

STEM club

*LET'S EXPLORE THE
UNIVERSE TOGETHER!*

CLUB LEADER

ACTIVITY DETAILS

RESOURCE LISTS

LEARNING OUTCOMES

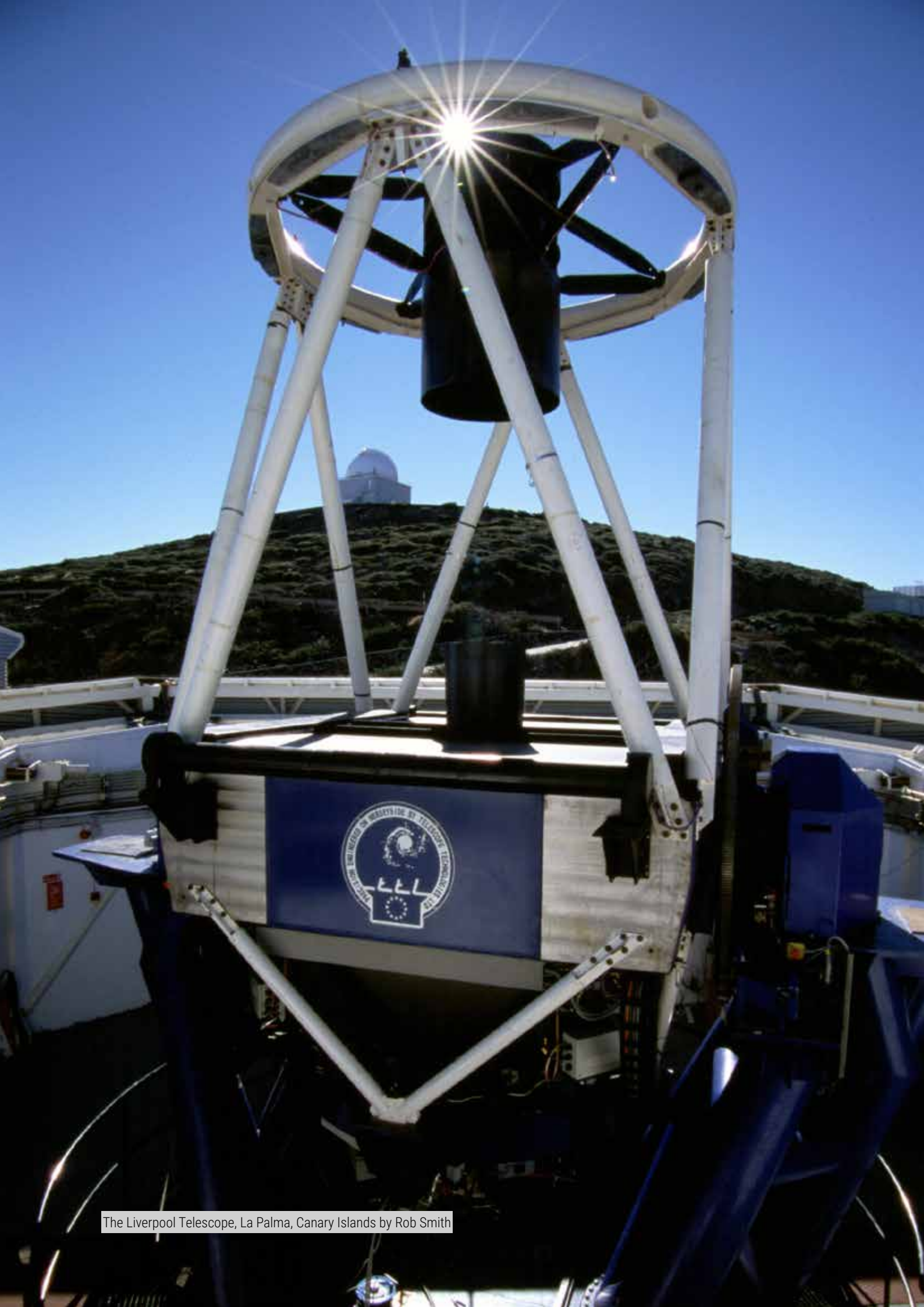
Butterfly Nebula by NASA, ESA, and the Hubble SM4 ERO Team

PROUD TO BE PART OF



GOLD
PRIMARY EDITION





The Liverpool Telescope, La Palma, Canary Islands by Rob Smith

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INTRODUCTION

The Schools' Observatory (TSO) is passionate about inspiring the next generation of scientists, programmers, engineers and mathematicians. We provide free access to the world's largest fully robotic telescope, and use the wonders of space to excite and amaze pupils of all ages and develop their love of STEM education.

What is the The Schools' Observatory STEM Club Programme?

This STEM Club programme provides three levels of activities; Bronze, Silver and Gold. Each level takes six weeks to complete. The activities are designed to take around an hour each week and can be run by someone with little-to-no science background, making them ideal for a parent, teaching assistant or even an older pupil.

The programme includes two resource booklets and a series of supplementary documents, hosted on www.schoolsobservatory.org/stem-club. The STEM Club Leader booklet (this booklet) provides guidance notes on the activities, and details the resources and knowledge needed to successfully and easily run each session. The pupil booklet contains step-by-step instructions for each activity and spaces for pupils to record their work throughout the programme. The pupil booklet forms their individual record of achievement as they progress through the levels.

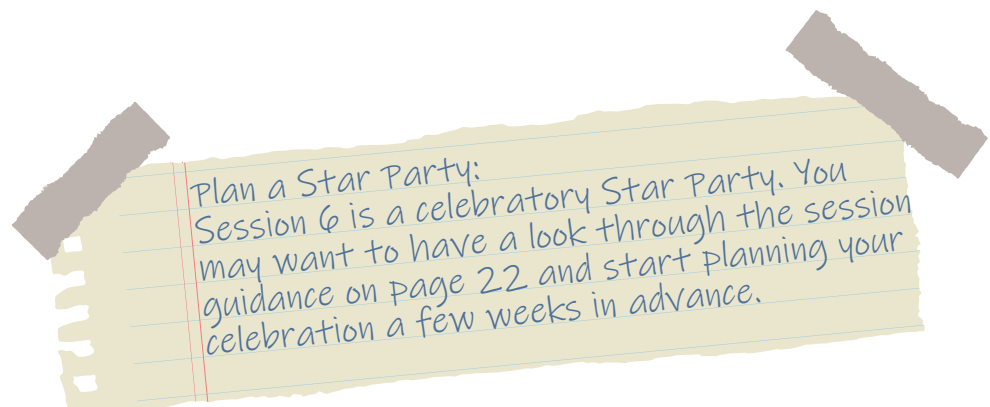
How To Use This Booklet:

This booklet contains six sessions. Each session will briefly explain the pupil activities, list the necessary resources you'll need and contains additional useful information, such as facts or web links. It will also give learning objectives for the session and provide any answers if relevant.

It would be useful to have your own copy of the pupil booklet to help you plan and deliver the sessions.

What Happens On Completion?

Once you have finished this STEM Club level you can download a certificate for your pupils from our website. Full details can be found on page 23 of this booklet.



ABOUT THE BOOKLETS

Both the STEM Club Leader and pupil booklets use the same style and formatting. This page contains a full set of examples.

1. Activity steps are numbered like this



Interaction with the booklet comes in the form of questions like this, with room for the pupil to write their answer.

Full resource lists are included. The tables refer to materials needed per group e.g.

REQUIRED RESOURCES

☆ One piece of A4 paper

☆ One pencil

WARNING

Warning notices are used to remind pupils to be careful when completing the activity.



IMPORTANT

Important information is always highlighted in this way so hopefully the pupil will not miss anything vital to the activity.



It would be great if you tagged us on any social media posts **@SchoolsObs**.



This is a tip. Useful information will be written like this to help it stand out from the activity steps.



SESSION 1: THE SOLAR SYSTEM

In this session pupils will be learning about the scale of our Solar System and the orbits of the planets.

Learning Objectives, pupils will learn:

1. the order of the planets in our Solar System
2. to create an accurate distance model of our Solar System
3. to understand the scale of our Solar System planets
4. to understand that each planet travels in an orbit around the Sun

Each group will require the following:

REQUIRED RESOURCES

- ☆ A3 paper, cut into long strips
- ☆ Pens or pencils

Before the session:

Make sure you have access to the required resources and have read through the instructions for this session.

Photocopy and chop up the grid references on page 10 for Activity 2. You need enough for one set for each pupil. Ideally, roughly equal amounts of pupils in the club will be using each of the different sets of grid references.

ACTIVITY 1: SOLAR SYSTEM IN YOUR POCKET

During the activity:

In this activity, pupils will make a scaled down distance model of the Solar System.

Answers: Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus, Neptune.

Instructions:

Hand out two long strips of paper to each pupil. Ask pupils to write 'Sun' at one end of the paper and 'Dwarf Planets' at the other end on both strips of paper.

On the first strip of paper, ask pupils to **estimate** where they think each of the eight planets fit between the Sun and the Dwarf Planets. They should write the name of each planet to show their guesses.

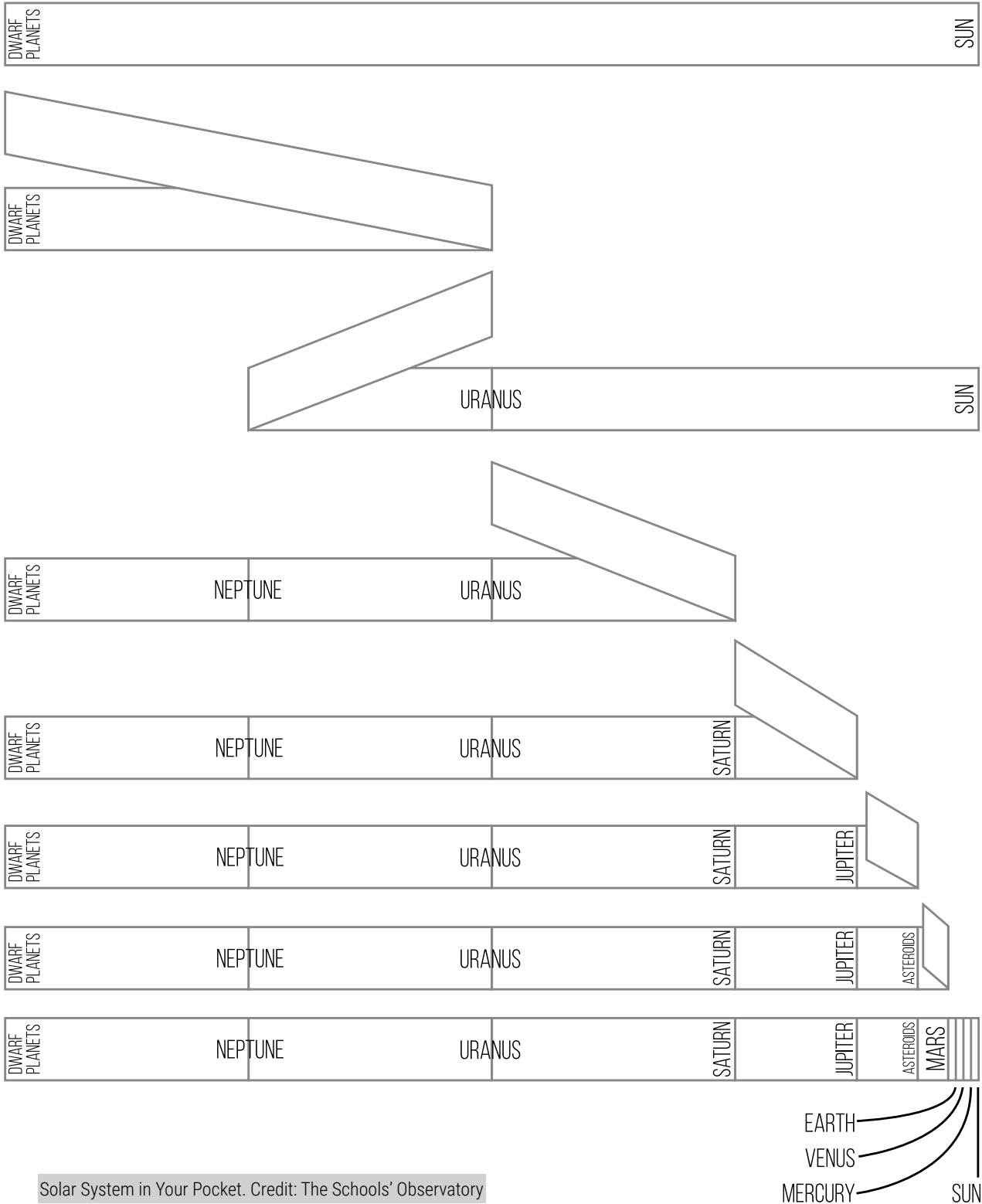
Now, pupils are going to mark the correct position for each planet on their second strip of paper. They do this following the instructions below, that you will read out (you could also display them on a screen, a PDF can be found here: www.schoolsobservatory.org/stem-club).

1. Fold the paper in half, unfold, and write "**Uranus**" on the crease.
2. Re-fold the paper, then fold in half again, write "**Saturn**" on the 1/4 closest to the Sun, write "**Neptune**" on the 3/4 fold.
3. Fold from the Sun up to Saturn, write "**Jupiter**" at this 1/8 crease.
4. Fold from the Sun up to Jupiter, write "**Asteroid Belt**" at this 1/16 crease.



5. Fold from the Sun up to asteroid belt, write “**Mars**” at this 1/32 crease.
6. Write the rest of the planets evenly in the remaining space (starting at the Sun, in this order); **Mercury, Venus, Earth**.

Ask pupils to compare their estimate with the correct position and write down something that surprised them about this activity in their booklets.



Solar System in Your Pocket. Credit: The Schools' Observatory



ACTIVITY 2: MAPPING THE SOLAR SYSTEM

The planets are often shown in images and pictures as being in a line. In reality they rarely appear together in the same part of our sky and will never perfectly line up because of the orientation and tilts of their orbits.

The planets each take a different amount of time to complete one orbit of the Sun. The further a planet is from the Sun:

- ☆ the slower it moves
- ☆ the further it has to travel to complete one orbit

So the further from the Sun a planet is, the more time it takes to complete an orbit.

Pupils will use four-figure grid references to answer questions in their booklets and plot the positions of the inner rocky planets.

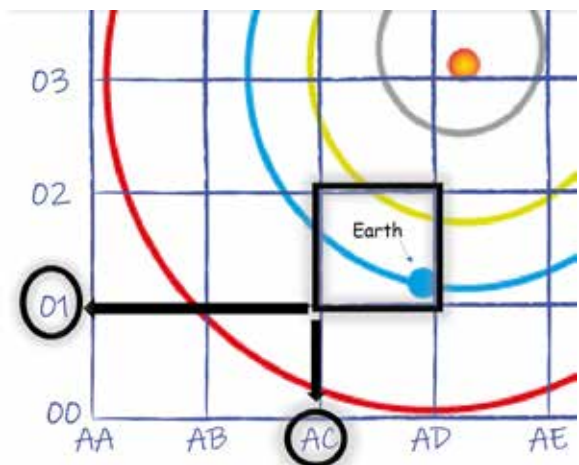
Pupils may not have used four-figure grid references recently, or at all. Remind them that:

- ☆ they should find the grid reference for the bottom-left corner of the square they want
- ☆ grid references are read along the horizontal direction first, and then the vertical

In the example on the right, the Earth is in grid square AC01.

Give each pupil a set of grid references, photocopied from page 10. Try to ensure that an equal number of pupils are working from each set of grid references – this is important for Activity 3.

Ask the pupils to plot the positions of the planets onto their orbits.



Answers to pupil questions:

Q1 Which grid square is Mars in?

Answer: **AE00**

Q2 Which planet is in grid square AC04?

Answer: **Venus**

IMPORTANT

Make sure pupils copy the date from their set of grid references into the space provided at the top of Grid B in their booklets.



ACTIVITY 3: PLANET EXPLORERS

Pupils will challenge another pupil to a game of 'Planet Explorers'. They will use their knowledge of grid references, along with the plot of the inner Solar System that they completed in Grid B during Activity 2. They should use Grid C in their booklets to record whether their shots on the enemy planets are hits or misses.

- ★ The aim of the game is to land on all four of their opponent's planets.
- ★ The rules of the game are given in the pupil booklets.
- ★ If pupils want to play again with a different set of grid references, you can print more blank grids from our website: www.schoolsobservatory.org/stem-club

Pupils may be able to use the date of Grid A and the date of their opponent's Grid B to estimate where their opponents planets are.

IMPORTANT

Pupils must play against someone who used a different set of Grid References in Activity 2. They should check that the date they have written at the top of their Grid B is not the same as their opponents.



Grid Reference Sets

There are 6 sets of grid references. We have duplicated them to save paper when copying this page.

<p>Set 1: Date 1st April 2021</p> <p>Mercury AD03</p> <p>Venus AE02</p> <p>Earth AB03</p> <p>Mars AC00</p>	<p>Set 3: Date 1st January 2022</p> <p>Mercury AD03</p> <p>Venus AC01</p> <p>Earth AC01</p> <p>Mars AB05</p>	<p>Set 5: Date 1st October 2023</p> <p>Mercury AC02</p> <p>Venus AE02</p> <p>Earth AF02</p> <p>Mars AA04</p>
<p>Set 2: Date 1st July 2021</p> <p>Mercury AD03</p> <p>Venus AB02</p> <p>Earth AD04</p> <p>Mars AA01</p>	<p>Set 4: Date 1st April 2022</p> <p>Mercury AD02</p> <p>Venus AC04</p> <p>Earth AB03</p> <p>Mars AE05</p>	<p>Set 6: Date 1st October 2025</p> <p>Mercury AC03</p> <p>Venus AC02</p> <p>Earth AF02</p> <p>Mars AB05</p>

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SESSION 2: THE NIGHT SKY

In this session pupils will be playing a game of 'Astro Cards' and creating pictures and models of constellations using art and craft materials.

Learning Objectives, pupils will learn:

1. to build on their knowledge of astronomical objects
2. to use numeracy, reading and social skills
3. to apply knowledge and skills involving measurements

*Materials can be downloaded and printed on A4 paper from this weblink:
www.schoolsobservatory.org/stem-club

The number of sets of Astro Cards you need will vary, depending on how big your STEM Club is.

** paper or plastic straws are suitable.

Before the session:

Download, print and cut out the sets of 'Astro Cards' from the weblink above. You could laminate the cards so that they last multiple games. Keep each set together to ensure that they don't get mixed up (to help with this you can mark the reverse of the cards with a number or letter).

Ensure you have the art and craft resources you need for Activity 2 and Activity 3.

Each group will require the following:

REQUIRED RESOURCES

☆ 'Astro Cards' (1 set per 6 pupils)*

☆ Paper for drawing

☆ Star stickers or coloured pens

☆ Pencils and erasers

☆ 30 cm rulers

☆ A4 piece of card per pair of pupils

☆ Orion star map per pair of pupils*

☆ 8 straws per pair of pupils**

☆ Balls of tin foil/ Blu Tack/ Play-Doh

☆ Cellotape

ACTIVITY 1 – ASTRO CARDS

As a class, read through the introductory text for this session in the pupil's booklets. Then introduce the game of 'Astro Cards'.

Aim of the game: win all the cards to end the game.

Pupils can work in teams of 2 – 6 players. The game should last 15 – 20 minutes.

Categories: **FIRST IDENTIFIED:** oldest wins
DISTANCE: largest wins
DIAMETER: largest wins
BRIGHTNESS: brightest (largest number) wins



Read the rules to the pupils:

- ☆ Shuffle the deck and deal an equal number to each player face down.
- ☆ Each player holds their cards face up to themselves. Only look at the top card.
- ☆ The person with the next birthday goes first!
- ☆ The starting player chooses one of the categories from their top card and reads it out loud to their opponent(s). The other players then read out their own values for the same category.
- ☆ The player with the winning value for the chosen category keeps all the cards from that round.
- ☆ The winner of that round gets to choose the next category.
- ☆ In the event of a draw, the cards are shuffled back into the players' decks and the starting player chooses another card.
- ☆ The winner of the Astro Cards is the person who has all the cards at the end of the game.

The pupils have extra questions to answer as part of the Astro Cards activity:

Question	Answer
1. After the Sun, which object is the next brightest?	The Moon
2. Which planet was discovered most recently?	Neptune in 1846
3. Ganymede is a moon of which planet?	Jupiter

ACTIVITY 2 – PICTURES IN THE SKY

In this activity pupils will create their own constellation based on their favourite animal, object or character from a story.

Give each pupil some paper and something to represent stars (this could be star shaped stickers or they could draw stars using coloured pens). We recommend having pencils and erasers available for pupils who want to draw an outline of their shape first.

Give the pupils a few minutes to discuss ideas for their constellations. Pupils should then spend around **10 minutes** creating their constellation using paper and stickers or pens. Remind them to think about the key points in their shape – will other people be able to recognise what it is?

The rule is that each constellation must contain no more than **10 stars**.

At the end of the activity:

Children pair up (or get together as a group) and guess each other's constellations. If they need clues, they can ask each other "yes" or "no" questions. Discuss how they decided where to put their stars. Have any pupils chosen the same animal or object or character? Compare their constellations – are they the same?



ACTIVITY 3 – 3D CONSTELLATIONS

This activity helps pupils understand that the night sky is a 3-dimensional place and that things that look like they are ‘together’ in the sky can actually be at great distances from each other. The activity should take around 15 - 20 minutes.

Pupils will work in pairs and use the instructions and table of distances given in their workbooks to make a 3-D model of the constellation, Orion. Provide each pair of pupils with the required materials, including a photocopy of the Orion star map. The ‘Required Resources’ lists a few options for suitable materials for the stars – choose whatever is available to you.

The activity has been adapted from an Education Activity by McGill Space Institute, Montreal, Canada.

At the end of the activity:

Use the following questions to prompt discussion:

- ★ Are all the stars in Orion at an equal distance from Earth?
- ★ Imagine you are on a planet orbiting one of the stars in Orion’s belt – would Orion look the same as it does from Earth?
- ★ As a group, can we draw a “side view” of Orion and draw an arrow to show the direction towards Earth?

Option to extend the session:

You can use the Stellarium (stellarium.org) online star map to show pupils some of the constellations visible in the sky that night and find objects including planets, nebulae and galaxies.



SESSION 3: THE EGGNAUT CHALLENGE

This week the pupils will be working in small teams to design and construct a vehicle that can safely protect their 'eggnaut' from the impact of landing on another world. They must follow the rules in their booklets when designing and constructing their vehicles.

Teams are successful if:

- ★ Their egg does not crack upon landing.
- ★ Their vehicle lands as close to the centre of the landing zone as possible.
- ★ They have followed all the rules for creating their vehicle (the rules are listed in the pupil booklets).

Learning Objectives, pupils will learn:

1. to think creatively to solve a problem
2. to use their everyday knowledge of materials and forces
3. to design and create a simple machine to protect an egg from cracking when dropped from a height
4. how to solve a similar problem in the future

Children will be handling raw eggs as part of this activity. Please download and read our **risk assessment** before carrying out this activity:

www.schoolsobservatory.org/stem-club

Each team will require the following:

REQUIRED RESOURCES	
★	2 Sheets of A4 paper
★	5 Lollypop sticks
★	100 cm of string
★	Cellotape
★	5 Rubber bands
★	1 Pair of scissors
★	1 Raw egg
★	1 30 cm ruler

The club leader may also find the following resources useful:

- ★ Plastic sheet or bin bag to protect the landing area from mess
- ★ Small cups or pots to stop eggs falling on the floor while teams are designing their vehicle
- ★ Weighing scales (these will be needed if your STEM Club includes optional rule 5 - see pupil workbooks)



Before the session:

Ensure that you have plenty of construction materials to hand. Feel free to make substitutions to the resource list based on what is available to you.

Decide whether to include **optional rule 5**: the team's vehicle's mass must be less than 400 g. This rule makes the activity more challenging, but if you are running a short session or don't have access to weighing scales you can leave it out.

Find a suitable area for dropping and testing the vehicles.

During the session:

1. At the start of the session, ensure that all teams understand the rules and aims of the activity. Show the pupils the resources they will be using to construct their vehicle. Let the pupils know if you are including optional rule 5.
2. Give the teams some time (we recommend about 10 minutes) to discuss ideas and decide on a plan for their vehicle. There is space in their booklets for each pupil to draw their team's design and explain how and why it will work. Encourage the pupils to think about the question prompts in their booklets.
3. Once all teams are ready, hand out the same materials to each team. Supervise construction of the vehicles. Encourage teams to work together to overcome any difficulties. We recommend giving teams about 20 minutes to construct their vehicles.
4. When the construction time is up, teams must show that their vehicle meets all the rules, including size and mass limits. Then test which are successful by dropping the vehicles one at a time into the landing zone. We recommend dropping the vehicles from a minimum height of 1.5 m.
5. During the testing, encourage pupils to think about what makes the test fair – e.g. releasing each vehicle from the same height; dropping, rather than throwing the vehicle; all teams having access to the same resources.
6. After all vehicles have been tested, pupils complete the conclusion section in their booklets.

IMPORTANT

Testing the vehicles could get messy, depending on how successful the teams are! You may choose to carry out the testing outside. If not, put something down that will protect the floor and be easy to clean away afterwards.



WARNING

If using a step ladder when dropping the vehicles, make sure you have carried out an appropriate risk assessment and taken any necessary safety precautions.



SESSION 4: THREE COLOUR NEBULA

In this session, pupils will be learning how to make a colour image of a nebula using an observation taken by the Liverpool Telescope. A nebula is a massive cloud of dust and gas in space.

The pupils will use our free image processing software to combine three images of a nebula taken by the Liverpool Telescope (a red image, a blue image and a green image) to make a colour picture. They will use the software to combine, align and scale the images.

Learning Objectives, pupils will learn:

1. to develop their skills at using websites
2. how to open, manipulate and save files using computer software
3. that red, green and blue filtered images combine to make full colour images

*If your room does not have internet access, download the files and copy them on to the pupils' computers. You may want to download LTImage in advance. There are instructions to do this below.

Each group will require the following:

REQUIRED RESOURCES

☆ Computer

☆ Internet access/downloaded files*

☆ Pupil usernames and passwords

Before the session:

1. You will need to create a teacher account and accounts for your pupils on our website. A teacher account enables you to create multiple pupil accounts for your group, quickly and easily. You might have already done this in the Bronze level STEM Club. If not, follow these instructions:
 - ☆ Go to www.schoolobservatory.org/register
 - ☆ Choose the option to 'Register as a Teacher'. You will need to complete a short registration form
 - ☆ Once you have registered an account, you can create pupil accounts under your login. This allows you to manage the pupil accounts yourself. You can create a full class set of pupil accounts in one go in the 'My Account' section when you are logged in.
 - ☆ A full video tutorial of the process can be found here: www.schoolobservatory.org/help/myaccount
 - ☆ Keep a note of the pupil usernames and passwords
2. If you do not have a reliable internet connection you may want to download our LTImage software in advance (compatible with Windows machines). The file names are shown on the next page.

The software is available from our website:

www.schoolobservatory.org/get-started/view-images

The files can be downloaded from our website:

www.schoolobservatory.org/teach/activities/3_colour_imaging



At the beginning of the session:

Introduce the session and read out the introductory information at the top of the pupils' workbooks.

The step-by-step instructions for the pupils can be found here:

www.schoolsobservatory.org/stem-club

You can either print them or display them on a screen for the group. These are the steps:

LOG IN TO OUR WEBSITE

The pupils will be asked to log in to our website. There is space in their booklet to write down their username. You will have made a note of these when you registered the pupil accounts on our website.

GET THE IMAGES

The pupils will download one set of image files - 3 files in total that include red, green and blue files.

Crab Nebula	Bubble Nebula	Dumbbell Nebula
Crab_Nebula_red.hfit Crab_Nebula_green.hfit Crab_Nebula_blue.hfit	Bubble_Nebula_red.hfit Bubble_Nebula_green.hfit Bubble_Nebula_blue.hfit	Dumbbell_Nebula_red.fits Dumbbell_Nebula_green.fits Dumbbell_Nebula_blue.fits

If your STEM Club does not have internet access or poor download speeds, you can download these files in advance for the pupils to copy onto their computers.

OPEN AND COMBINE THE IMAGES

If required, demonstrate how to load images into the software, or play our support videos on how to do this. Make sure the pupils follow the instructions in their books carefully and open the files in the correct order:

- ★ Image selection 1 – red
- ★ Image selection 2 – green
- ★ Image selection 3 – blue



If the files are not in the correct order, their image won't look quite right in the later steps.

Pupils will use the fourth image selection window to combine the files into a 3-colour image. When the pupils first 'Make a new image', their images will probably be mostly black. This is normal at this stage, so no need to worry. The pupils will reveal the colours in the 'Scale the Image' step.



ALIGN THE IMAGES

The software has done its best to line up the red, blue and green images on top of each other. It might not have done it perfectly. The pupils will correct any misalignment in this Activity. Encourage them to carefully check the alignment of the image by following the instructions in their booklets.

If pupils cannot find a suitable “dot” to use to check the alignment, they can move on to ‘Scale the Image’, and come back and align the images later.



SCALE THE IMAGE

Up until this activity, the software is only showing the very brightest parts of the image. Pupils will now ‘scale’ their image to reveal more of the nebula.

Encourage pupils to use trial and error during this activity. There is not one correct solution. They should change the red, green and blue colour values in LTIimage in turn, checking the result in the preview and image windows, until they are happy with their image.



SAVE THE PICTURE

Pupils follow the instructions in their booklets to save their picture. They can save multiple versions if they want.

Direct pupils to a suitable folder, where they can save their image. Images can be saved as a JPG and then printed out.

At the end of the session:

As a class look at a selection of the images produced. Are they all the same? Why not?

Extension:

Pupils can have another go at the session but with a different nebula observation. They could also use Go Observing on our website to request their own sets of 3-colour data from the Liverpool Telescope. Remember, they will not get the data immediately.



SESSION 5: SPACE CAREERS

In this session, pupils develop their knowledge and understanding of the different jobs available to people who enjoy space and science. Your club will learn what a stereotype is and discuss gender stereotypes relating to jobs in science, technology, engineering and maths. Pupils will also assess their own skills and qualities, and discover possible jobs that might match their skills.

Learning Objectives, pupils will learn:

1. that there are many different jobs relating to space and science
2. about stereotypes relating to gender and space jobs
3. to understand that the skills and qualities you have are important for a job and do not consider gender or race

Each group will require the following:

REQUIRED RESOURCES

- ☆ 'Space for Everyone' presentation

Before the session:

Read through all the information in this session to familiarise yourself with the activities.

Download the 'Space for Everyone' PowerPoint presentation and save it somewhere convenient for access during the session. If you can't present the slides during the session, print them out so you can show the pupils.

The link to the presentation slides is: www.schoolsobservatory.org/stem-club

ACTIVITY 1: SPACE FOR EVERYONE

Pupils answer the first three questions on page 16 in their booklets. Ask pupils to share their answers with the rest of the group. Pupils may not be familiar with the word "stereotype". Encourage them to share their ideas before giving them the definition of the word:

"A stereotype is a fixed belief about a particular group of people."

Here are some examples of stereotypes:

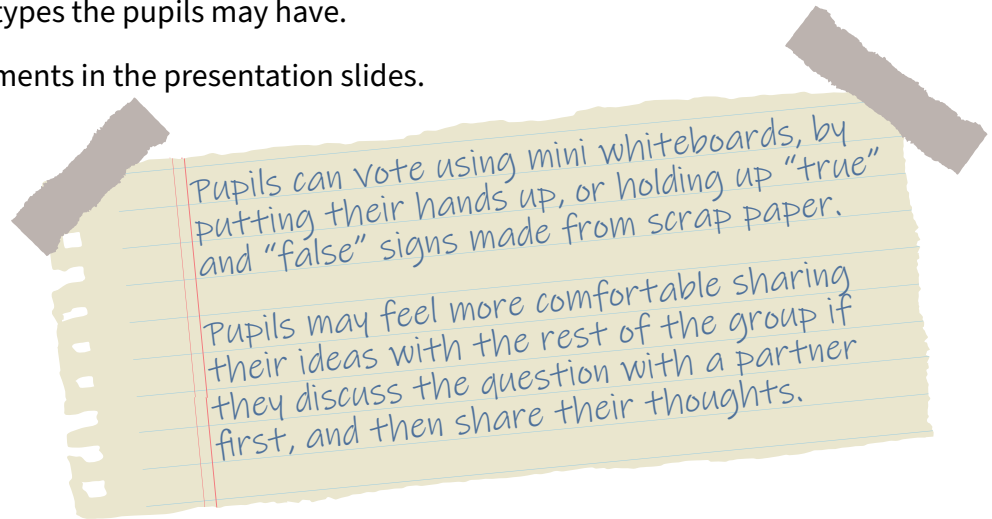
- ☆ Girls are better at cooking than boys
- ☆ Children don't like healthy food
- ☆ Boys are messy

Play the 'Space for Everyone' Quiz...

1. Show the pupils statement 1 on the presentation slides.
2. Before revealing the answer on the next slide, ask the pupils what they think. Encourage discussion using the discussion points below.
3. Ask pupils to vote on whether the statement is true or false.



4. Go to the next slide to reveal the answer and picture of a Space Hero. Take the opportunity to address any stereotypes the pupils may have.
5. Repeat for all statements in the presentation slides.



Discussion points for 'Space for Everyone' Quiz

Statement	Discussion Points
Women and men can go to space	Can you think of any women astronauts? Which is a better word to use – astronaut or spaceman?
All scientists are men	Can you think of any women scientists? Does anyone have a relative who is a scientist?
The best science shows are presented by men	Do you watch any science shows on TV or YouTube? Who are your favourite presenters?
Most of the first computer programmers were women	What do you think computer programmers do? Could anyone do it?
Women can be engineers	What do you think engineers do? Could anyone do it?
Men don't care about plants and animals	How can science help animals? Why are plants useful?
Women are better at writing than boys	Who are your favourite male and female authors?
Men are braver than women	What's the bravest thing you've done?
Women can be maths experts	Why is maths important? How do you use maths skills outside school?
Men are better leaders than girls	Can you name any politicians?

ACTIVITY 2: SPACE SKILLS

Pupils answer the first question on page 17 in their booklets. Ask pupils to share their answers with the rest of the group.

Explain to the group that they are now going to play the 'Space Skills' Game. This game is designed to show that skills, interests and qualities are more important when choosing a career, than gender or skin colour.



Make sure all the pupils understand the rules of the game:

1. **Everyone** in the club will **stand up**.
2. The club leader will read out one statement at a time relating to a particular job – but won't reveal what the job is just yet!
3. If pupils **agree** with the statement, they **stay standing up**.
4. If pupils **disagree** with the statement, then they **sit down**.
5. Once all 5 statements have been read out, the club leader will reveal what the job is.
6. Any pupils still standing have some of the skills and qualities needed to do that job!

The **statements and jobs** are listed below. Play the game with each of the jobs listed.

Statement	Job
<ol style="list-style-type: none"> 1. I get on well with people 2. I want to travel to other places 3. I'd love to fly a plane 4. I'm happy to exercise every day 5. I don't get travel sick 	Astronaut
<ol style="list-style-type: none"> 1. I'm interested in the latest technology 2. I enjoy designing and making things 3. I like to solve puzzles 4. I can work on my own or as part of a team 5. I notice my mistakes and correct them 	Engineer
<ol style="list-style-type: none"> 1. I'm interested in tv and media 2. I'm confident at speaking in front of others 3. I can keep calm under pressure 4. I get on well with people 5. I like to travel to different places 	TV Presenter
<ol style="list-style-type: none"> 1. I'm curious about the world 2. I can work on my own or as part of a team 3. I'm good at explaining ideas to other people 4. I like to do experiments 5. I don't mind waiting for things 	Scientist
<ol style="list-style-type: none"> 1. I like to collect things 2. I'm an organised person 3. I'm good at explaining ideas to other people 4. I'm interested in history and the past 5. I love to share my passions with other people 	Museum Curator
<ol style="list-style-type: none"> 1. I like using computers 2. I enjoy solving puzzles 3. I'm a creative person 4. I love learning new things 5. I don't mind not getting things right the first time 	Computer Programmer

When the game is finished, ask the pupils to complete the final two questions on page 17 in their booklets.

Reminder: the next session is the Star Party do you have everything for your celebration?



SESSION 6: STAR PARTY

In this session, your club will celebrate completing The Schools' Observatory STEM Club with a Star Party! Give the pupils some time to reflect on what they have done over the last few weeks and complete the questions in their workbooks.

How you celebrate is up to you and your club, but we have included some ideas here:

- ★ Have a prize giving and hand out the pupils' certificates*.
- ★ Display the work pupils have created around the room.
- ★ Repeat a favourite activity from one of the STEM Club booklets.
- ★ Get creative and make space-themed objects. Hang them around the room.
- ★ Put on a space-themed playlist to soundtrack your Star Party.
- ★ Watch an appropriate space-themed film with popcorn.
- ★ Do some astronaut training!
There's plenty of ideas here: www.nasa.gov/tla/activities/english.
- ★ Include some space-themed snacks. What do astronauts eat in space?

*Instructions on how to obtain your certificates are given on page 23.

If you have clear, dark skies, you might want to go outside to do some observing. If so, here are some resources which might make it easier!

- ★ Binoculars
- ★ Telescope
- ★ Star Chart
- ★ Mobile app for finding stars (e.g. SkyView Lite, Star Walk 2)
- ★ Free Stellarium software to plan your observing



Take some photos of your party and share them with us! We have included a space for a photo from the star party in the pupil workbooks.



NEXT STEPS...

Congratulations on completing the Gold level of The Schools' Observatory STEM Club!

We hope your pupils have enjoyed the last six weeks and are proud of their completed workbooks. You will notice that the final page of their workbooks contains a space for their certificate. To obtain your certificates, please complete this short online form:

www.schoolsobservatory.org/stem-club/certificates

Once you submit the form, you will be able to download your certificate.

Thank you for being part of The Schools' Observatory STEM Club!

JUST FOR FUN

We love to see the images that pupils have created from their observations! On page 19 of the pupil booklet there are details on how to share pupils' astronomical observations with us. The images you share with us may be showcased in our [Galleries](#) on The Schools' Observatory website.

You can share pupils' images with us by:

★ Tagging @SchoolsObs on [Twitter](#) or [Instagram](#)

By sharing pupils' images with The Schools' Observatory, you consent for us to use those images on our website and social media accounts and/or for publicity.

FEEDBACK

We love to hear from our users about how we can improve our services. If you or your pupils have ideas about how we can improve these booklets please email SchoolsObs@ljmu.ac.uk





For more lesson ideas and interactive workshops
visit the 'Things to Do' section of our website.

WWW.SCHOOLSOBSERVATORY.ORG/THINGS-TO-DO

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**STEM
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**PRIMARY
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