Adam Frost

THE AWESOME BOOK OF SPACE

The world's most AWESOME FACTS



BLOOMSBURY

LONDON NEW DELHI NEW YORK SYDNEY

LIFT OFF!

This is Arthur the Alien. He's stuck on Earth and wants to go home. Fortunately he's come up with a cunning plan involving helium balloons.



Arthur weighs the same as an average nine-year-old (28.6 kg). He needs around 2,043 helium balloons to lift him into the sky*.

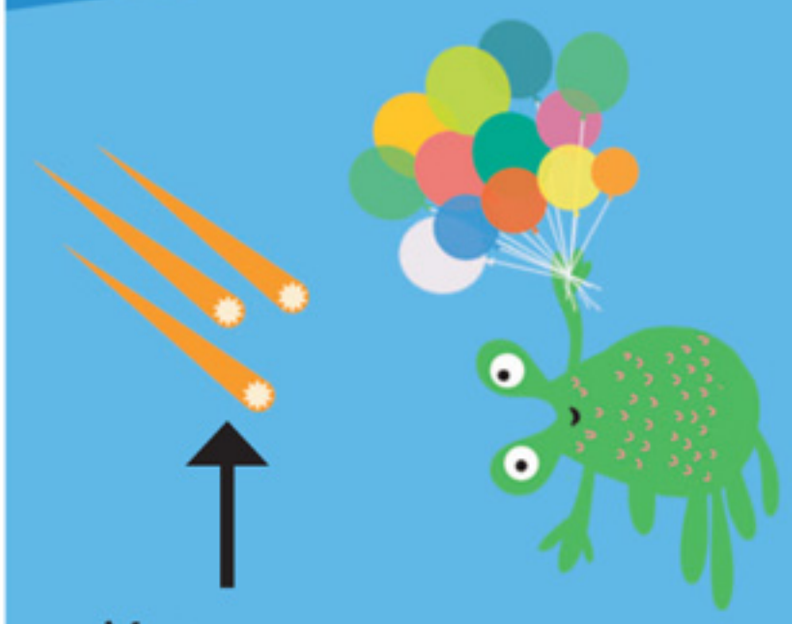
*An average helium balloon can lift 14 g. To work out how many helium balloons you'd need to lift YOU, divide your weight in GRAMS by 14.

UP IN THE AIR

What might happen to Arthur as he rises through the sky? Start at the bottom and read UP!

THERMOSPHERE 80–1,000 km
At 2,000°C, temperatures are hotter than an oven here. But because the air is so thin, Arthur would feel freezing cold.

Northern lights



Meteors

MESOSPHERE 50–80 km
Arthur's balloons would probably have burst by now. The highest a helium balloon has ever reached is 53 km. It's also -90°C here. That's colder than the South Pole!

STRATOSPHERE 12–50 km
Air pressure would be so low here that Arthur would need a special pressure suit to stop the fluids in his body from boiling.



Weather balloon



TROPOSPHERE 0–12 km
The temperature would drop to about -57°C. Arthur would also need to breathe through an oxygen mask because oxygen levels would fall from 21% to 4%.

HYPER DRIVE

What if you could give Arthur a lift and just DRIVE him into space? How long would it take to get to different places?*





5 months

The Moon





41 years

Venus





93 years

Mercury





152 years

The Sun





228 years

Mars



5,870 years

(ANOTHER 24 PAGES)

Pluto



The fastest manned rocket ever – Apollo 10 – went at 25,000 mph. At THAT speed, you'd reach Mars in about 8 months and Pluto in about 16 years.

*Assuming you were going at 70 mph. And someone was driving the whole time. (No stops for a wee or buying crisps.)

FREE FALL

Uh-oh! Arthur's balloons have burst.
Luckily we've borrowed Luke Aikins' giant net.

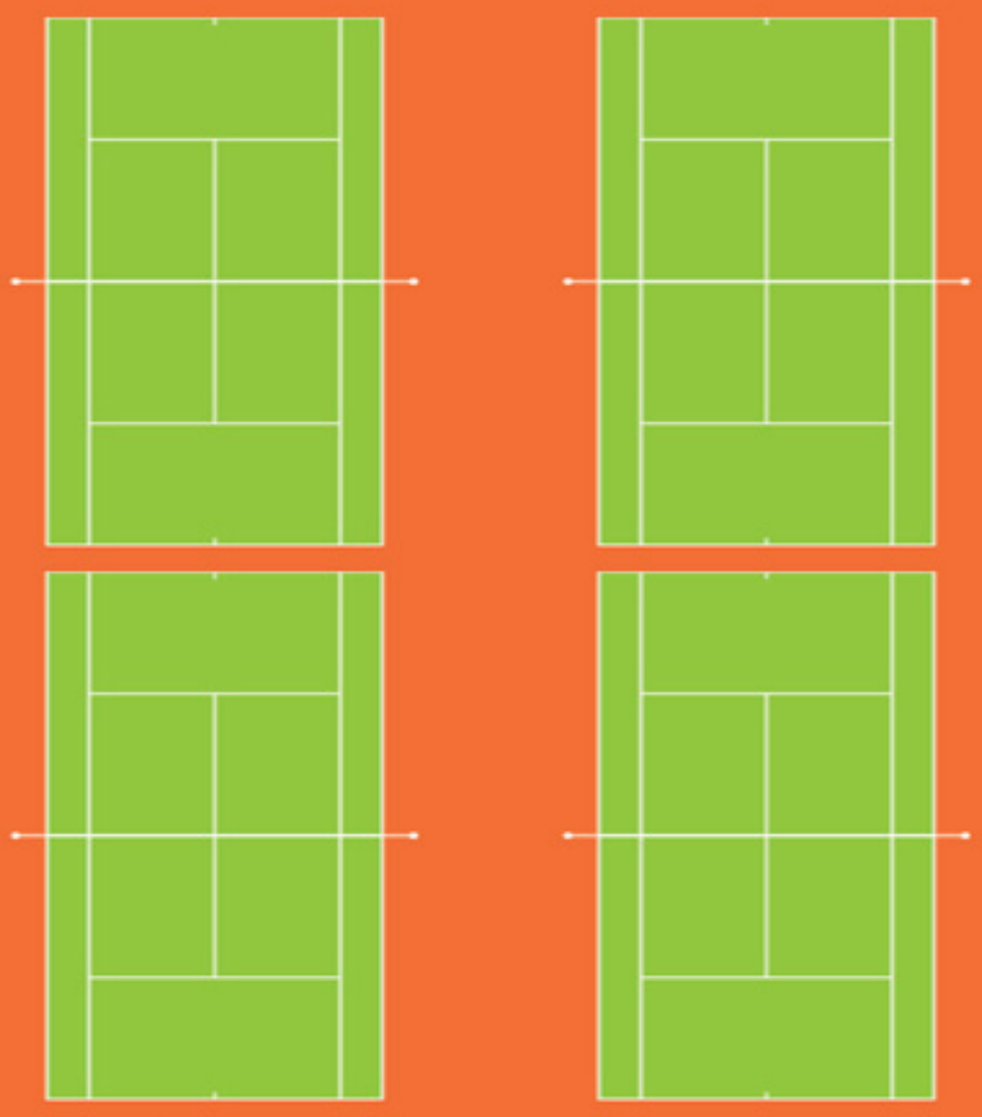


WHO IS LUKE AIKINS?

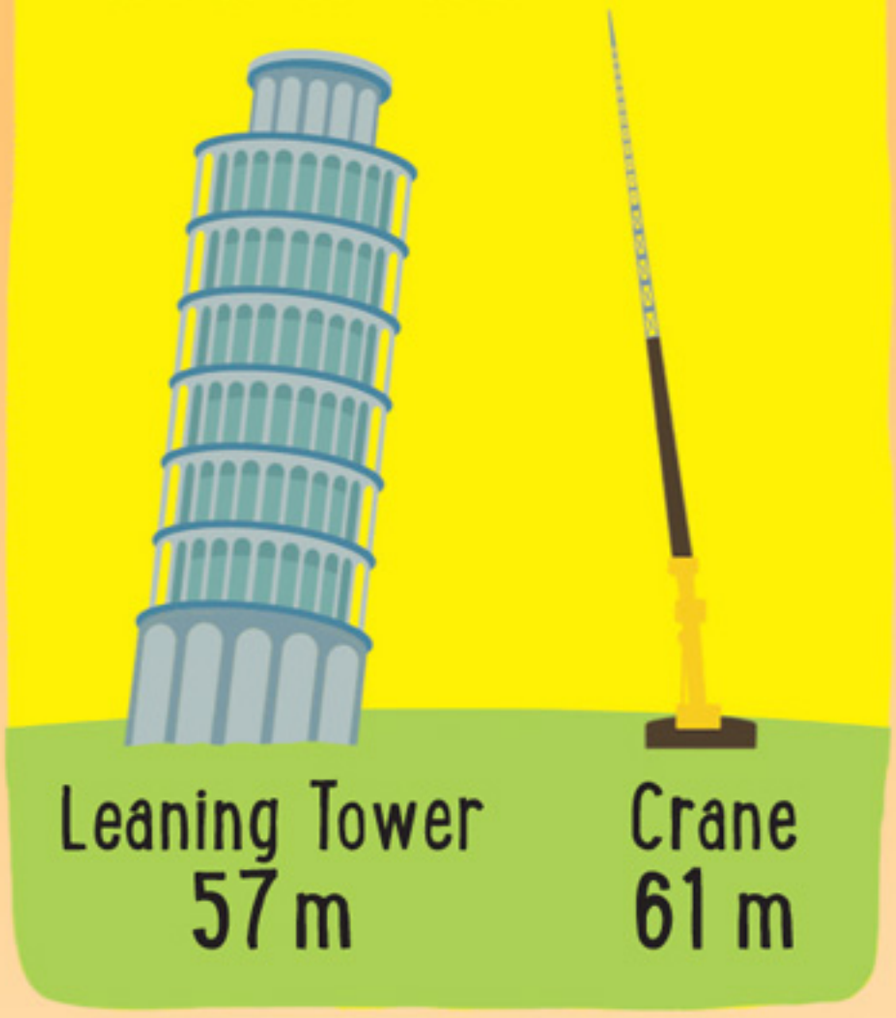
He's an American skydiver. In 2016, he jumped from a plane 7.6 km up in the sky **WITHOUT A PARACHUTE.**

He landed in a huge net in the California desert – and suffered NO injuries.

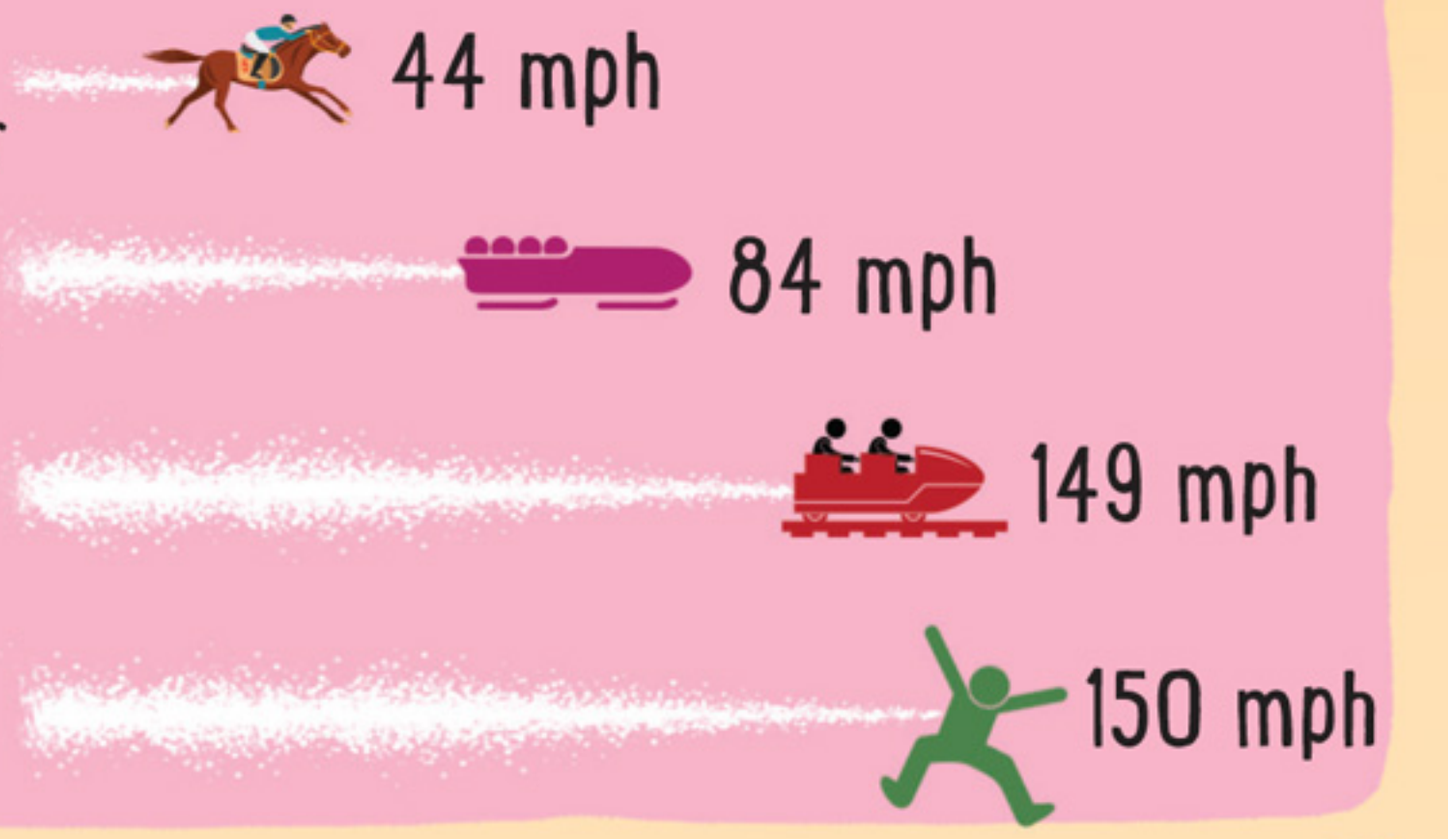
The net was 30 m^2 – about the size of four tennis courts.

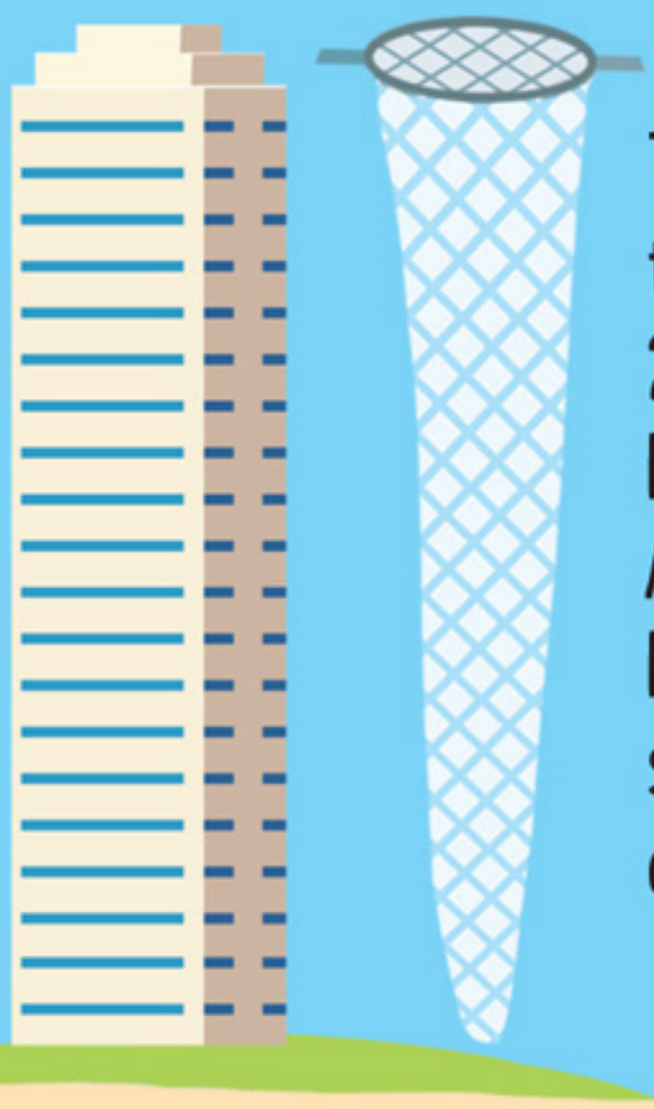


It was held up by four 61-metre cranes – taller than the Leaning Tower of Pisa.



As he fell, Luke Aikins reached speeds of 150 mph.





The net had to be deep – 20 storeys high – or Luke Aikins would have bounced straight out of it.

In 2012, Felix Baumgartner fell further (39 km) and faster (844 mph – breaking the sound barrier). But he used a giant parachute to slow himself down. I guess that makes him a... lightweight?



THIS IS A BLAST!

So you've decided to build a rocket in your back garden.
What do you need to think about?

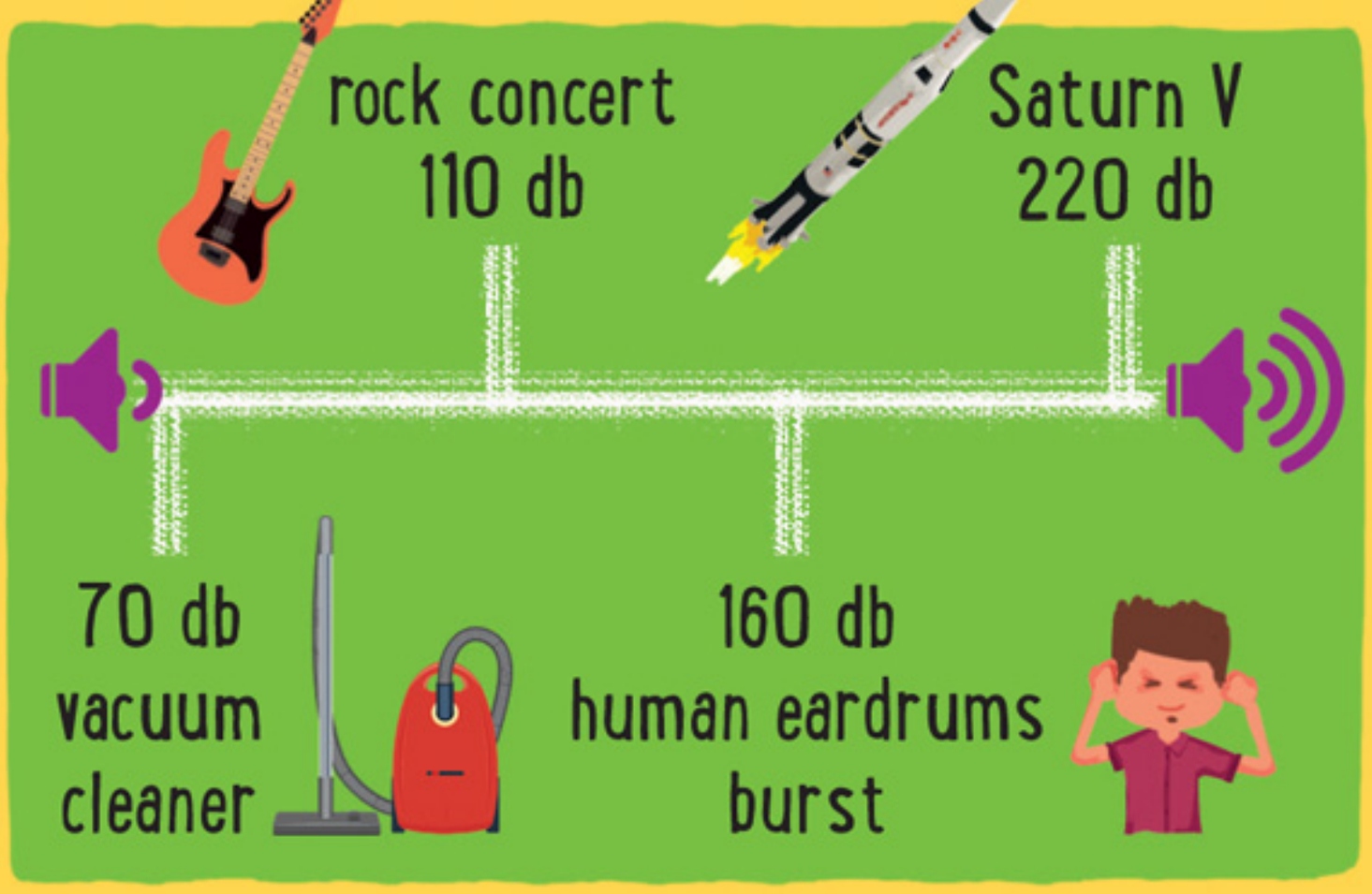


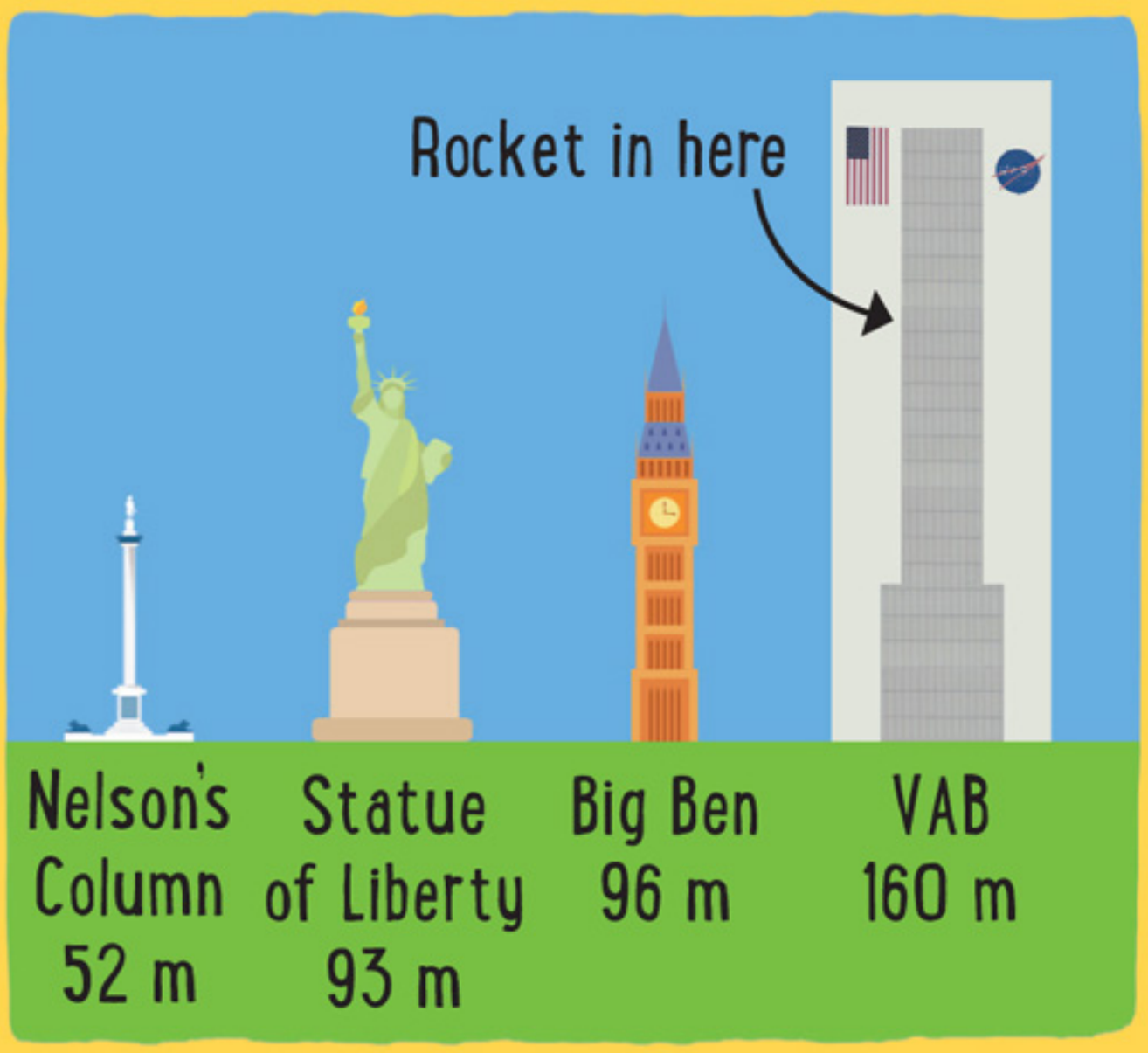
1. LOCATION

It would be good if your garden was near the Equator. The Earth spins fastest there, so rockets get an extra 'push' as they take off.

2. NOISE

It would help if no one were living next door. NASA's Saturn V made one of the loudest noises ever recorded – 220 db. This is loud enough to melt concrete.





3. A LARGE SHED

You need to build (and store) your rocket somewhere. NASA's Vehicle Assembly Building (VAB) is the tallest single-story building in the world (160 m). It also contains the tallest doors (139 m).

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