LESSON 1:
MISSION PATCH

SUPPLIES

LESSON KIT #1

- Cardboard disks (20)
- Styrofoam balls (20)
- Ribbon (colored and white) (2 each)
- Star stickers
- Wooden skewer (20)
- Aluminium foil
- Crayons

PENCIL BOX

- Markers
- Tape
- Pencils

BIG FOLDER

- Printer paper (40)

OBJECTIVES

- [x] Students will understand the significance of an astronaut mission patch
- [x] Students will be able to explain what a comet is

HOOK

2-3 min

Have you ever accomplished something with a team? Think about a time you have worked with friends to achieve a common goal. Would you have been able to do it alone?



INTRODUCTION

3 min

Attention! Attention! This is Mission Control calling all future space explorers! A mysterious comet has entered our solar system. Astronomers have been tracking its journey through space and discovered that its path will take it very close to Earth. While comets usually travel safely through space, NASA wants to learn everything possible about this visitor so we can better understand our solar system and keep our space neighborhood safe. That's where YOU come in!

NASA needs the STEAM leaders of the future to join an exciting mission. Your job is to train like real astronauts, learn about the amazing objects in our solar system, and help NASA collect important scientific information before the comet reaches the Moon.

The first step is making a Mission Patch for Operation Mysterious Comet!

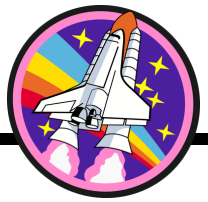
LET'S LEARN ABOUT MISSON PATCHES!

NASA mission patches are circular or shield-shaped emblems worn on astronaut flight suits. astronauts design their mission patches to tell the story of each shuttle mission. The astronauts choose pictures, colors, and symbols that explain the importance of the mission and represent the astronauts on the team.



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MISSION PATCH



DISCUSSION

3-5 min

A mission patch is a special symbol that represents your crew and reminds everyone of your important mission. Show students the NASA mission patch examples included below. Ask students: “What do you notice? What images are on these patches? Why might an astronaut want a patch?”

Explain that every NASA mission gets its own patch. The crew designs it together. It goes on their suits, their gear, and into history books. Point out the common elements: mission name, crew names, images that represents the mission’s goals, and stars, planets, or spacecraft related to where they’re going!

Have students brainstorm what items could go on the mission patch. Suggest the following:

- The name of the mission: **Operation Mysterious Comet**
- A picture of a comet or the solar system
- The school mascot or name

Everyone’s patches will look different, but reinforce the idea that there should be common elements.

ACTIVITY #1: MISSION PATCH

20 min



1. Distribute cardboard discs and supplies. Walk through steps before students begin. Provide expectations for the applicable age groups in your class:

   • **K–1**: focus on the center image and coloring.
   • **2nd–3rd**: Encourage at least 3 design elements plus text.
   • **4th grade**: Challenge to include a motto and a specific launch date. These written elements can go on the back of the patch.

2. Students can brainstorm ideas on printer paper if they would like. Once they are ready, instruct students to lightly sketch their design in pencil on the cardboard disk. Put the mission name along the top curve and crew name along the bottom, just like real patches.



3. Next, draw your central image in the middle of the disc. This is the largest, most important element. Color in!

4. Add background details such as stars, planets, space backgrounds, etc. with crayons or markers. Ink over pencil lines with marker for bold, clear lines.

5. Add additional cut-paper elements or star stickers if desired. A paper rocket or planet glued on top adds dimension to a mission patch.



6. Optional: punch a hole in the top, thread yarn through, and students can wear their patches home!

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MISSION PATCH

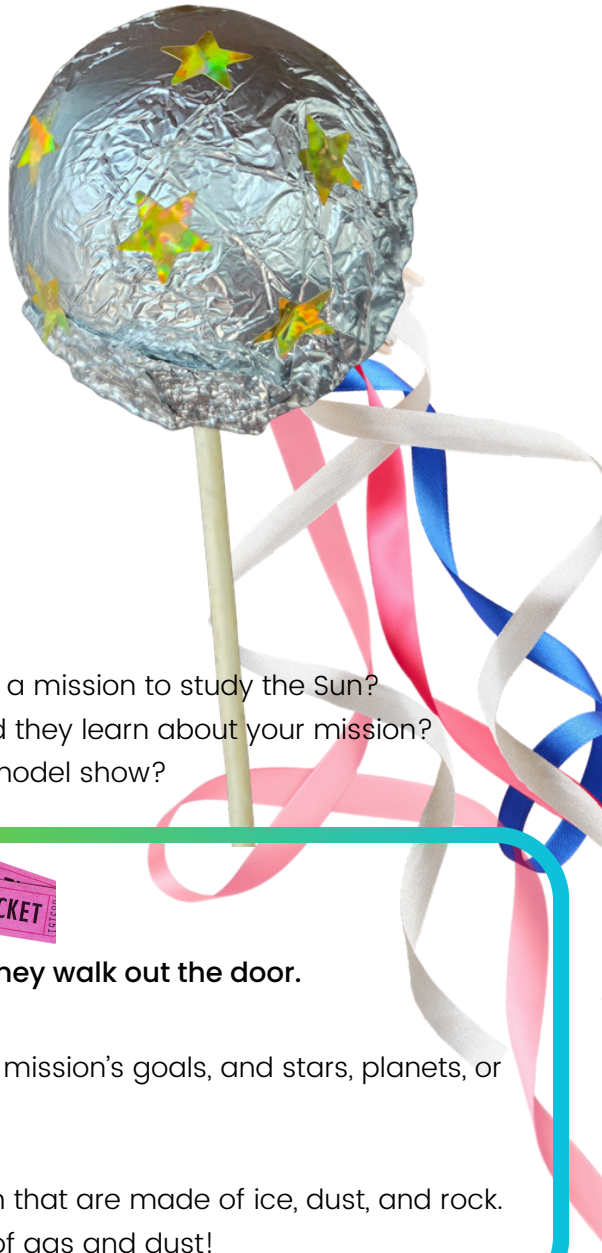
ACTIVITY #2: MAKING A COMET

20 min

The mysterious comet is getting closer, and scientists need more information. Your next assignment is to build a model of the comet so everyone can study it more closely! In this second activity, students will build a handheld comet model on a stick using a foam ball nucleus, foil for the coma, and ribbon tails representing the ion and dust tails. After building, they can swoop and swoosh their comet, observing how the tails stream.

Comets are ancient icy travelers from the far edges of the solar system. When they fly close to the sun, the heat causes its ice to change into gas. No matter which direction a comet moves, its tail always points away from the sun. A comet is a small body made of ice, rock, and dust that orbits the sun. When it gets close to the sun, the ice turns to gas and forms two tails: one made of gas, one made of dust.

1. Instruct students to place the foam ball in the center of a foil square. Wrap the foil loosely around the ball, leaving some crinkled texture on the surface (this will look like the rough, cratered surface of a real comet). Pinch the foil at the bottom where the stick will attach, but do not fully close it yet.
2. Hold 3–4 colored ribbons (gas tail) and 3–4 white ribbon strips (dust tail) together at one end. This bundle goes at the base of the foil-wrapped ball. Pinch the foil tightly around the tail bundle.
3. Push the skewer up into the foil-wrapped ball. The stick should feel firmly attached when you wave the comet gently.
4. Swoosh the comet and watch the tails fly!



OBSERVE & EXPLAIN

3 min

Ask students the following questions:

- Why do you think astronauts design their own patches?
- What symbol would you use to show a mission to Mars? What about a mission to study the Sun?
- If a future explorer found your patch 500 years from now, what would they learn about your mission?
- What is a comet made of? What aspects of a real comet does our model show?

Exit Ticket

Ask each student one of the following questions as they walk out the door.

- Q: What is one feature of an astronaut's mission patch?
  - A: the mission name, crew names, images that represents the mission's goals, and stars, planets, or spacecraft related to where they're going!
- Q: What is a comet?
  - A: Comets are travelers from the far edges of the solar system that are made of ice, dust, and rock. Comets travel around the Sun and grow a bright, glowing tail of gas and dust!

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MISSION PATCH 1: STUDENT DIRECTIONS

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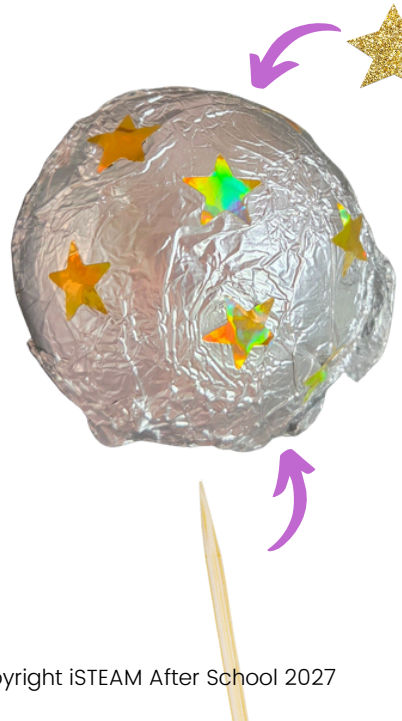


MISSION PATCH 2: STUDENT DIRECTIONS

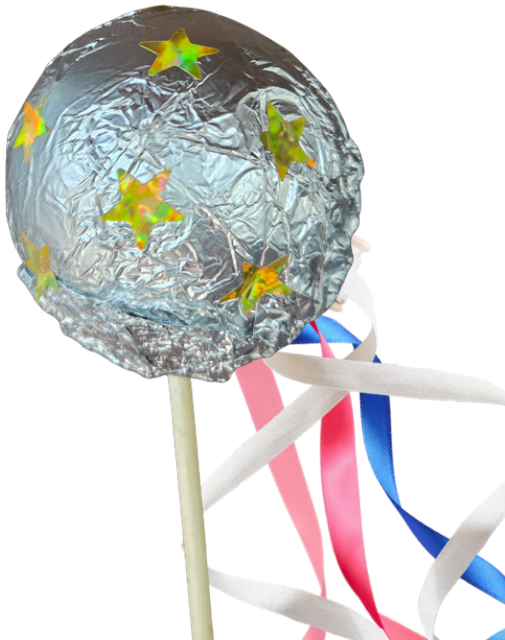
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