

Welcome to OpenUpScience

from Cambridge Science Centre.



This issue is all about Telescopes.

A telescope is a tool that makes far away things look bigger. Some scientists, called astronomers, use telescopes to look into space. These telescopes work by collecting lots of light coming from space and focusing it so we can see stars, planets and galaxies more clearly.

Lots of telescopes use light that our eyes can't see, like infrared and ultraviolet light. These different lights help us to explore deeper into our universe.

The James Webb Telescope

On **18th December 2021** the James Webb Telescope will launch into space. It is the biggest and most complicated space telescope ever made. It will use infrared light to look into the unknown and **will change our understanding of the universe.**

Discover more about the James Webb Telescope in this issue...

James Webb Telescope. Space telescope using Infrared light.

Hubble Telescope. Space telescope using ultraviolet, visible and infrared light.



Big ground based telescopes are high up on hills so that there is less air to see through.

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Getting The James Webb Telescope To Space



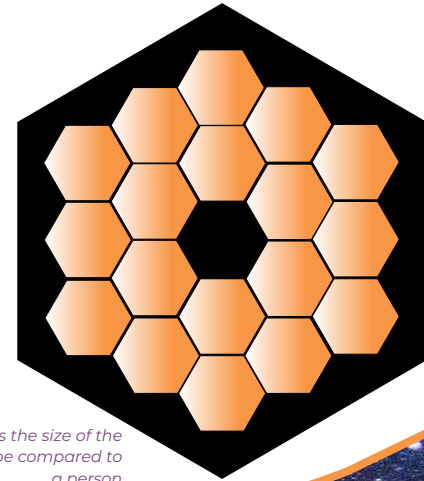
The James Webb telescope is **huge**, so how does it get into space?



The base of the James Webb Telescope is roughly the size of a tennis court and scientists have had to figure out a way to blast it up into space. How? **Fold it up and unfold it when it is in space!**



This shows the size of the telescope compared to a person



What to do

1. Cut out the template at the back of the magazine along the white lines.
2. Take the rectangular template and wrap it around a loo roll tube. This will be your rocket. Secure with sticky tape.
3. Fold the blue tab over on the mirror piece and use it to stick the mirror piece to centre of the solar shield.
4. Fold your assembled template up as neatly as possible so that it fits inside the loo roll tube.
5. *Optional:* Attach two pieces of string to the solar shield and see if you can design a fold that allows you to pull the telescope out of the tube and unfold it just by pulling on the string.

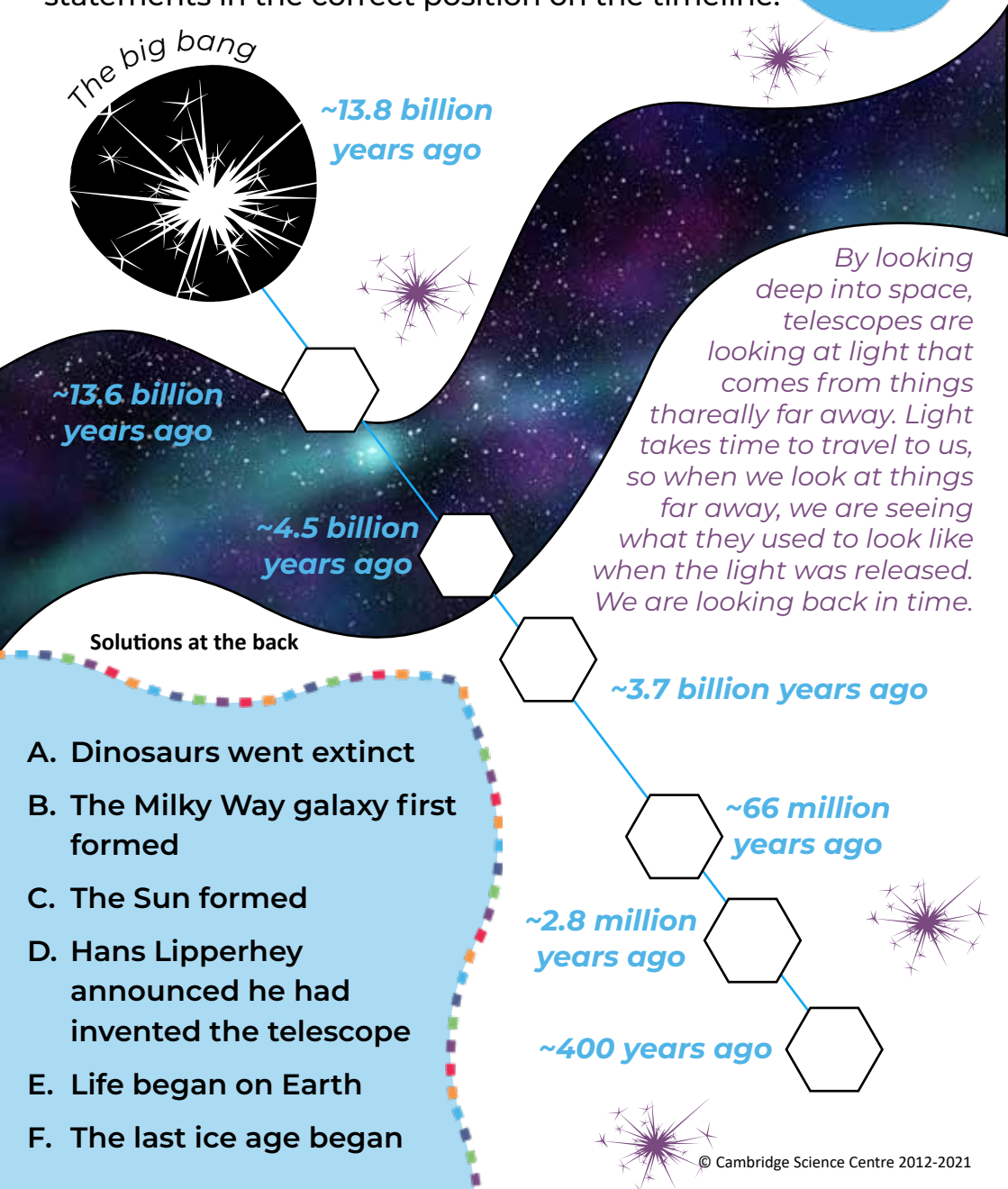
What you'll need

- Templates
- Loo roll tube
- Sticky tape

Looking Back In Time



After unfolding the telescope we can start unfolding the history of the universe. Put the statements in the correct position on the timeline.



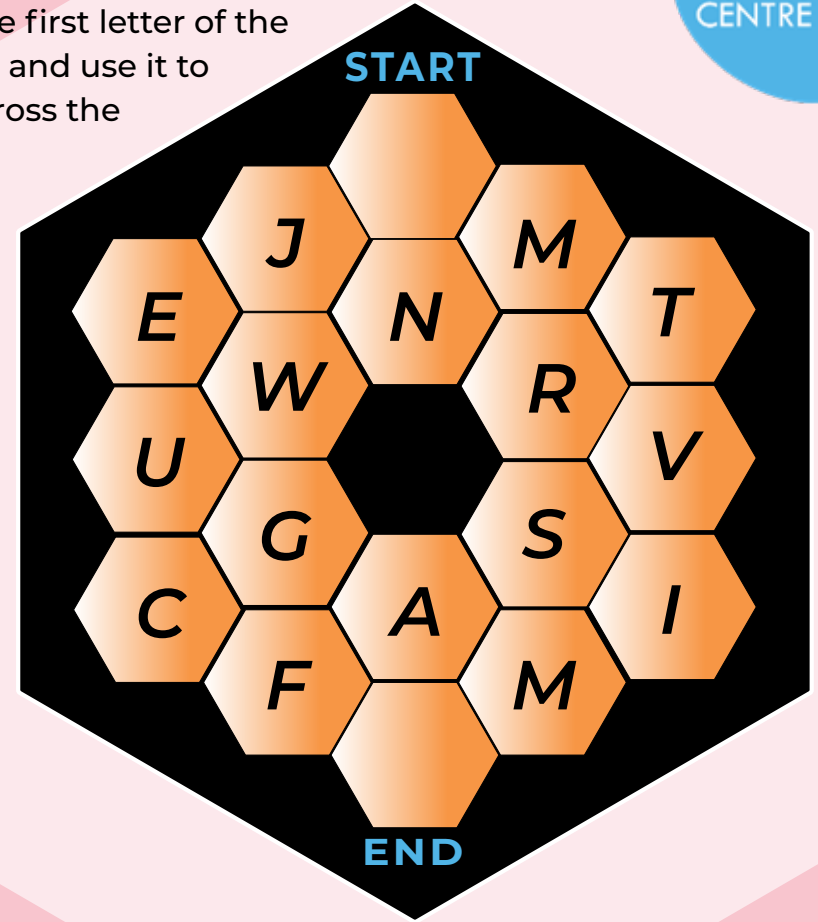
By looking deep into space, telescopes are looking at light that comes from things thareally far away. Light takes time to travel to us, so when we look at things far away, we are seeing what they used to look like when the light was released. We are looking back in time.

- A. Dinosaurs went extinct
- B. The Milky Way galaxy first formed
- C. The Sun formed
- D. Hans Lipperhey announced he had invented the telescope
- E. Life began on Earth
- F. The last ice age began

Block Hopping Puzzle



Work out the answer to the questions below, take the first letter of the answer and use it to hop across the board.



1. What ___ did Neil Armstrong first step foot on?
2. What ___ makes far away objects look bigger?
3. What ___ do you need to travel in to get into space?
4. What ___ is the second planet from the sun?
5. What ___ is the type of light that the James Webb Telescope will use?
6. What ___ do people use telescopes to study at night?
7. What ___ is a scientist who studies space?

Nebula Jars

The James Webb Telescope will peer through Nebula dust clouds to see stars and planets forming. Make your own Nebula in a jar with this activity.



- ### What you'll need
- A clean jar with a lid
 - Poster paint (at least two colours)
 - Cotton wool balls
 - Water
 - Glitter
 - Pencil

Nebulas are massive clouds of dust and gas in space. Some come from the dust and gas from the explosion of a dying star. Others are where new stars form and are sometimes called 'star nurseries'.

What to do

1. Fill a third of the jar with water.
2. Add a good squeeze of paint, put the lid on the jar and shake to mix the paint and water. The paint will make the water cloudy like the gases in a nebula.
3. Add glitter to the water and paint solution. These are the stars that have formed inside your nebula.
4. Pull and stretch out the cotton balls so that they look like clouds. The cotton wool is the clouds of dust in your nebula. Add them to the water and press down with a pencil.
5. Fill another third of the jar with water and add a good squeeze of another coloured paint. Repeat steps 2-4 using the pencil to mix in the paint instead of shaking.
6. Fill the final third with water and repeat steps 2-4 again.

Infrared Inferno



Match the images taken in visible light to the images taken in infrared light below.

Infrared is a kind of light that humans can't see. It is given off by things that have heat so it's sometimes used in thermal cameras. Infrared light can pass through things that visible light can't, like bin bags and dust clouds in space, making it a really good way of exploring our universe!

Solutions at the back

VISIBLE LIGHT



INFRARED LIGHT



images: NASA

What would you look like in infrared?

Draw your ideas and send them to us to get them featured on our social media:

openupscience@cambridgesciencecentre.org

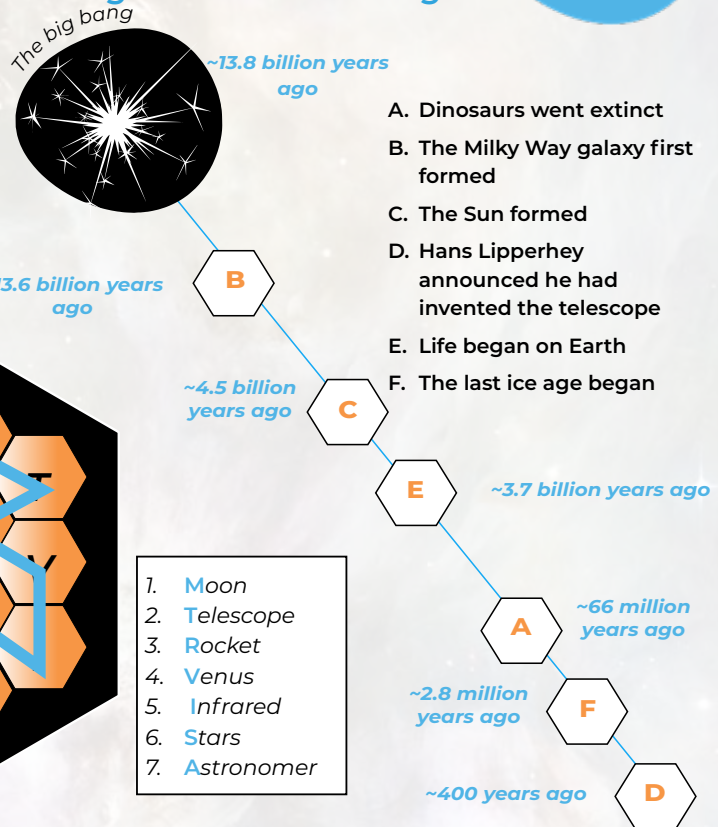
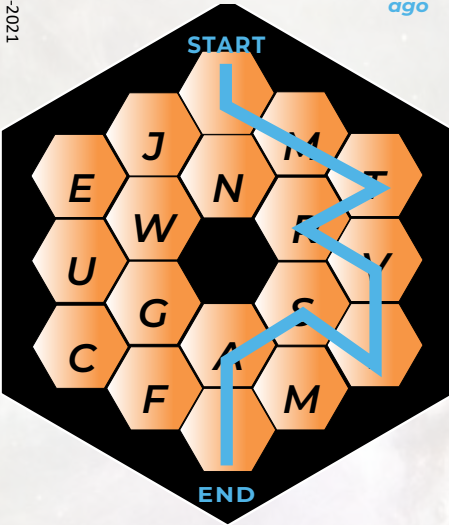


Puzzle solutions

If you have any questions or want to send us a photo of your experiments, drop us an email at openupscience@cambridgesciencecentre.org



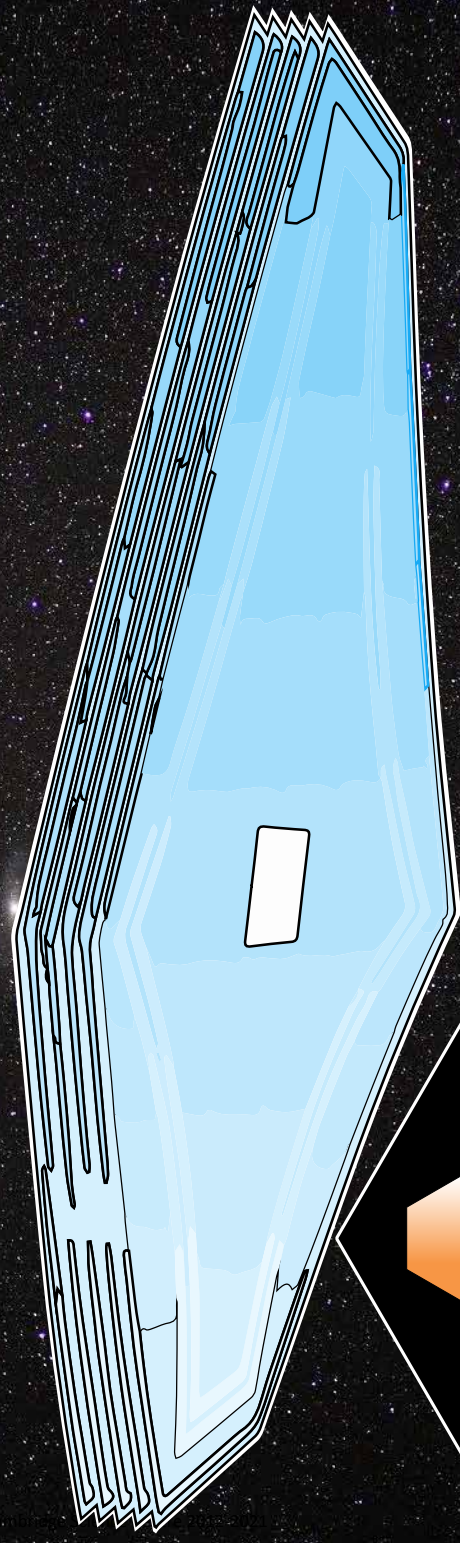
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VISIBLE LIGHT AND INFRARED MATCH UP



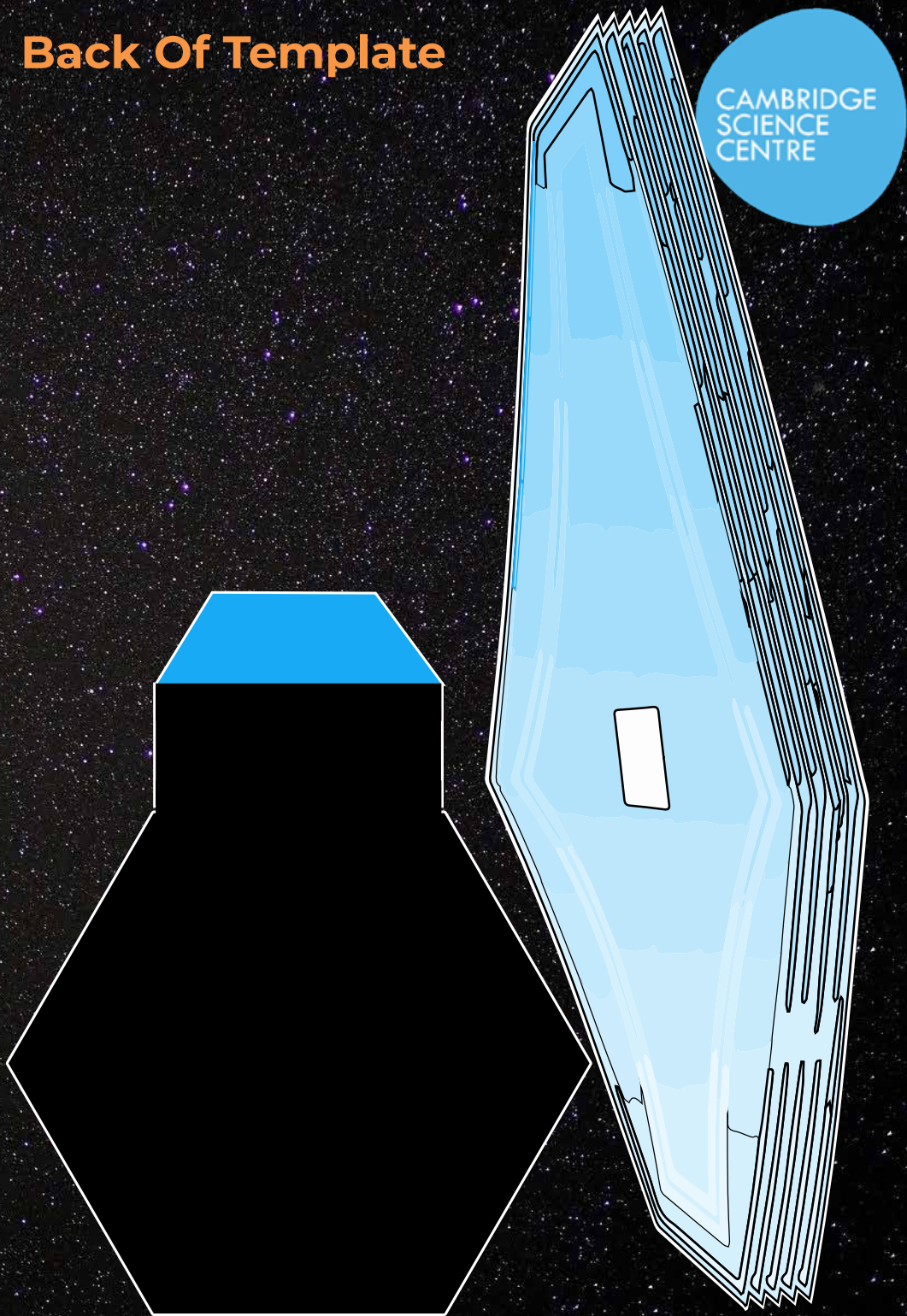
Solar shield
22m x 14m



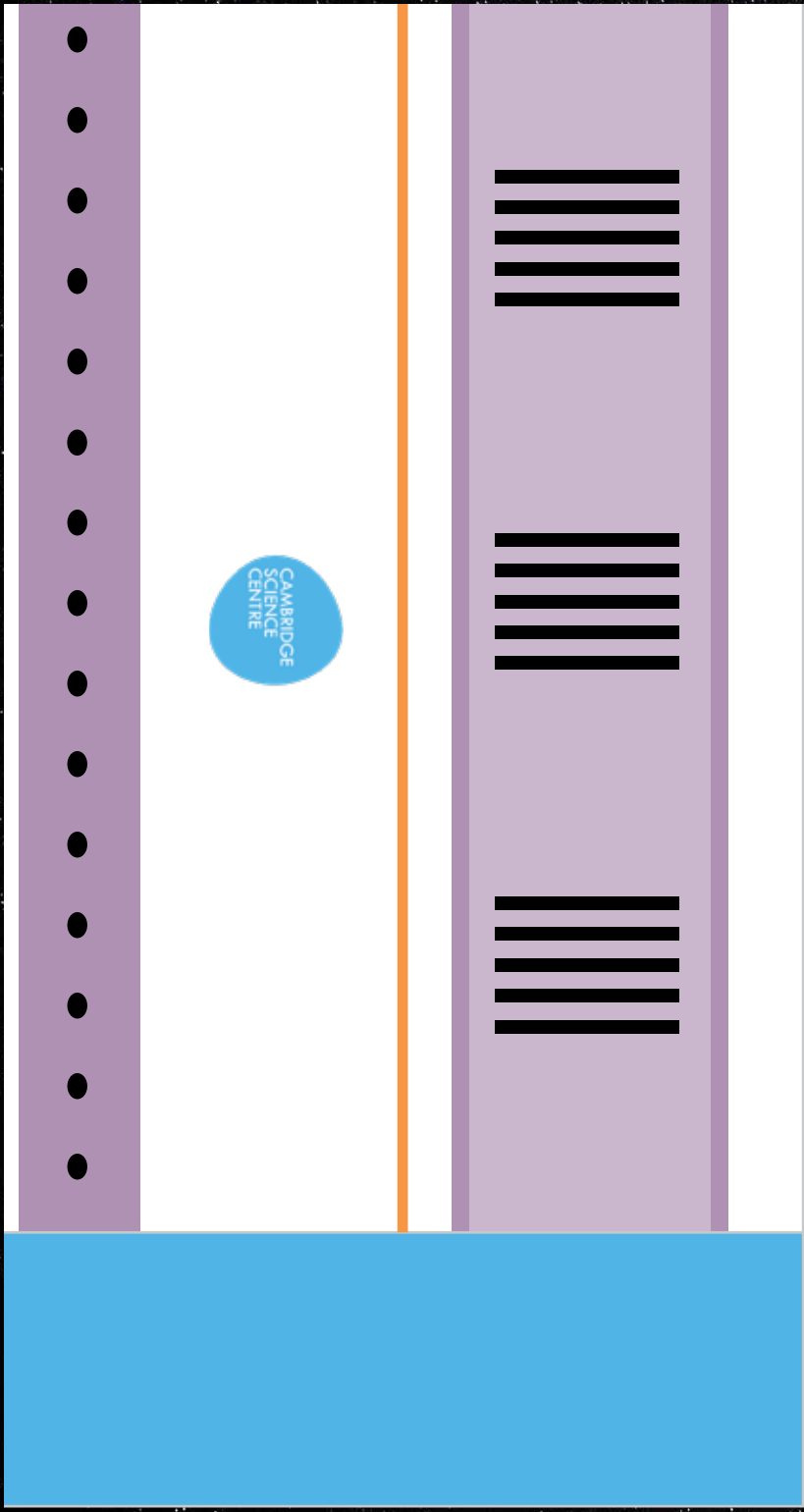
Primary mirror
Height: 6.5m
Mass: 705kg



Back Of Template



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is all about empowering young people to discover science for themselves through hands-on activities. Take a look at our website for our centre opening times, events and all the other exciting things we do!



**Spark, Ignite,
Fuel, Illuminate**

Tell us what you think!
We always want to improve, so let us know what you liked - or didn't like - about this issue!

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