

The Podium

Stand outside the Podium and look up at the ArcelorMittal Orbit.

1. Think of 6 ways that these people used maths when designing and building this sculpture.

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F Fantastic Facts

It was designed for the 2012 London Olympic Games & Paralympic Games

During the games there were 5,000 visitors a day



Looking Up!

Stand outside the Podium and look up at the ArcelorMittal Orbit.

- 2 a) Estimate how tall the building is and record your answers in the table below.**
b) Ask 9 friends to estimate its height and record their answers in the table below.

c) Use the data that you have collected to work out the mean, mode and median of your estimates.

Mean **Mode** **Median**

d) Ask your teacher or guide how tall the ArcelorMittal Orbit is.m.

e) How did your averages compare with the actual height and the averages of other groups of your friends?

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The Canopy

Walk over to the foot of the ArcelorMittal Orbit, you are now under the Canopy, wait until you can use the lift.

Engineers must know how heavy the ArcelorMittal Orbit is in order to reinforce the ground so that the mass is well supported. The sculpture contains:



35,000 steel bolts each weighing 0.5kg	19,000 litres of paint, (each litre has a mass of 2kg)	700 people, with an average mass of 75kg
A pendulum damper with a mass of 40,000kg	1,800,000 kg of steel panelling and tubing forming the main part of the sculpture	117 panels, each with a mass of 720kg, forming the cone of the canopy you are standing under

3. Calculate approximately how heavy the ArcelorMittal Orbit is. Use the space opposite to work out your answer, no calculators allowed.

Going up!



The lift takes 34 seconds

Your group will probably need to split into smaller groups to use the lifts.

F The lift holds 14-15 people. It will take about 5 minutes to load each of the two lifts, travel to the top, unload and travel back down

4. How many people can visit each hour?

F The lift goes up to the upper platform, which is 34.5 metres below the top of the sculpture

5 a) Using the total height of the sculpture, calculate how high the upper platform is off the ground.

b) Calculate the average speed of the lift.

**c) If it takes 4 seconds to reach this speed, calculate the average acceleration using:
average acceleration = change in velocity / time**

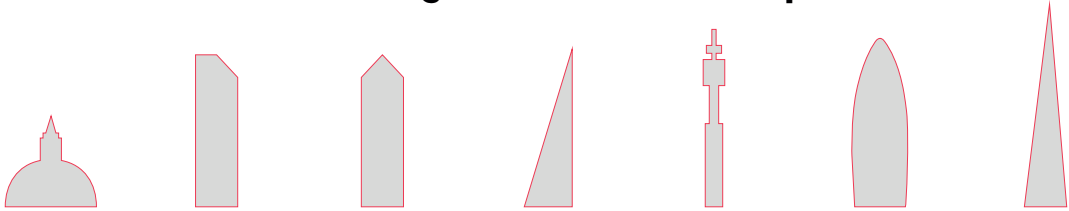
Upper Deck External

Turn to your right and go along the walkway. Take care and leave space for other visitors to look!

F When it's sunny you can see for more than 20 miles

6. Look back at the structure of the sculpture - Draw three different shapes, correctly name them and label their properties.

7. Look across London. Find buildings to match these shapes.



Upper Deck

Continue along the walkway and enter through the door into the viewing platform.

8. Estimate how long it would take the people in the table below to get to Crystal Palace. After you have made your estimates calculate the actual speeds.

	Estimate of time (hours)	Distance (km)	Speed (km/hour)	Actual time (hours)
Usain Bolt		15	45	
Sebastian Vettel		15	300	
A marching beefeater		15	4	
A taxi stuck in traffic		15	10	

Mirrors

What can you see in the mirrors? Try looking from different places.

9. a) Look in the mirrors. These mirrors distort the images of London. What happens to the reflections when you:

STAND CLOSE TO THE MIRROR

YOU

LONDON SKYLINE

STAND FAR AWAY FROM
THE MIRROR

YOU

LONDON SKYLINE

9. b) Why does it change?

Outside

Go through the door onto the walkway. Take care and leave space for other visitors to look!

10. Look across Stratford. Write a list of Mathematical terms to describe the space.

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F The ArcelorMittal Orbit is the **TALLEST** sculpture in Britain – 114.5m

Lower Deck

Follow the walkway along and down the stairs. This will lead you inside onto the lower deck.

11. a) If you stretched out all these tubes they would be 560m long, if each tube is 2m long. How many tubes make up this sculpture?

b) Do all the tubes have the same diameter?

c) Estimate the diameter of the tube.

d) Calculate the surface area of one the tubes.

F There are **455** steps

Stairs down

Exit the deck via the main doors and take the entrance to the stairs, next to the lifts.

12. a) Time how long it takes you to walk down the steps.

b) Calculate your speed walking back down the steps.

c) How many times faster is the lift?