

## EDUCATOR'S GUIDE

# Design a Spacesuit

## Preparation

### Overview and Objectives

This lesson is geared toward students in grades 3–5.

Participants will learn about what happens in the vacuum of space and why astronauts need spacesuits. This topic will be explored by investigating how a vacuum chamber impacts three different substances: a cup of water, two balloons and a marshmallow. Participants will explore what a spacesuit is and how it can act as a protective force against this vacuum. Participants will then design their very own space suit!

This lesson includes a [slideshow](#) in which an instructor can lead participants through various spacesuit designs and ultimately work on an activity to design their own.

### Instructional Modalities

This activity was designed for both synchronous or asynchronous instruction.

For **synchronous instruction**, we recommend a platform that allows both for whole class discussion and for students to interact in small groups.

For **asynchronous adaptations**, we provide suggestions for teachers to provide additional support for the activities and for students to share their work with each other.

### Materials

- [Design a Spacesuit Slideshow](#)
- [Design a Space Suit Instructions](#)
- **Construction paper, foam stickers, tinfoil, origami paper, scissors, oil pastels, glue sticks, rhinestones. Large human template**

### Standards

Common Core Anchor Standards

CCSS.ELA-LITERACY.CCRA.R.7

National Core Arts Standards

Creating Anchor Standard #1

## Lesson

### 1. Introductory Activity

- Discuss:
  - **How is life in space different than life on Earth?**  
Prepare students for the activities and video to follow by discussing how Earth has an atmosphere. Space; however, does not have any air, so there is no air pressure on matter in space. When objects, and living beings, that are used to having air pressure applied to them suddenly have no pressure - odd distortions and dangerous situations happen!
- Participants will watch either a [3 minute video](#) or [30 minute video](#) demonstrating why astronauts need to wear space suits in the vacuum of space. Ask participants:
  - **What is the vacuum of space?**
  - **Why do astronauts need spacesuits?**
- Have students look through NASA infographic showing components of spacesuits. Discuss the components of a spacesuit with the group:
  - **How does a spacesuit support life (temp regulation, pressure, oxygen)?**
  - **How does a spacesuit keep an astronaut safe?**
  - **How does a spacesuit help astronauts do their job well?**

Any good spacesuit needs to do the following: Provide stable pressure, allow movement, supply breathable oxygen and eliminate carbon dioxide, regulate temperature, allow communication with others, and be able to collect and contain solid and liquid bodily waste. Spacesuits also need to shield against radiation, have a means to maneuver, dock, release, and tether onto a spacecraft, and protect against small objects like rocks that could hit you in space
- Have students look at examples of spacesuits from history, including layers of fabric, and essential elements.
  - **What do you notice?**
  - **Why do you think some of the features you see were added?**

### 2. Core Activity

- Explain to participants that we will now be designing their own spacesuits. Our spacesuits need to protect against radiation and space dust, provide temperature regulation, provide pressure and Oxygen. They will have a variety of materials for their design. Share [visual](#)

[instructions](#) with participants.

- Give participants a chance to show their suit designs.
  - **Which features did you include to help astronauts stay safe?**

## Asynchronous Adaptation

Have participants go through the [slideshow](#) on their own and create their own [spacesuit](#) using the worksheets attached. Have students take a picture of their spacesuit and share it on a Padlet or Google Doc.



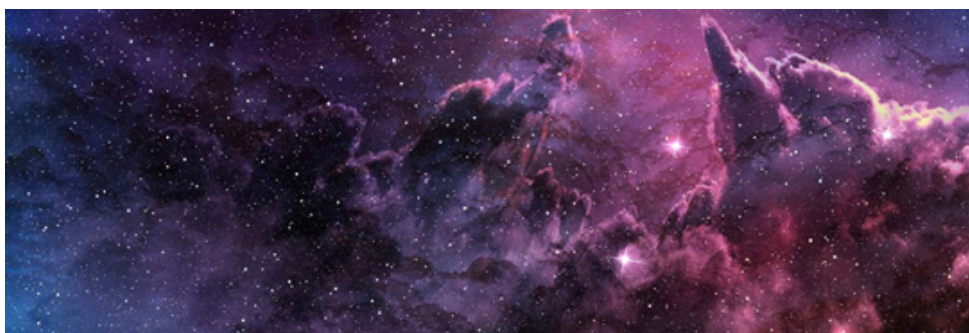
## ACTIVITY: DESIGN A SPACE SUIT

### Directions:

NASA is looking to hire a team to design a spacesuit to keep their astronauts safe as they travel back to the moon on the Artemis mission. You are part of the lucky design team. Remembering what we learned about the space vacuum, think about the materials and components you will use.

### **Your space suit must:**

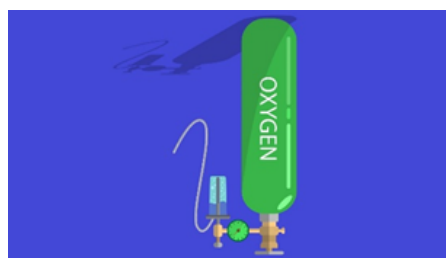
1. Protect you astronaut from radiation and space dust



2. Keep your astronaut from getting too hot or too cold



3. Be pressurized and provide your astronaut with oxygen



Try to create a stylish space suit that meets these three goals.

**Be creative!**

# VISUAL INSTRUCTIONS: DESIGN YOUR OWN SPACE SUIT

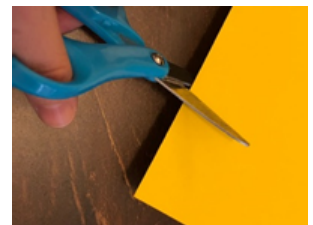
Use the materials to design your space suit:

- Construction paper
- Foam stickers
- Tinfoil
- Origami paper
- Scissors
- Oil pastels
- Glue stick
- Rhinestones

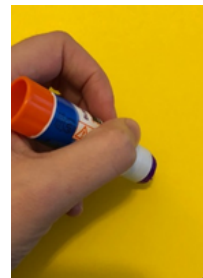


**Steps:**

**1. Think about what your astronaut's job is. What kind of space suit will they need to do their job?**

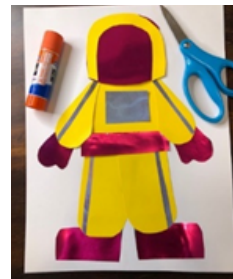


**2. Cut large shapes out of construction paper or tin foil to make the large shapes of your space suit.**



**3. Glue these shapes onto your astronaut silhouette.**

**4. Add smaller details to your suit with origami paper, rhinestones, foam stickers or felt shapes**



**5. Use oil pastels to put your final additions on your design and draw a background.**

