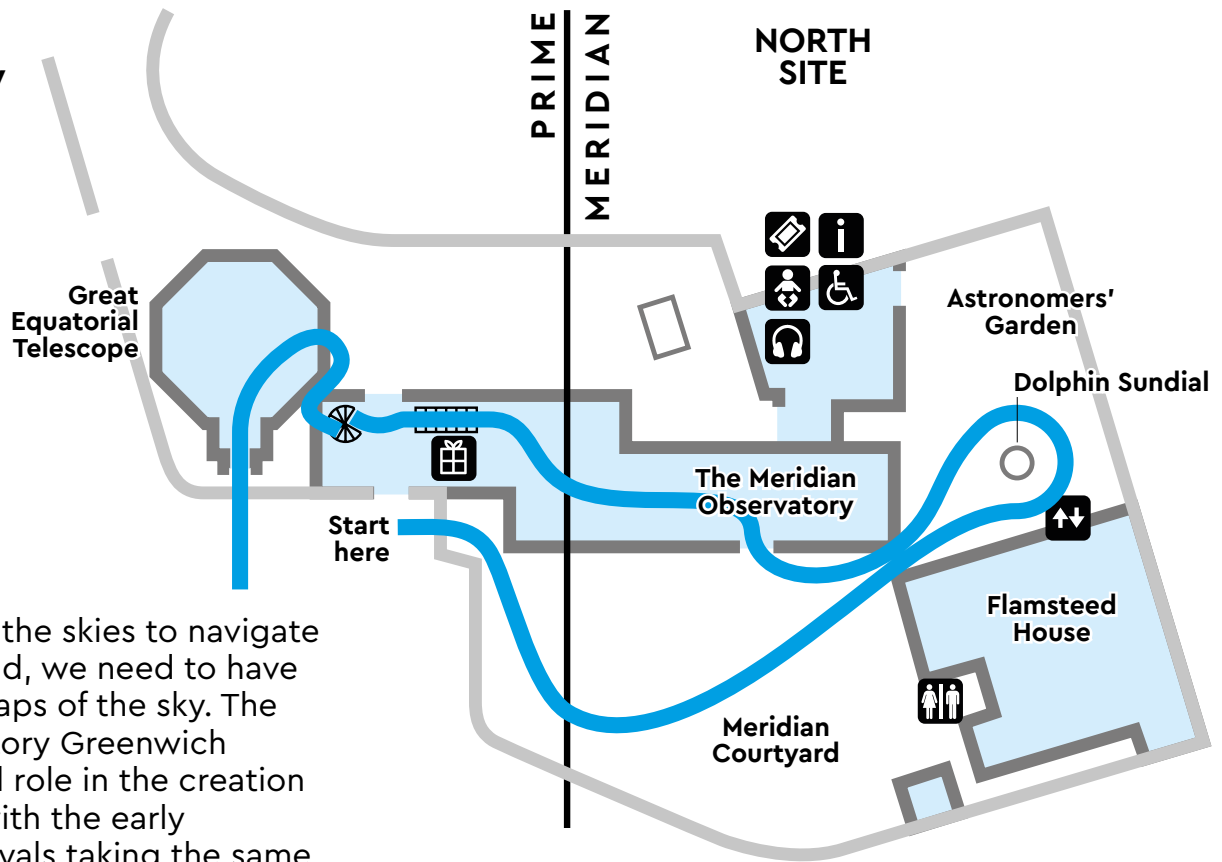


# KS4 School Trail

## Royal Observatory Greenwich (ROG) – site map



In order to use the skies to navigate across the world, we need to have very precise maps of the sky. The Royal Observatory Greenwich played a pivotal role in the creation of star maps, with the early Astronomer Royals taking the same measurements over and over again. As technology improved, these repeated measurements were used to create more accurate maps.

The Royal Observatory at Greenwich was not the only Observatory established to map the sky to create accurate navigational aids.

All the questions in this trail will be in blue boxes. **Don't forget to use the information signs around the site to help you.** There are a few 'challenge' questions for you to think about. These questions are highlighted or presented in a different colour and are also in italics.

**Why did the British Navy establish an observatory in Cape Town, South Africa?**

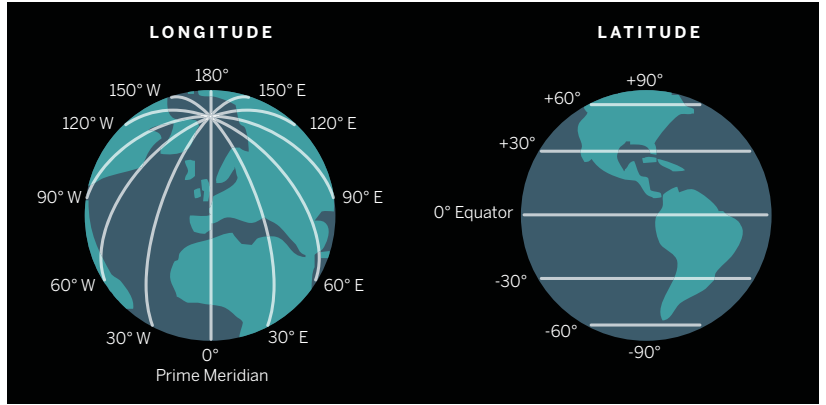
Walk around the Meridian courtyard. Read the information signs that are in front of the Meridian Observatory (marked on the map) to help answer the following questions.

1

Use the reverse of these sheets to complete the questions or tasks.

# KS4 School Trail – Latitude & Longitude

Look at the Prime Meridian marker embedded into the courtyard. It has a number of cities and their longitudes listed as being either East (E) or West (W).



To the right we have globes showing lines of latitude (right) and longitude (left), with the equator and the current Prime Meridian labelled.

**Cities with a longitude ..... are further ahead in time than Greenwich.**

**Cities with a longitude ..... are further behind in time than Greenwich.**

There are a number of cities listed, with their longitudes given. They are listed in order of latitude, with the highest northern latitudes at the north end of the line, while the most southern are at the south end.

Now, walk around to the Astronomer's Garden (marked on the map) and find the Dolphin Sundial. Read about it before turning and reading about the Equation of Time on the information boards in the garden.

**Fill in the missing words:**

**Equator = 0 degrees L .....**

**Prime Meridian = 0 degrees L .....**

**What is a meridian line?**

**Why was the 'Prime Meridian' established?**

**Which cities are the furthest ahead or behind?**

**Further ahead in time**

.....

.....

**Further behind in time**

.....

.....

## Challenge

**What is the 'furthest East' you can go?**

Hint! It's not 360 degrees.

## Challenge

**What time zone is used at the North pole?**

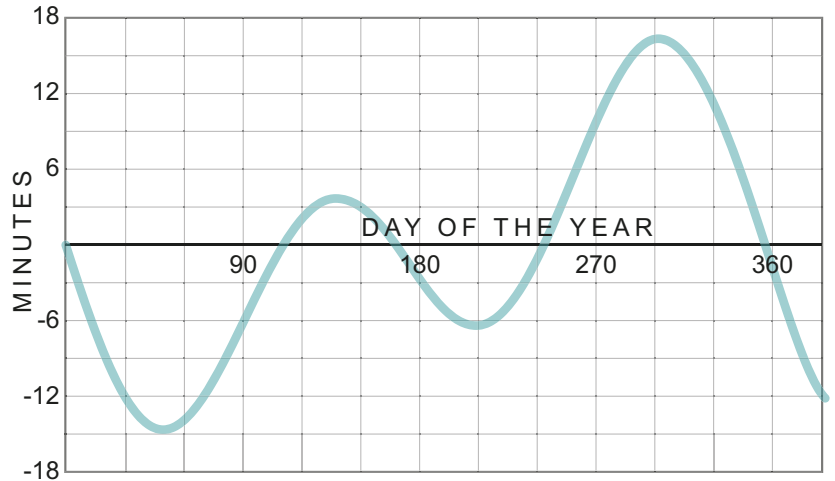
**Are there any cities on the line that you thought were further north or south than they actually are?**

# KS4 School Trail – Solar Time

The graph to the right is a replica of the graph that is shown on the information boards.

**On it, label:**

- 1. The shortest solar day**
- 2. The longest solar day**
- 3. The 4 days of the year when the solar day is exactly 24 hours.**



**Why does the length of a solar day change?**

**How long is one sidereal day, and how is it defined? Under what circumstances would you use sidereal vs solar time?**

You can find information about sidereal time on information signs in the main courtyard.

# KS4 School Trail – Telescopes

## Transit Telescopes

Walk into the main entrance of the Meridian building. To the right you can see Halley's Transit Room.

The instrument on the central pillar is called a quadrant, to which a transit scope could be fitted. These could only move up and down so were only able to observe a very narrow part of the sky. They were used to measure the height of stars above the horizon (altitude) as they crossed over the meridian line due to Earth's rotation.

**Sketch an image of the quadrant in Halley's transit room.**

How did astronomers use this instrument to measure the altitude of stars? Annotate your diagram and/or write in the box to explain.

3

Head into the room to the left of the entrance – this is Bradley's transit room. Take a look at the transit scope and read the information signs before heading into Airy's transit room.

**Why were these different meridian lines established?**

**Are any of these old meridian lines (Halley's, Bradley's, Airy's) still used today? If yes, what for?**

## Great Equatorial Telescope

Head through the door to the shop, up the stairs and then up the spiral staircase to the Great Equatorial Telescope.

Read through the illuminated information signs.

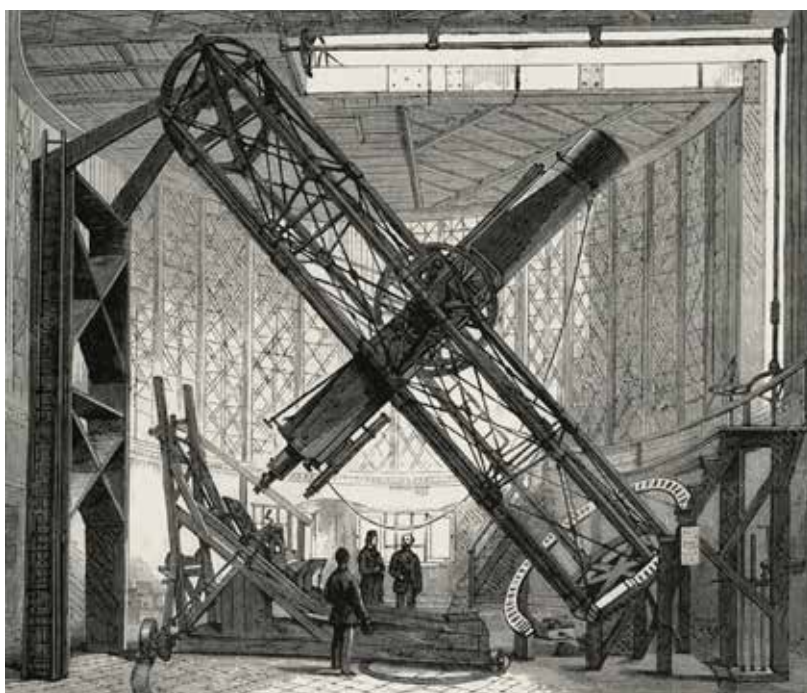
This telescope was used to examine binary stars – stars that are orbiting each other. With the naked eye, these individual stars are too close to resolve (or separate/distinguish), but with a telescope you can.

## Challenge

**Two stars appear close together on the sky – does that make them a binary star? Extra challenge: how can telescopes be used to figure out whether stars are a true binary system?**

**What star is mentioned as being studied particularly here at the observatory?**

**Look at the ring on the floor. What was its purpose?**



**This is an image of the telescope that was in the dome before the GET. List some similarities and differences between the GET dome and telescope as it is today and this old image.**