILL DEFINE THE SHAPE OF THE BACKPACK. USE YOUR MARKER TO DRAW OVER THE SIDES, DIAGONAL CORNERS, AND TOP OF THE BACKPACK. DO NOT DRAW OVER THE BOTTOM BACKPACK LINE.





FUN FACT

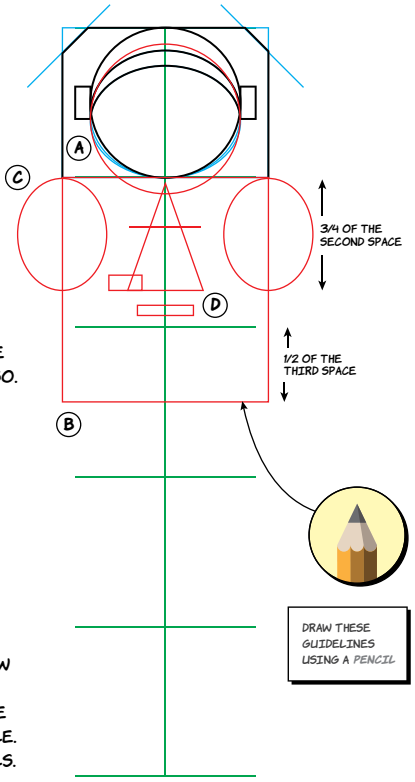
THE BACKPACK CONTAINS THE PORTABLE LIFE SUPPORT SYSTEM, WHICH HOUSES THE SUIT'S POWER AND OXYGEN AND REMOVES EXHALED CARBON DIOXIDE AND OTHER TOXIC GASES.

3. DRAW THE TORSO GUIDELINES AND DETAILS

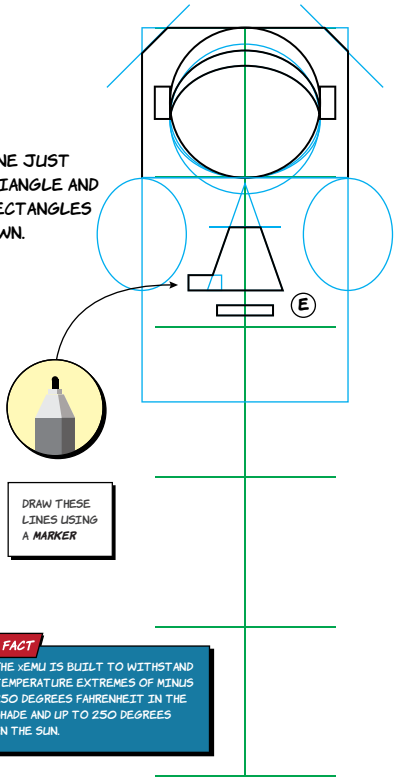
USING YOUR PENCIL, DRAW A CIRCLE THE SAME SIZE AS THE HELMET, BUT A LITTLE LOWER DOWN. THIS WILL BE THE NECK RING. DRAW A RECTANGLE FROM THE SECOND GUIDELINE TO THE MIDDLE OF THE THIRD SPACE, MAKING IT THE SAME WIDTH AS THE BACKPACK. THIS WILL BE THE TORSO.

AT EACH SHOULDER, ADD AN OVAL IN THE SECOND SPACE, STARTING AT THE TOP SPACE GUIDELINE AND GOING DOWN ABOUT 3/4 OF THE SPACE. THESE OVALS SHOULD BE CENTERED ON THE SIDES OF THE TORSO AND BACKPACK, AND WILL SHOW WHERE THE SLEEVES JOIN THE TORSO.

IN THE MIDDLE OF THE TORSO, DRAW A TRIANGLE AND TWO RECTANGLES AS SHOWN. ADD A HORIZONTAL LINE THROUGH THE TOP OF THE TRIANGLE. THESE WILL BE THE TORSO DETAILS.



OUTLINE JUST THE TRIANGLE AND TWO RECTANGLES AS SHOWN.

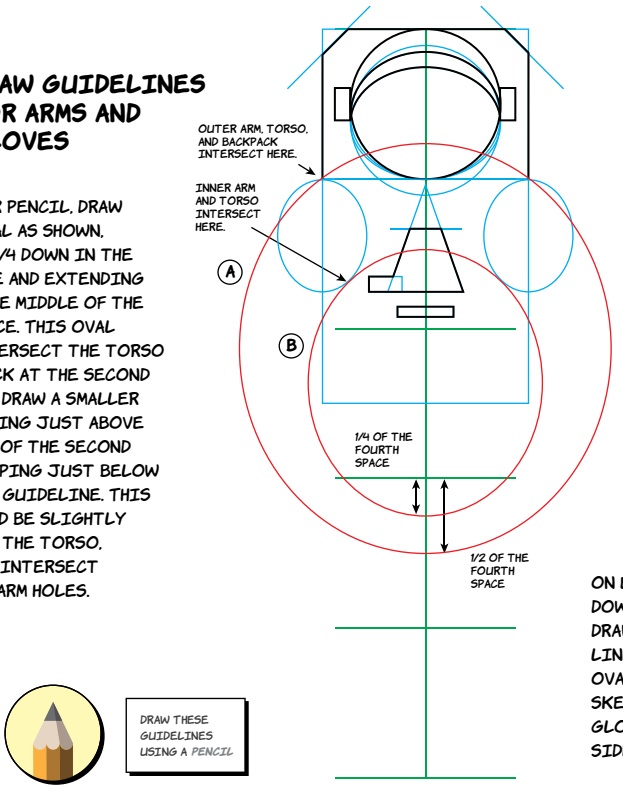


FUN FACT

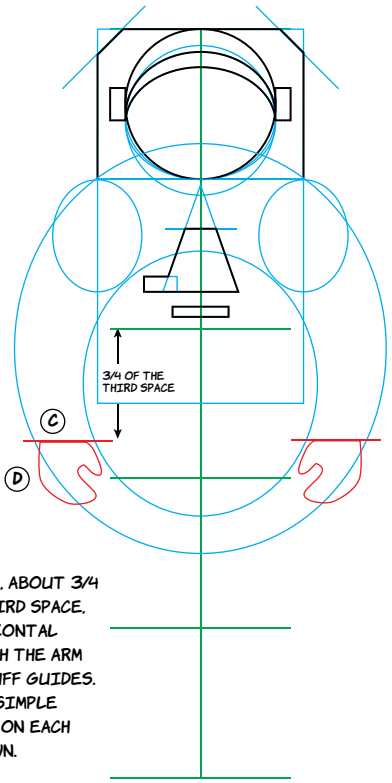
THE XEMU IS BUILT TO WITHSTAND TEMPERATURE EXTREMES OF MINUS 250 DEGREES FAHRENHEIT IN THE SHADE AND UP TO 250 DEGREES IN THE SUN.

4. DRAW GUIDELINES FOR ARMS AND GLOVES

USING YOUR PENCIL, DRAW A LARGE OVAL AS SHOWN, STARTING 3/4 DOWN IN THE FIRST SPACE AND EXTENDING DOWN TO THE MIDDLE OF THE FOURTH SPACE. THIS OVAL SHOULD INTERSECT THE TORSO AND BACKPACK AT THE SECOND GUIDELINE. DRAW A SMALLER OVAL STARTING JUST ABOVE THE MIDDLE OF THE SECOND SPACE, STOPPING JUST BELOW THE FOURTH GUIDELINE. THIS OVAL SHOULD BE SLIGHTLY WIDER THAN THE TORSO, AND SHOULD INTERSECT THE TORSO ARM HOLES.



DRAW THESE GUIDELINES USING A PENCIL



ON EACH SIDE, ABOUT 3/4 DOWN THE THIRD SPACE, DRAW A HORIZONTAL LINE THROUGH THE ARM OVALS FOR CUFF GUIDES. SKETCH IN A SIMPLE GLOVE SHAPE ON EACH SIDE AS SHOWN.

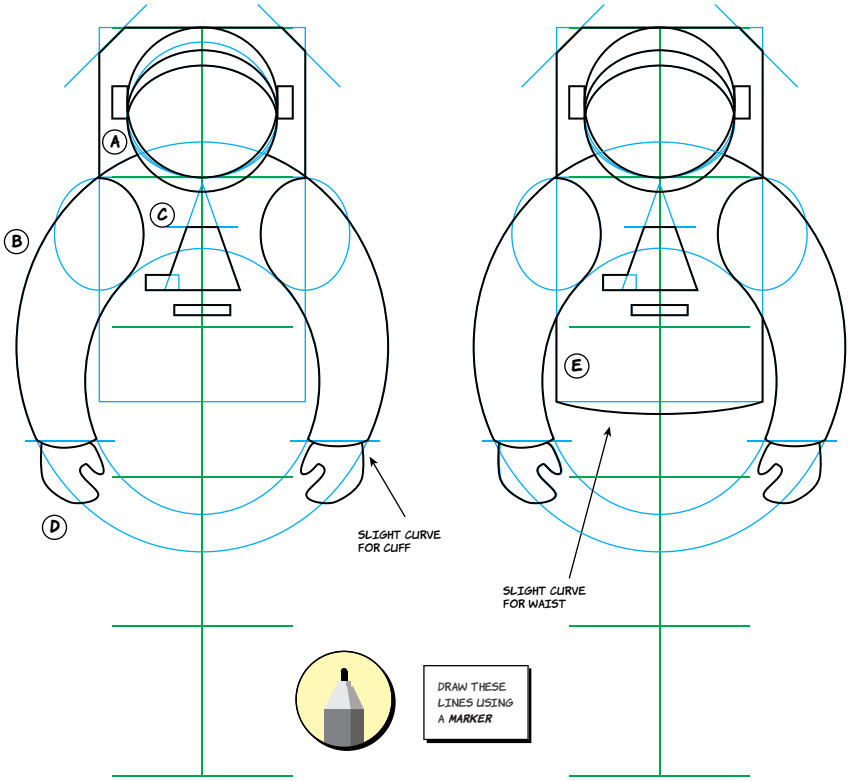
5. DRAW ARMS, GLOVES, AND TORSO

USING THE MARKER, DRAW THE HELMET NECK RING, THEN ONE OUTSIDE ARM CURVE FROM THE SIDE OF THE NECK RING DOWN TO THE CUFF GUIDE. ADD A DOWNWARD CURVE TO THE CUFFS FOR A MORE REALISTIC LOOK. DRAW THE INSIDE ARM CURVE FROM THE CUFF TO THE TORSO ARM HOLE, THEN DRAW OVER THE INSIDE OF THE TORSO ARM HOLE GUIDE. DRAW OVER THE GLOVE SHAPE. DO THE SAME ON THE OTHER SIDE.

DRAW THE TORSO DOWN FROM ONE ARM. DRAW THE WAIST, ADDING A SLIGHT DOWNWARD CURVE FOR A MORE REALISTIC LOOK. CONTINUE YOUR LINE UP TO THE OTHER ARM.

FUN FACT

A MAJORITY OF CRITICAL XEMU COMPONENTS ARE SOURCED FROM COMMERCIAL AND INDUSTRIAL SUPPLIERS.



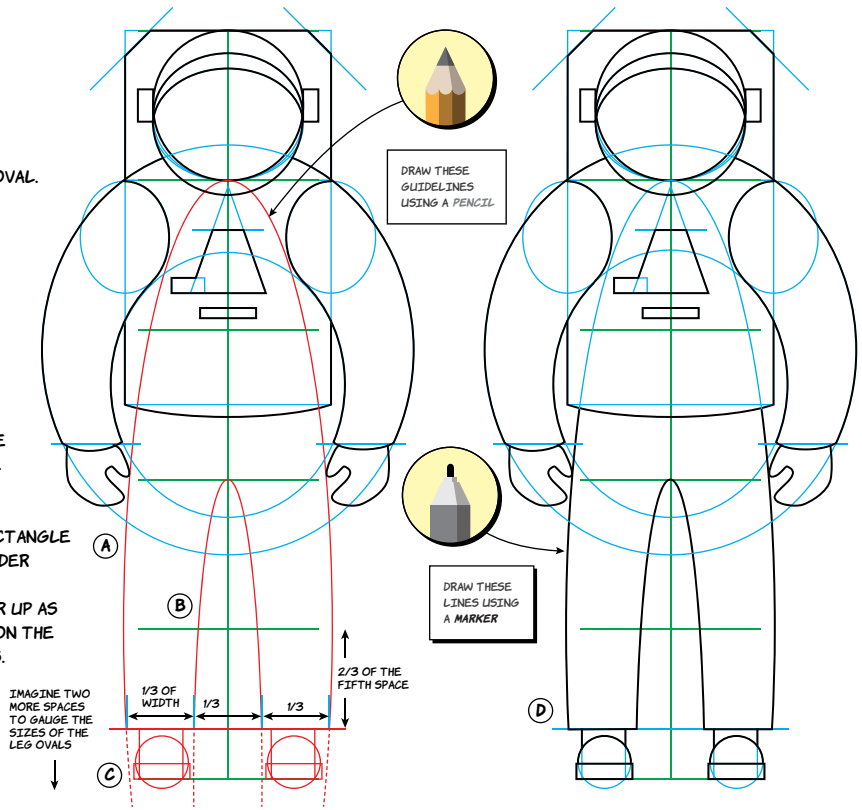
6. DRAW LEGS AND BOOTS

USING YOUR PENCIL, DRAW A PARTIAL OVAL. IT SHOULD BE AS WIDE AS THE TORSO. TO MAKE IT THE RIGHT SIZE, IMAGINE IT GOES OFF THE PAGE FOR TWO MORE SPACES BELOW THE DRAWING. ADD A LINE FOR A CUFFS GUIDE ABOUT 2/3 OF THE WAY DOWN THE FIFTH SPACE.

ADD A NARROWER OVAL STARTING AT THE FOURTH GUIDELINE AND GOING DOWN TO THE SAME (IMAGINARY) SPOT AS THE LAST OVAL. THE OVAL SHOULD BE ABOUT 1/3 AS WIDE AS THE LARGER ONE AT THE LEVEL OF THE PANTS CUFFS.

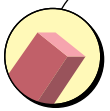
ON ONE SUIT LEG, ADD A NARROWER RECTANGLE FROM THE SUIT LEG TO THE LAST DIVIDER AS SHOWN. ADD A NARROW HORIZONTAL RECTANGLE FROM THE BOTTOM DIVIDER UP AS SHOWN, THEN ADD THE CIRCLE. REPEAT ON THE OTHER LEG. THESE WILL BE THE BOOTS.

USING YOUR MARKER, DRAW OVER THE PANTS LEGS AND BOOTS AS SHOWN.

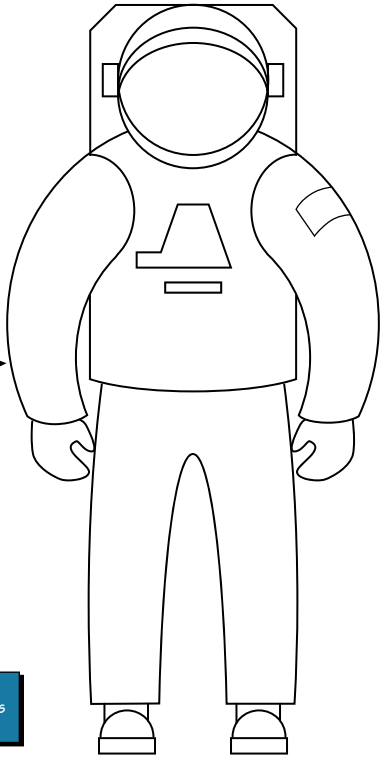


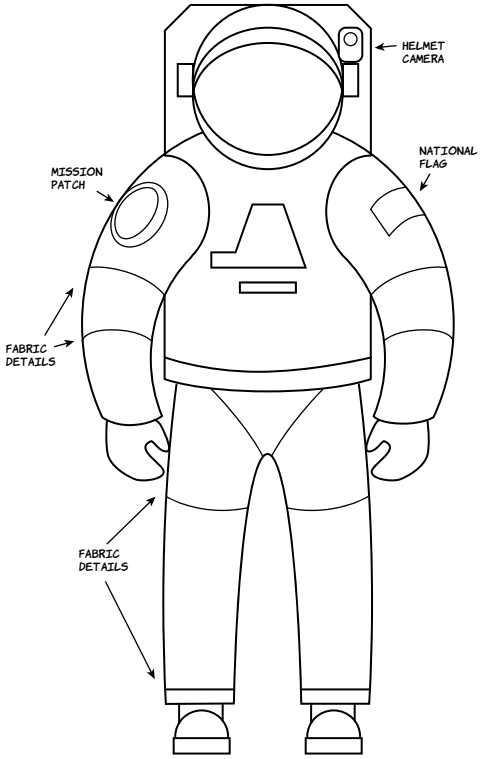
7. ERASE THE GUIDELINES

ERASE THE PENCIL GUIDELINES. ONLY THE INK DRAWING SHOULD REMAIN. YOU CAN ADD SOME DETAILS TO THE SUIT, USING THE COVER IMAGE AS A GUIDE. YOU'RE NOW READY TO ADD SHADING.



ERASE THE *PENCIL* LINES





FUN FACT

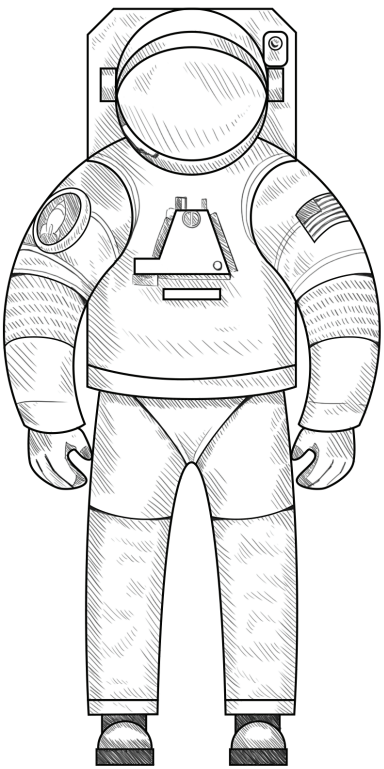
THE xEMU IS DESIGNED WITH INTERCHANGEABLE PARTS THAT CAN BE CONFIGURED FOR SPACEWALKS IN MICROGRAVITY OR ON A PLANETARY SURFACE.

8. SHARE YOUR MASTERPIECE!

MAKE IT YOUR OWN! ADD EXCITING COLORS, ADD A FACE IN THE HELMET, AND DRAW A PLANET WITH AN ALIEN SKY.

DON'T FORGET TO SHARE YOUR MASTERPIECE ON SOCIAL MEDIA!

#DRAWARTEMIS



ARTEMIS

National Aeronautics and Space Administration

www.nasa.gov
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