

KS2

Space exploration

TEACHING PACK

- Learn about becoming an astronaut
- Build a space vehicle
- Write a space travel story

Contents

Section A: Lesson plans	3-19
Section B: Teacher pack	1-23
Section C: Pupil pack	1-25



Space exploration

Section A: Lesson plans

About this project-based teaching pack

This project-based learning unit is designed to teach and reinforce the concepts in a primary science unit on space exploration and can be used in conjunction with existing curriculum materials.

The project is divided into 5 Milestones; each Milestone includes a self-contained pupil project activity. Completed in sequence, the Milestones connect to enable pupils to complete a comprehensive space exploration project.

The minimum suggested duration for completing this project is 5 lessons. However, it is completely flexible and can be lengthened or shortened as necessary, based on available class time and interest level.

How to use this teaching guide

Each Milestone for this project-based learning unit includes detailed daily activities presented in step-by-step order, with teaching notes, instructional guidance and page references to resources and materials included in the Teacher pack and Pupil pack.

Daily activities are organized for you as follows:

- **Prepare (bell-ringer/starter activity)**

Use these short opening activities at the beginning of class.

- **Present (teach/model)**

Use this section of the lesson to deliver new subject material and project information, and to model any instructions or activity required for the Produce or Participate elements.

- **Produce (pupil project work)**

Use this section of the lesson to allow pupils to work independently or in small groups on activities and other project elements.

- **Participate (pupil/group share)**

Use this section of the lesson to allow pupils to share any project, research, or presentation materials.

- **Practise (homework/assessment/independent)**

Use this optional section of the lesson, if desired, to give pupils homework activities.

Step-by-step project teaching guide

Overview

Milestone 1: Building background knowledge of space exploration

Explore four different astronaut training activities and then explain the steps in the astronaut selection process.

Explain why it is so hard to become an astronaut.

Milestone 2: Famous astronauts

Answer questions about a famous astronaut by conducting research.

Explain the characteristics necessary for being a successful astronaut.

Milestone 3: Spacecraft and space travel

Explore the changes in spacecraft over time.

Identify the parts of a spacecraft and explain what they do.

Design their own vehicle to travel in space.

Milestone 4: Building a new space vehicle

Explain the changes in spacecraft over time.

Justify the design features of their own spacecraft.

Milestone 5: Describing a trip to space

Synthesise everything learnt in this unit by writing a story about a journey into outer space.

Explain if they would like to be an astronaut and justify the reasons for and against their decisions.

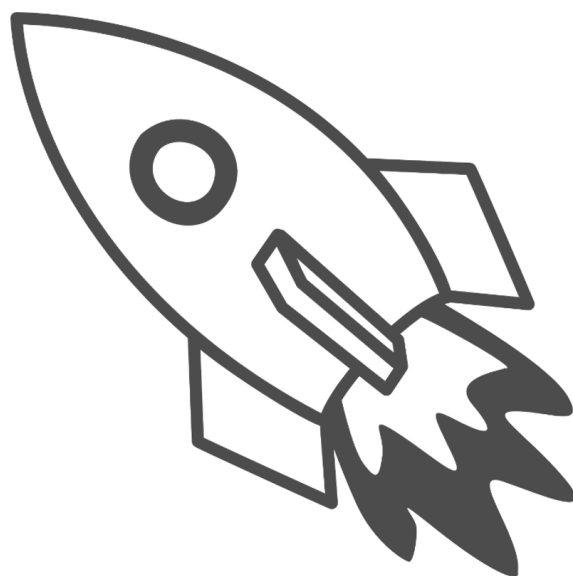
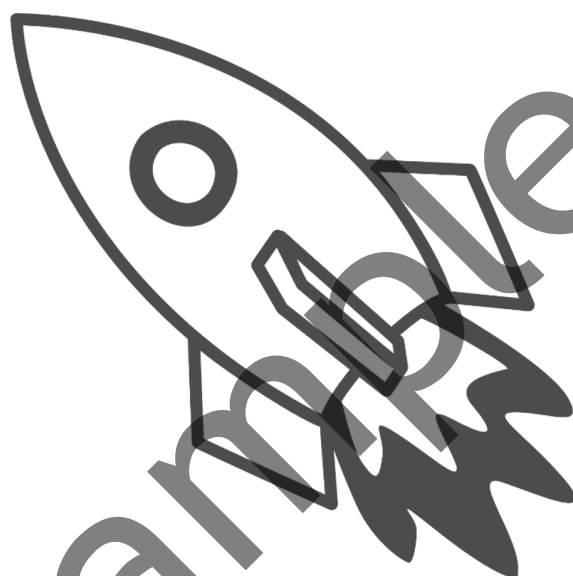
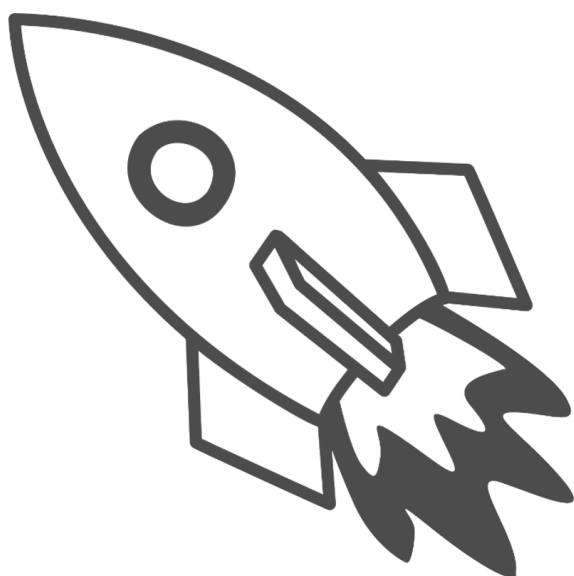
Science astronaut training centre

Teacher notes: Put the rocket template on the next page at the centre. Pupils will also need crayons, coloured pencils and pens, scissors, tape, thick straws, thin straws and sticky tack for this experiment. They should have page 5 'Astronaut technical jobs' from the Pupil pack. Cut off the top section of this page, and put the instructions below in the Science astronaut training centre.

Science astronaut training centre

1. Gather the supplies that are listed on the 'Launching a rocket' sheet on page 5 of your Pupil pack.
2. Follow the instructions to make your rocket launcher.
3. Have rocket races with your group members, and answer the questions based on your results.
4. If you have extra time, put a piece of paper on the floor as a 'planet.' Try to land your rocket on the planet.

Rockets for 'Launching a rocket'



Astronaut cards

Teacher notes: Make 3 copies of the Astronaut cards, cut them out and mix them up in a hat or bag. Ask each pupil to choose one card to determine which astronaut they will research.



Tim Peake



Guion Bluford



Mae Jemison



Helen Sharman



Buzz Aldrin



Ronald McNair



Sally Ride



Jim Lovell

Name: date:

Designing an astronaut lander

Landing on the Moon or Mars is tricky. Landers are spacecrafts that travel incredibly fast (as fast as 24,816 miles per hour!) but they also need slow down before touching the surface and land gently. If there are astronauts on board, the lander also needs to keep them safe.

Use what you know about space travel to design and build a lander that will protect two 'astronauts' when they touch down. Build a shock-absorbing lander out of simple materials and improve your design based on the results of your test landing.

Instructions: Follow these steps to design and test your own astronaut lander.

Step #1 - Gather supplies.

You will need:

- Scissors
- 1 piece of stiff paper or cardboard
- 1 cup
- 3 A5 pieces of card
- 3 rubber bands
- 8 plastic straws
- 10 miniature marshmallows
- 2 marshmallows (to use as astronauts)
- Tape to share with your group members

Step #2 - Design your astronaut lander.

Consider how you will softly land your 'astronauts' using the materials.

- What kind of shock absorber can you make from these materials to help soften a landing?
- How will you make sure the lander does not roll while falling through the air or tip over when it lands?
- Your 'astronauts' (the two marshmallows) must be inside the cup. The cup must stay open. You cannot put a lid on it.

Draw your design in the box on the following page.

Name: date:

Astronaut characteristics

Part 1: Watch the video 'If I were an astronaut'. On the lines below, write characteristics that all astronauts need to have.

.....

.....

.....

.....

Part 2: Write the name of your chosen astronaut on the line below. As you do your research, write characteristics your astronaut demonstrated and important things he or she did to show that trait.

Astronaut's name:

Character trait #1:

.....

Character trait #2:

.....

Character trait #3:

.....

Character trait #4:

.....