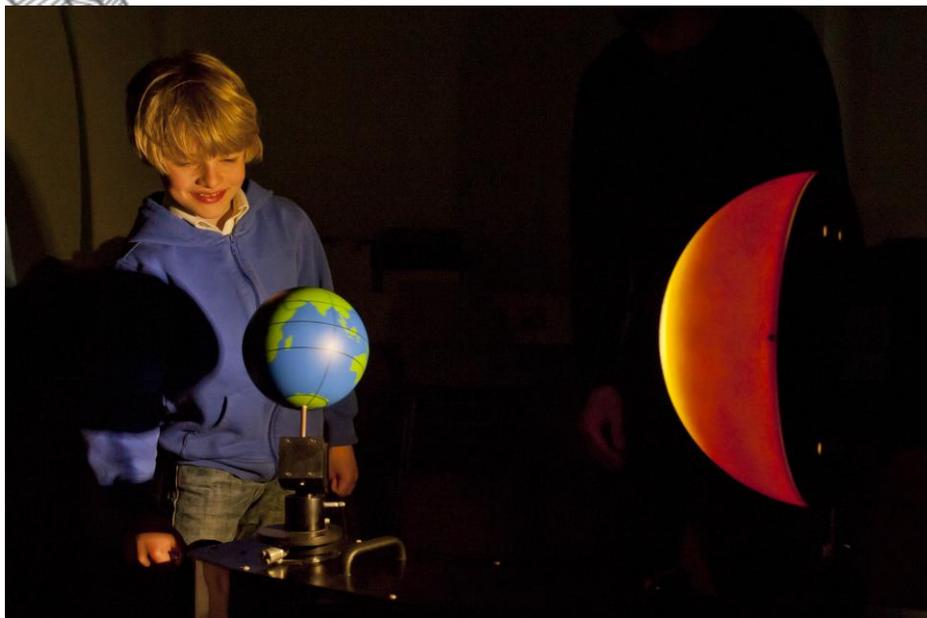




# Primary Programme Guide 2016/17



## About The Royal Observatory Greenwich

The Royal Observatory at Greenwich was founded by Charles II in 1675 and is one of the most important historic scientific sites in the world. Today the Observatory is a museum and science centre which provides access to information about space to schools and the wider public. A visit to the Observatory offers inspiring, curriculum-linked experiences delivered by REAL astronomers based around REAL cutting edge science.

## What we offer

Whether you are looking for something to ignite the imagination and enthusiasm of your group, develop and stretch their knowledge or give them an insight into the working world of space science there will be something to suit.

Our content relates to space science and its associated branches of the STEM (Science, Technology, Engineering and Mathematics) subjects. It is not often that students get access to state of the art equipment, real scientific data and to chat to real scientists; at the Royal Observatory they do and it is what makes our education programme truly unique. As a result of our programme being so different we naturally get asked a lot of questions about it. Here we have answered some of the most frequently asked questions, if you have any others please do get in touch.

## What does the Primary Programme consist of?

For early years and primary groups we offer a ***Discovery Day*** or a ***Space Spectacular Day***. Depending on which you choose your visit can be made of: a planetarium show, an interactive workshop, drama session or science theatre show, a self-facilitated visit to the Weller Astronomy Galleries and historic north site and a time-slot in the lunch room.

## How much does a visit cost?

Primary visits including a planetarium show with either a workshop, science theatre show or drama session carry a charge of £105 for a group of up to 30 students. If you wish to book only one of these elements you can do so at a charge of £90 for a planetarium show (for 30 students) and £60 for a workshop, science theatre show or drama session (for 30 students).

## Is the schools offer the same every day, all year round?

No, we understand that there are certain times of the year when it is easier and more appropriate to bring groups out on trips so we have designed our programme to fit in with our school visitors. Therefore, we have key stage specific ***Discovery Days*** and ***Space Spectacular Days*** on certain days throughout the year. For information on what is on and when, please check with our bookings team or online.

## Our Primary Programme Explained



Below you will find answers to some of the most frequently asked questions about the schools programme. If you have any more questions please contact the booking team as they will be more than happy to help.

### What is a Discovery Day?

*Discovery Days* are designed to be very flexible visit days. It is up to you what sessions you select for your *Discovery Day*. Depending on the day you can choose from: a planetarium show, workshop, science theatre show, drama session, gallery visit, use of the lunch room or all of these. The bookings team will be able to timetable your day so you include all the components you want to.

### What is Space Spectacular week?

*Space Spectacular* weeks are very special as they only run 3 times a year so you will need to book fast. Visits during *Space Spectacular* weeks are made of: a planetarium show the demo-filled science theatre show *Prepare For Launch* (new to the 2016/17 academic year), time and modern astronomy gallery visits and a lunch room slot.

### What is a planetarium show?

Think of our planetarium as a tour bus of the Universe taking you on amazing journeys to explore and experience the wonders of the night sky. Combining real images from spacecraft and telescopes with advanced CGI, all projected onto a fully immersive dome, the Planetarium can fly you into the heart of the Sun, transport you to distant galaxies, show you the birth of a star or land you on Mars.

### What is a workshop?

The astronomer-led workshops are very interactive and plenty of opportunity to ask questions and discover new things. The workshops use a combination of sound, film, large scale demonstrations and team activities to explain different scientific concepts.

## What is a science theatre show?

A science theatre show is an interactive astronomer-led show action-packed full of demonstrations. Throughout our science theatre shows we often ask for volunteers to come and help us out with the demonstrations. They currently only run during *Space Spectacular* weeks.

## What is a drama session?

We have two types of drama sessions to choose from for your visit. The first, *Through the Telescope* takes place in the Great Equatorial Telescope dome on the north site of the Royal Observatory Greenwich. This session relates to the past Astronomer Royal William Christie, his Victorian telescope and how it works. The second session *Going Above and Beyond* takes place in one of the learning space on the south site of the Royal Observatory Greenwich. This uses a fictional astronaut character Liz to explore what it is like to travel and live on Mars. Both sessions are led by actor interpreters who will take the students on an action-packed scientific adventure.

## What else can I do on a visit day?

If a *Discovery* or *Space Spectacular* day still doesn't satisfy your scientific appetite you can also visit our temporary exhibition gallery and the historic observatory site, including the Prime Meridian, the Great Equatorial Telescope, the Time and Meridian Galleries. We also have visit guides (for KS1 and KS2) for those doing self-facilitated sessions which are available for free on the website.

## Who develops and runs the sessions?

The sessions are run by our real astronomers so there is always an expert available to ask any questions. Our content is developed by the astronomy education team in collaboration with our teacher's forum. The drama sessions we run have been created in collaboration with a specialist drama company and are delivered by actors. All sessions are tested and evaluated with the teacher's forum and also with school groups to ensure that the content developed is exactly what teachers are looking for and what students will thoroughly enjoy!

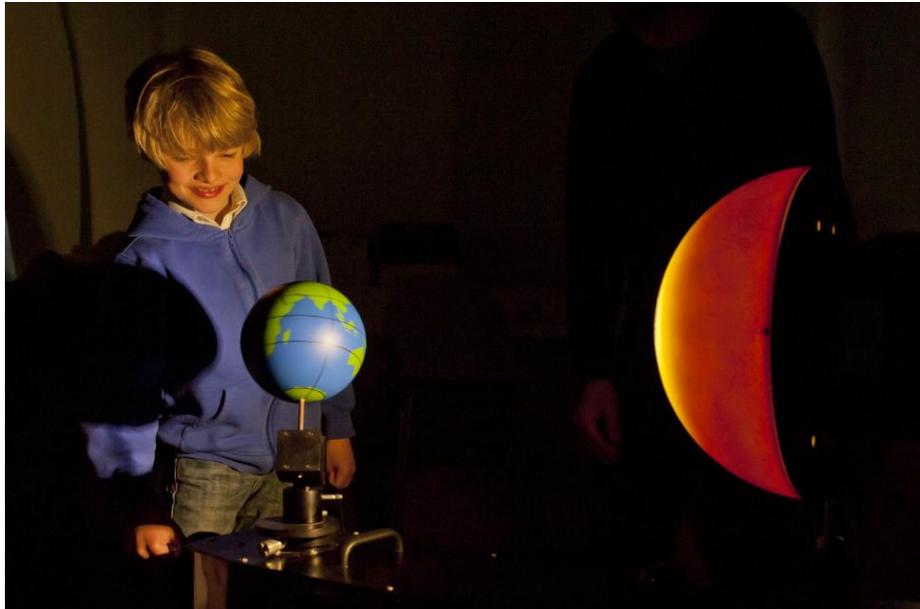
## Are there activities that can follow on from my visit?

Yes - LOTS. On our website you will find information about: our teacher forum, a growing collection of curriculum-linked classroom resources, videos (the screenshots below are taken from some of our KS1 and KS2 videos), podcasts and even blogs.



## Workshops

Our interactive workshops take place in one of three purpose-built learning spaces and are designed to encourage active learning and hands-on scientific enquiry. Workshops only run on *Discovery Days*.



Workshops for Early Years, Foundation Stage and Key Stage 1 students were developed in collaboration with early years specialists. These sessions are 30 minutes long and introduce basic ideas of light, dark, night and day and the seasons through physical activity, music and story.

Key Stage 2 workshops are 45 minutes long and delivered by Royal Observatory astronomers. They focus on concepts of light and shadow and the Sun-Earth-Moon system through interactive exploration of large-scale astronomical and/or digital models and student experiment.

### **Moon Walking**

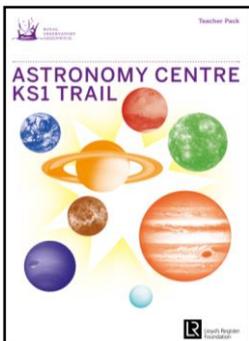
**Session level: EYFS**

**Session length: 30 minutes**

**Key points covered** - simple space science and space exploration concepts including: stars, planets the Sun and Moon. This workshop uses original music along with genuine NASA footage from the *Apollo* Moon missions.

**Workshop summary** – through the use of music, song, movement, role-play, images and video the class will be invited to go on a fun-filled adventure to the Moon. The group will be asked to: sing and play instruments along with some specially created songs, build an imaginary spaceship and role-play a journey to the Moon to try to imagine the rocket take-off and landing and explore the how differently their bodies would move in low gravity on the Moon. The workshop ends with a landing activity based on parachute play followed by a goodbye song based on the welcome song, but this time, slower and calmer.

<p><b>Seasonal Explorers</b>  <b>Session level: KS1</b>  <b>Session length: 30 minutes</b></p>
<p><b>Key points covered</b> - simple scientific concepts such as day and night, observable changes in the seasons and a basic introduction into why we have them on Earth. This workshop uses original music and bespoke models to bring the concepts covered to life.</p>
<p><b>Workshop summary</b> – the children will go on a real adventure with Ted the teddy bear. Ted really needs the children’s help, he has been in space for so long that he has completely forgotten what it is like on Earth. Through music, song and role-play the students will help to explain the different seasons to Ted and what each is like. They will use specially created models and songs to learn all about the seasons. They will then choose just the right clothing for Ted for each season to make sure he doesn’t get too hot or cold but is just right.</p>



An accompanying KS1 *Astronomy Trail* is available on our website to download and print for FREE. This is great if you are looking for help structuring your group’s time in the galleries. It comes with a set of teacher’s notes and student worksheets.

<p><b>Sun, Earth and Moon</b>  <b>Session level: KS2</b>  <b>Session length: 45 minutes</b></p>
<p><b>Key points covered</b> –the Earth, Sun and Moon, their relative sizes, distances, orbital periods and motion and also aspects of light and shadows. Bespoke equipment including a tellurium is used throughout to explain scientific concepts.</p>
<p><b>Workshop summary</b> – during this workshop, students will be asked about similarities and differences between the Sun, Earth and Moon and to think about the relative scale of these objects. They will take part in a series of interactive elements that encourage them to think about our motion through space and the concepts of days, months and years. They will look at the properties of shadows cast on a rotating model of the Earth and why the Moon goes through phases. They will also have a chance to explore the phenomena of solar and lunar eclipses.</p>

<p><b>Shadows and Sundials</b>  <b>Session level: KS2</b>  <b>Session length: 45 minutes</b></p>
<p><b>Key points covered</b> – revision of: shadows, the motion of the Sun and its use as a timekeeper along with other aspects of light and dark.</p>
<p><b>Workshop summary</b> – through the use of large scale models, images, calculations and practical experiments students will investigate the relationship between the Sun’s position in the sky and shadows. Students are introduced to the idea of longitude and how this enables us to calculate local time in other cities all over the world. They then design and construct their own sundial using real life examples as their inspiration.</p>

## Planetarium Shows

Planetarium shows take place in the Peter Harrison Planetarium and are delivered live by Royal Observatory astronomers. Our state-of-the-art digital planetarium provides an inspiring, immersive and interactive learning experience, allowing students to examine the day and night-time sky, choose how to fly through our solar system or enjoy visually stunning pre-recorded shows about the latest discoveries in astronomy.



Shows are 30 minutes long at Early Years Foundation Stage and Key Stage 1 and 45 minutes long at Key Stage 2. Each planetarium show can accommodate up to two classes of 30 students.

### **Space Safari**

**Session level: EYFS, KS1**

**Session length: 30 minutes**

**Key points covered** – light and dark along with understanding the world around you. This show uses original music produced by Trinity College of Music in collaboration with Wolfendale Primary School.

**Show summary** - this charming, interactive show for younger visitors follows Ted the Bear in his search for the Great Big Bear in the night time sky. Students meet Ted in his bedroom, waiting for the sky to get dark so he can begin his journey. After noting what can be seen in the sky in the day and in the night, children travel with Ted to the Moon and then the Sun, discovering some basic science of light and shadow along the way. Next, the children follow Ted as he explores the Solar System, visiting all eight of the planets from Mercury to Neptune learning simple facts about each along the way. Each time Ted fails to find the Great Big Bear, children help him travel further by singing his special song. Finally the children return to Earth with Ted, where he discovers the Great Big Bear in the stars overhead before returning to his room and waving goodbye.

## **Meet the Neighbours**

**Session level: KS2**

**Session length: 45 minutes**

**Key points covered** –aspects of light and shadow, Earth, Sun, & Moon, forces in action , the Solar System and how we see things.

**Show summary**– this amazing interactive show begins with an introduction to the sky, both day and night time and examine the apparent motion of the Sun and stars. They then lift off from Earth to hover over the North Pole and watch our planet spin on its axis, bringing night and day to different parts of the world. Going on to visit our nearest neighbour, the Moon, students first explore the origin of its phases and then land on the lunar surface. Flying out to view the entire Solar System, pupils learn or review the general appearance and arrangement of the planets, their relative sizes, and how fast they orbit around the Sun. After a trip through the outer Solar System, where comets and plutoids are found, the show concludes with a journey beyond the Solar System to consider the hundreds of extrasolar planets now known to orbit stars other than our Sun. The presenter explains how these alien worlds are discovered and how astronomers are working to find more. The show ends by zooming farther and farther from home to look at the Milky Way Galaxy then, some of the hundreds of billions of galaxies which form the cosmic web of our Universe.

### **New for 2017!**

March 2017 will see the arrival of *The Final Frontier*, a brand new planetarium show for KS2 audiences that will run during Space Spectacular weeks. Details will be released in late 2016 so keep your eyes peeled for more information.

## Science Theatre Shows

Our Science theatre shows take place in one of three purpose-built learning spaces and only run during Space Spectacular weeks.



Science theatre shows are interactive, astronomer-led shows action-packed full of demonstrations that explain scientific concepts. Throughout our science theatre shows we often ask for volunteers to come and help us out with the demonstrations.

**NEW to 2016/17 – *Prepare For Launch!***

**Session level: KS2**

**Session length: 40 minutes**

**Key points covered** – forces and motion, our Solar System and living in and exploring space.

**Show summary** – It is time to fasten your seatbelts and prepare for launch. If you have ever wondered what it might be like to be a space scientist, to design missions or to explore the wonders of the Universe then this is the show for you. Packed with interactive demonstrations and brain-busting science facts this show will take you on an expedition to explore the unknown. The only question left to ask is...are you ready? The show will end with a 15-minute question and answer session with the astronomer who led the session.

## Drama Sessions

Our drama sessions run at different points throughout the year and take place either in the Great Equatorial Telescope dome or one of the purpose-built learning spaces.



Sessions last for 30 minutes and we can accommodate 30 students and 4 teachers per session. These sessions only run on selected days so please do check with our bookings team for more information.

### **Through the Telescope**

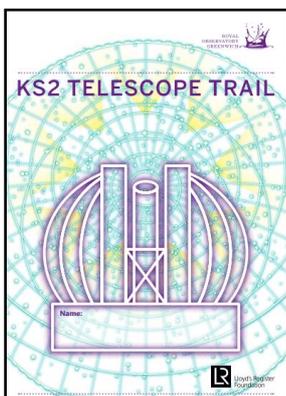
**Session level: KS2**

**Session length: 30 minutes**

**Location** - as this session takes place in the Great Equatorial Telescope dome which is a historic listed building, access is limited as there is unfortunately no lift.

**Key points covered** – light travels in straight lines, the everyday effects of light and how we see, mirrors and reflection, rotation of the Earth and its effects (the motion of the Sun, Moon and stars).

**Show summary** – this is an interactive session in which an actor interpreter takes the role of William Christie, the 8<sup>th</sup> Astronomer Royal at Greenwich. The session takes place in the Great Equatorial Telescope dome. Through storytelling and use of the 18 tonne Victorian telescope along with other props, he explains how we see light from distant stars, how telescopes work using lenses and mirrors and how the Earth's rotation is responsible for the Sun and other stars appearing to move across the sky.



An accompanying *KS2 Telescopes Trail* is available on our website to download and print for FREE if you would like to extend your visit and follow on from your *Through The Telescope* session. This comes with a set of teacher's notes and student worksheets.

**Going Above and Beyond****Session level: KS2****Session length: 30 minutes****Location:** Royal Observatory Greenwich learning space**Key points covered** –space travel, our solar system and living processes.**Show summary** – this is a key stage 2 interactive session where an actor interpreter takes the role of the fictional astronaut Liz. The students will go on an exciting journey of discovery to find out all about Liz's trip to Mars. They discover what it is like to blast off from Planet Earth, live in space and also explore a new and very different world.

## Galleries

With four galleries on offer there is sure to be something to grab your attention during a visit. FREE gallery guides are available on our website in addition to the trails we have already mentioned if you would like to follow a highlights tour of the spaces.



### Weller Astronomy Galleries

A visit to the Weller Astronomy Galleries is a must do component of any schools visit. Three galleries comprise the middle floor of the Modern Astronomy Centre and contain a host of child friendly interactive exhibits allowing students to explore our current understanding of the Universe and how astronomers gather evidence to learn more about it.

- 1. Astronomy Inspires gallery** - the Astronomy Inspires gallery showcases two models of the Universe. One is a beautiful 19th century orrery demonstrating the motion of the planets known at that time. The other is a state-of-the-art projection wall summarising our current understanding of the formation and evolution of the Universe, from the Big Bang to the present day in 4 minutes!
- 2. Astronomy Explores gallery** - the Astronomy Explores gallery highlights the many different techniques astronomers use to learn about the Universe and allows visitors to try some out for themselves. Learn how planets around distant stars are discovered through the interplay of light and shadow. See how different kinds of light reveal what distant stars are made of. Or try your hand at pointing a telescope or commanding a space mission.
- 3. Astronomy Questions gallery** - the Astronomy Questions gallery features an interactive table-top which allows visitors to find out the answers to some of the biggest and most exciting questions about the Universe via a panel of on-screen experts. Is there life on other planets? Do black holes exist? What is dark matter? Come to the Astronomy Questions gallery to find out!

### The Micro-gallery

The Micro-gallery is found on the bottom floor of the Modern Astronomy Centre and is the home of the Insight Astronomy Photographer of the Year exhibition. We run a project each year called *Creative Cosmos* where students can learn the science behind some of these images, learn to take their own and win some amazing prizes along the way.

## The Historic Observatory

The Royal Observatory at Greenwich, was founded by Charles II in 1675 and is one of the most important historic scientific sites in the world so don't forget to have a look around and soak up some of the history too. We have developed a primary visit guide as well as KS1 and KS2 trails which you can find on our website to download and print before your visit if you would like extra activities to do.



**The Prime Meridian** - every place on Earth is measured in terms of its distance east or west from the Greenwich Meridian, which divides the eastern and western hemispheres of the Earth, just as the Equator divides the northern and southern hemispheres. Since the late 19th century, the Prime Meridian at Greenwich has served as the reference line for Greenwich Mean Time. It can now claim to be the centre of world time and was the official starting point for the new Millennium.

**Flamsteed House** – this is the original Observatory building at Greenwich, designed by Sir Christopher Wren in 1675 on the instructions of King Charles II. Take a fascinating glimpse into the apartments where the Astronomers Royal and their families lived and worked. Tour the beautiful Octagon Room, designed to observe celestial events including eclipses, comets and planetary movements then see one of the world's earliest public time signals, the bright red Time Ball, on top of Flamsteed House.

**Time Galleries** - The award-winning time galleries explore our need for accurate timekeeping and the role it plays in our everyday lives. Find out about two British solutions to the longitude problem, including Harrison's famous chronometers. Watch our horology conservators at work and learn about the provision of accurate timekeepers for the Navy. Explore the history of the development of timekeeping and find out about the role of time in our everyday lives.

**The Meridian Galleries and Great Equatorial telescope** - explore a display of historic telescopes, including the Great Equatorial Telescope, which is the largest of its kind in the UK and the seventh largest in the world. Completed in 1893, it was designed to keep the Royal Observatory at the forefront of contemporary astronomy. Visiting this section is free to schools that have booked onto one or more of our education sessions.

## Site information

### Supervision

You are legally responsible for your group at all times whether they are visiting the shop, having lunch, in a planetarium show, workshop, science theatre show or looking around the galleries so please ensure that you have sufficient staff with your group throughout the visit.

### Arrival and Departure

On arrival you will be greeted by a member of our schools hosting team, who will provide you with orientation and take you to a place where you can store bags and coats. You may visit the PHP foyer to collect bags and coats at the end of your programme, before you leave the Royal Observatory. Note that if you intend to visit the historic site you may leave your bags and coats and collect them later.

### Storage Facilities for Bags and Coats

Bags and coats are stored in cages in the Planetarium Foyer for groups who have booked a lunch space, with one cage used for bags (lunches) and another for coats. At lunch time you are responsible for transporting the cage in which lunches are stored to the Activity Space which also serves as our lunch room. These cages must be returned to the planetarium foyer after lunch. The space is permanently occupied, so possessions are secure. However, many students like to take small bags and valuables with them.

### Lunch Facilities

If you require a lunch space, please make sure you have one booked prior to your visit. Due to limited space, lunch rooms are only offered to schools who have booked a full science programme. Lunch facilities are provided in the Activity Space, which is situated on the first floor of the Astronomy Centre. Capacity is limited and groups must adhere strictly to the lunchtime listed on the Visit Schedule. Please ensure the lunchroom is left clean and tidy after use. In good weather, many groups choose to enjoy a picnic in Greenwich Park.

### Toilet Facilities

A disabled toilet is available next to the lunch room for emergencies or use during lunch time. The main toilets are on the lower ground floor, next to the micro-gallery. An early morning toilet stop is advised before programmes commence.

### The Shop

The shop is also on the lower ground floor. If you would like to visit the shop you are advised to do so at the end of your visit. You are strongly advised not to visit the shop just prior to your planetarium show, as show start times cannot be delayed to accommodate students in the shop. To simplify purchases for primary school children, goody bags are available at £1.00 and £2.00. A Goody Bag form will be included in your confirmation pack. Any orders must be placed at least one week prior to your visit.

### The Café

Hot drinks and food are available for teachers in the café. However, please note that you are legally bound to ensure that the requisite number of teachers remain with your groups. Older students are welcome to make purchases from the café if they so desire.

## How to organise a visit

There can be a lot to think about when organising a school trip so we have come up with a 'to-do' list to help you to make sure you have everything you need to make your visit to the Royal Observatory Greenwich as enjoyable as possible. If you have any questions don't hesitate to get in touch with the bookings team or take a look at the website.

### Step one – choosing your sessions.

**Top tip – book early.** Our sessions are very popular, time slots are limited and all sessions must be booked in advance. We recommend choosing your sessions and booking them as early as possible to avoid disappointment.

### Payment of sessions

To make sure you day runs as smoothly as possible we would highly recommend paying for your session when you book. Payment in advance can be taken by credit or debit card only. If you choose to pay on the day payment by cash, cheque, credit/debit card will be accepted. Please note that failure to pay for sessions prior to them commencing will result in your group not being allowed to take part in the session. Please also note that we no longer invoice schools for the visits.

Checklist question	For more information	Complete?
What date and time would you like to visit? Do you have some alternatives?		
How many students and accompanying adults will be visiting?	See the <i>Programme Guides</i> .	
Would you like to book a Discovery Day or Space Spectacular Day?	See the <i>Programme Guides</i> .	
What sessions would you like your visit to be made up of?	See the <i>Programme Guides</i> .	
If you are booking a planetarium show as part of your visit do you have the payment details?		
Would you like to book some time in the lunch space?		

### Step 2 – booking.

Please telephone **02083126608** or e-mail **bookings@rmg.co.uk** to arrange your visit when you have completed step 1.

Checklist question	For more information	Complete?
Have you checked that the booking information sent by the bookings team is as it should be?	See booking information you have been sent.	
Have you read the cancellation policy?	See booking information you have been sent.	
If you have more than one class visiting at once have you split them up into groups of 30 and labelled them A, B, C, D?	See booking information you have been sent.	
Have you ensured that you have enough staff to supervise each group?	See the <i>Programme Guides</i> .	

### Step 3 – planning.

**Top tip** – prepare each for your visit carefully to ensure it runs smoothly on the day.

**Your journey** - while we will do all we can to accommodate school groups who are delayed in transport, it is not always possible to reschedule learning sessions and planetarium shows for groups who arrive late for their sessions.

**Your staff** - please provide all accompanying adults with a copy of the timetable for the day and make sure you have enough supervising adults to satisfy the safety requirements.

**Your students** - please remind students to act responsibly while on site and ensure they know what to do if they get lost. Gallery staff are fully briefed on 'lost child' procedures and are always on hand to help. Risk assessment information can be requested from our Bookings Unit if required. You can also prepare your students for learning so they get the most out of their visit. Full information on each of our pre- and post-visit resources and extension activities is available online at [rmg.co.uk/schools](http://rmg.co.uk/schools). Please check back frequently as this website is regularly updated.

Checklist question	For more information	Complete?
Would you like to do a pre-visit?	Ask the booking team for details.	
Have you read the health and safety requirements?	Ask the booking team for details.	
Would you like your class to complete any of the challenges in the visit guides?	These are available to download free from the website.	
Do you have all the information you need to plan your journey?	See the website for details.	
Have all accompanying staff been briefed?		

### Step 4 – following on.

**Top tip** – tell us how we did and get more involved with our teachers forum.

Checklist question	For more information	Complete?
Would you like to get more involved with the teachers forum?	Contact Liz Avery on <a href="mailto:eavery@rmg.co.uk">eavery@rmg.co.uk</a>	
Have you seen the Classroom Resources?	See the website for details.	
Tell us what you thought, please get in touch and tell us what you thought of your visit.	Ask the bookings team for details.	