

Luna Scope's guide to the Solar System...

the sun

mercury

VENUS

EARTH

MARS

JUPITER

SATURN

URANUS

NEPTUNE

ASTEROID

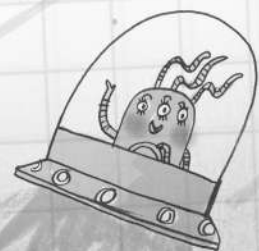
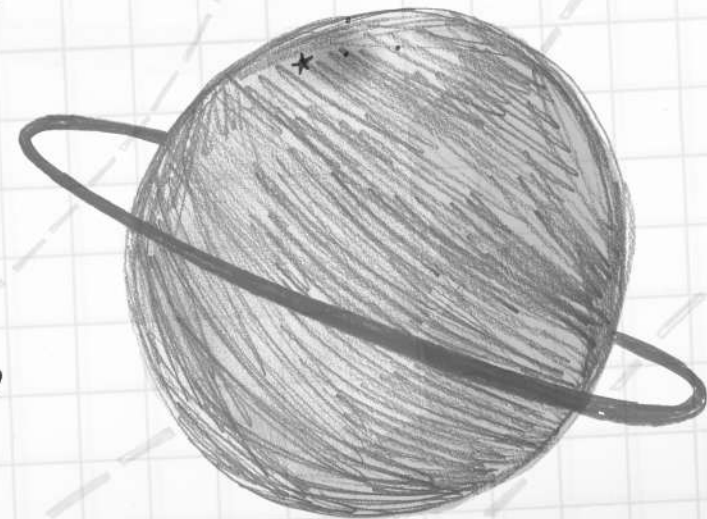
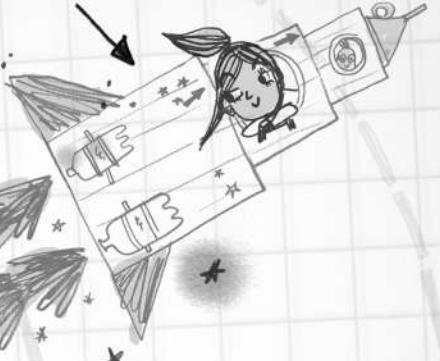
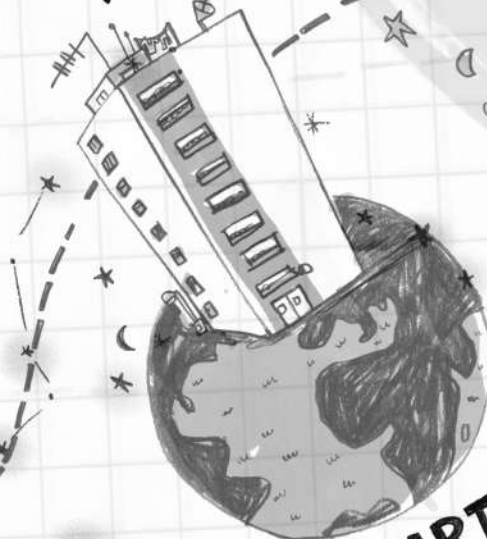
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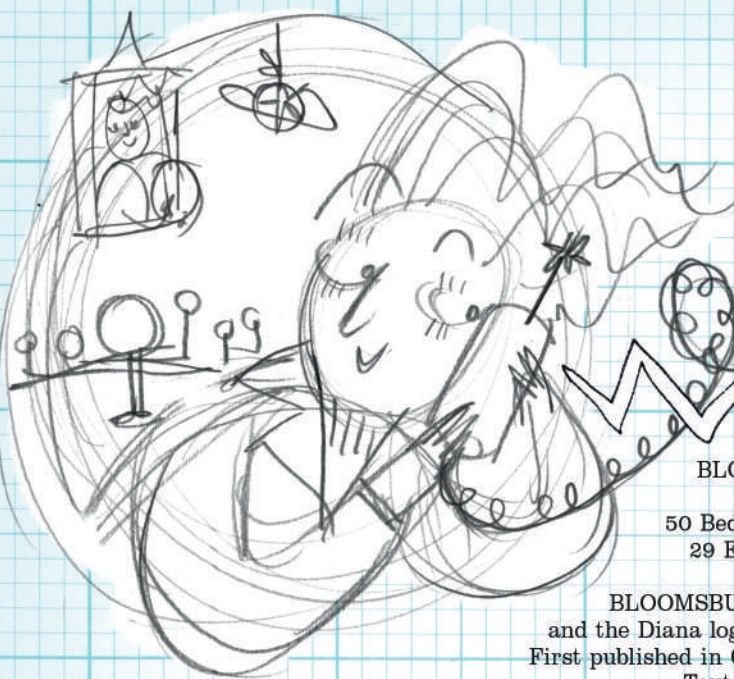
my GRANNY

my rocket!

my dog

Hello!





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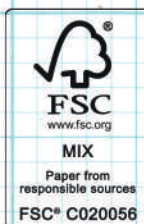
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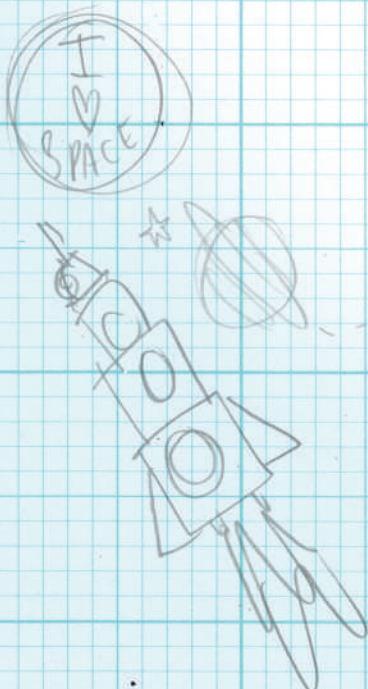
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KATE PANKHURST

WE ARE ALL

ASTRONAUTS!



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I, **Luna Scope** aged 7 and a bit
Earth years, have a **MISSION** ...

**TO BE AN
ASTRONAUT!**

I made this
snazzy space
helmet ...

I want to see a
BILLION stars
twinkling in the
Milky Way!

I think this
rock might be
from a **ALIEN**
WORLD! Cool.

We have
lift off!
LOOK! She's
floating!

TOP SECRET
plans for my
own space
craft.

**HEROES
OF SPACE!**

Meet the
CREW! Me
and **BLAST!**

Hmm...
That's not
all the
heroes of
space

Everything I'll
ever need for
living in space.

Whoops! My
test launch
made a bit of
a **MESS**.

Which planet
shall I **VISIT**
first?

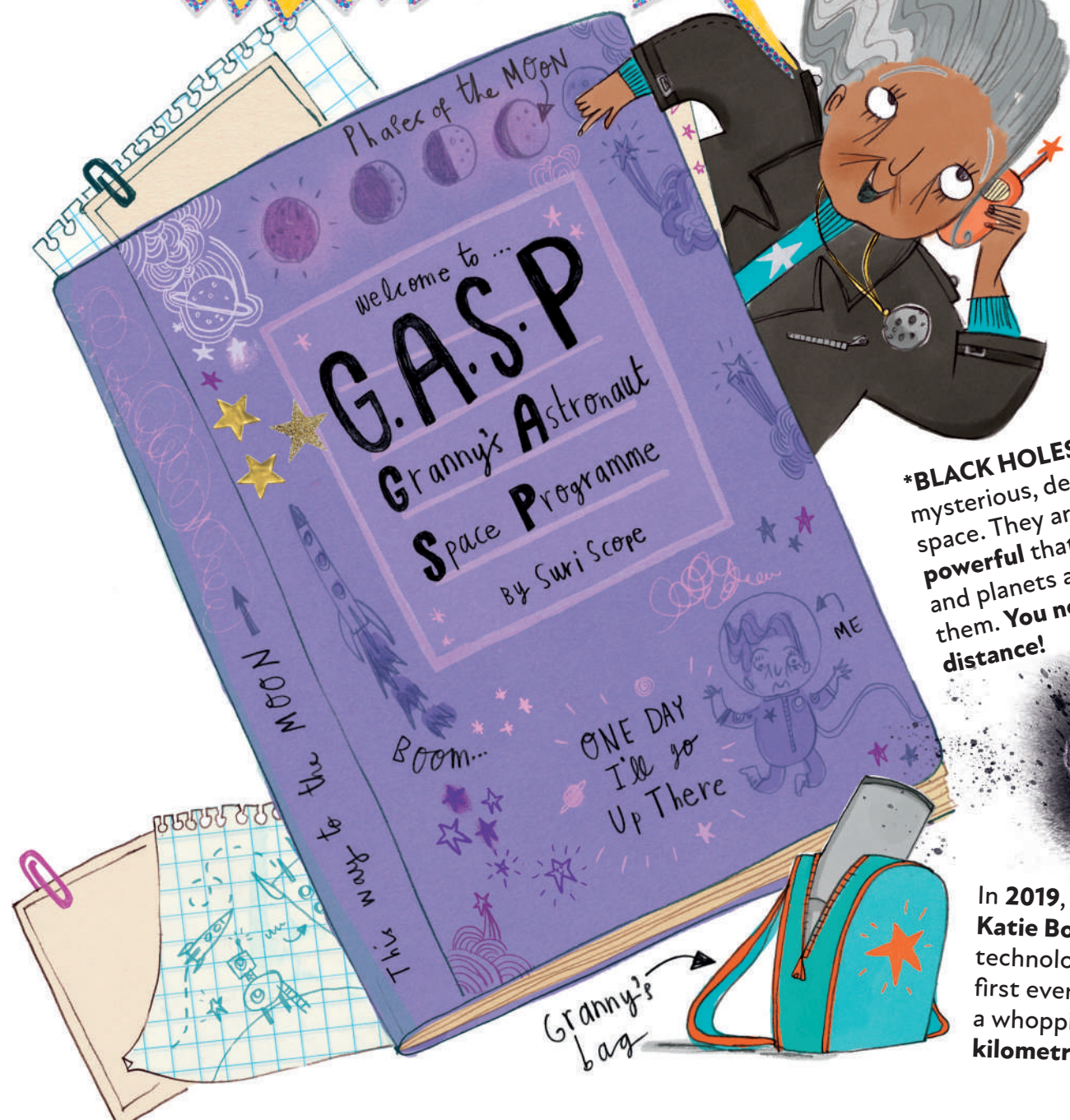
Good bye my home
planet, I will
miss you!

I am **READY FOR LAUNCH!**

**FIVE ... FOUR..
THREE... TWO ...**

**EARTH TO LUNA!
EARTH TO LUNA! YOU
HAVE FORGOTTEN
SOMETHING VERY
IMPORTANT!**

Shooting stars Luna Scope – you can't blast off into space just like that! Space exploration is FULL of unexpected twists, turns and **black holes***. You need to know your space stuff first! You need **G.A.S.P!**



***BLACK HOLES** are mysterious, dense areas of space. They are so **immensely powerful** that nearby stars and planets are sucked inside them. **You need to keep your distance!**

In 2019, computer scientist **Katie Bouman** pioneered new technology that produced the first ever image of a black hole a whopping **500 million trillion kilometres** from Earth!



First things first, don't forget to pack your spacesuit! You'll need it to go on spacewalks. This is when **repairs, tests** and **experiments** outside the space craft happen. A spacesuit turns an astronaut into a **SUPER HUMAN** able to cope with ...

OUT-OF-THIS-WORLD COLD!
The coldest known place in the universe is **-273°C** below freezing (the **coldest place on Earth** is the Antarctic at around **-90°C**.) That means that spacesuits need lots of layers for warmth. Fingers lose heat quickly, so spacesuit gloves contain special **finger heaters!**

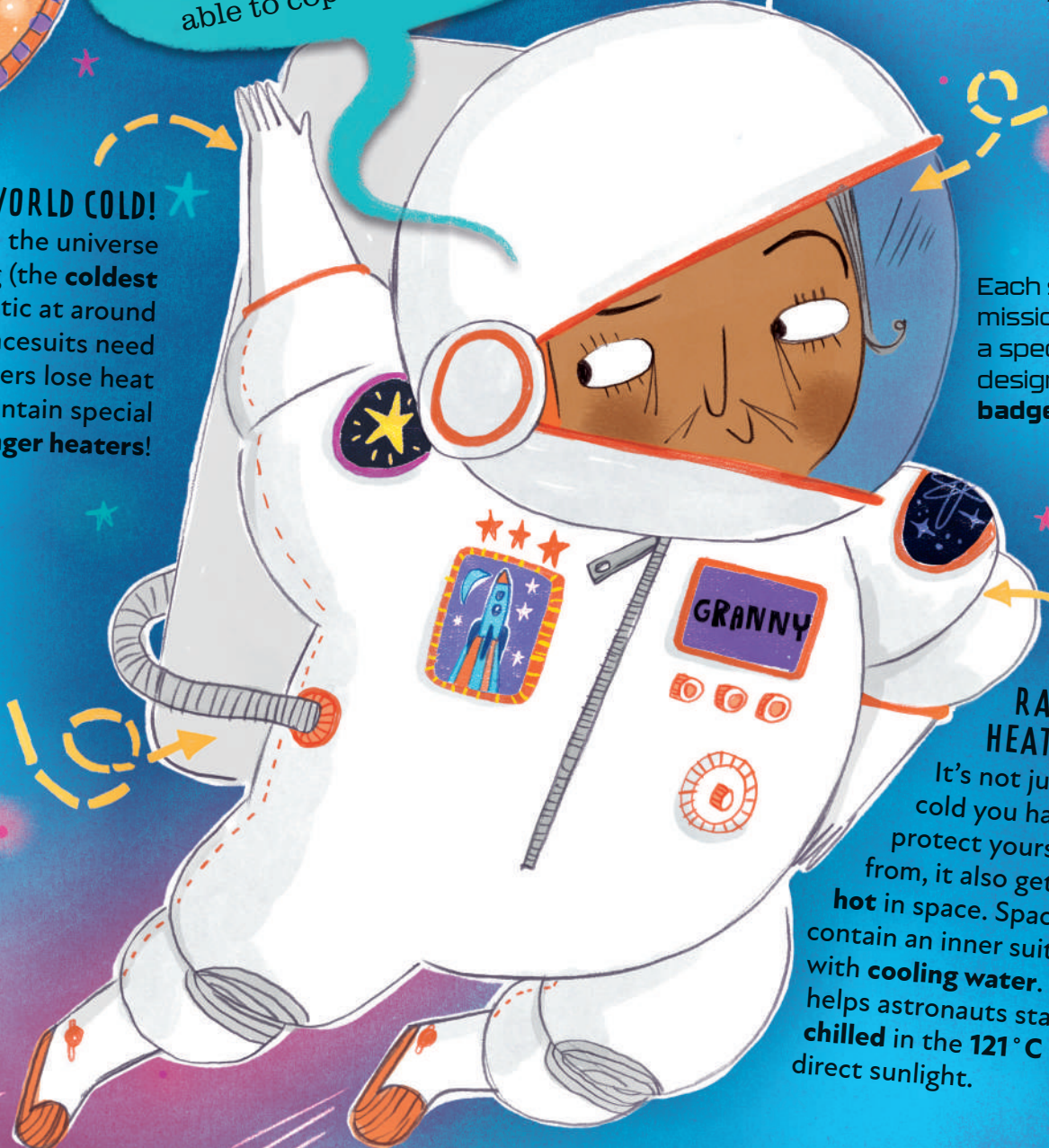
NO OXYGEN!
Humans breathe air to live, which contains **oxygen**. There isn't any oxygen in space, so astronauts wear **oxygen tanks** so they can breathe. Better keep those tanks **full!**

Spacesuits are **white** because this colour reflects the heat of the sun best.

DAZZLING LIGHT!
Visors are like **super-duper** space sunglasses. They are coated with **gold** to protect astronauts' eyes from the brightness of the sun!

Each space mission has a specially designed **badge**.

RAGING HEAT!
It's not just the cold you have to protect yourself from, it also gets **very hot** in space. Spacesuits contain an inner suit filled with **cooling water**. This helps astronauts stay super **chilled** in the **121°C** heat of direct sunlight.



That's our outfit sorted! But before we can go **into space**, let's keep our feet on the ground and just ...



LOOK UP!

All space travellers need to understand what they can see in the night sky before going up there. So let's **STARGAZE** and be **AMAZED**!

The stars we can see from Earth are all part of our home galaxy – the **MILKY WAY**. There are many countless **trillions** of galaxies in the universe. **WOW!**

Groups of stars in the night sky are called **CONSTELLATIONS**. Different constellations can be seen depending on where you are standing on Earth.

LEO, the LION

CANIS MAJOR
The GREAT BEAR

URSA MINOR
the small BEAR

LUPUS
the Wolf

The **ANCIENT GREEKS** believed that the constellations were placed there by the Gods to remind humans of their **great deeds**.

LIGHT POLLUTION from street lights, towns and cities can sometimes make it hard to see the night sky clearly.

LOOK FURTHER!

TELESCOPES have allowed astronomers to see far more than we can with our eyes alone ...

In the 1700s **CAROLINE HERSCHEL** became the first professional female **astronomer**. A woman being paid for her scientific talents was a **remarkable achievement**. At the time women were expected only to get married and have children.



SATELLITES are objects that orbit the Earth. Some send signals, making phones and TVs work.

Hello, hello? Can you hear me?

Puerto Rican astronomer **Wanda Díaz-Merced** lost her eyesight aged 20, but she refused to give up her dream of studying the stars. Wanda now watches the night sky by **listening** to it! She uses a technique that turns the starlight gathered by telescopes into sound waves. Her pioneering work has opened astronomy to others with **disabilities**.

Want to know what other wonders you can see in the night sky? Make a wish on a **shooting star** and we'll find out!

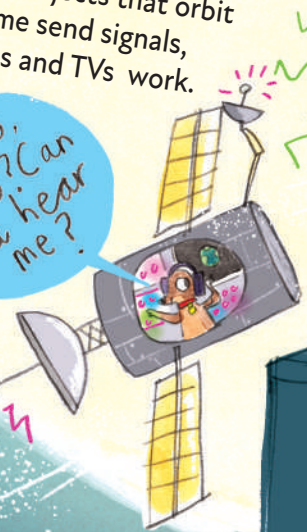
The **HUBBLE TELESCOPE** launched in 1990. Orbiting above Earth's atmosphere, it can peek into distant galaxies. **Nancy Roman**, NASA's first female chief astronomer, was known as **'Mother of Hubble'** for making the telescope a reality. Hubble changed our understanding of the universe!

I helped to make **HUBBLE** possible.

In **2021** the **JAMES WEBB** telescope launched. It can see even deeper into space than Hubble. It is observing some of the first stars and galaxies that formed after the **Big Bang**!



Light from the NIGHTSKY



But did you know that a **shooting star** isn't actually a star at all? It is a fragment of space rock whizzing through our atmosphere!



Let us explain! Hey! I'm an **ASTEROID**. A large chunk of rock orbiting the sun ...

When asteroids collide with each other, small fragments of rock called **METEORIDS** break off. That's me!

Just popping in to say hi! I'm a **COMET** — a huge ball of dust and ice. As I whizz through space, I leave a bright tail of dust and gas behind me.

Earth's **GRAVITY*** pulls me into the atmosphere. Then you get me, a **METEOR**! The streak of light I make in the sky is a **SHOOTING STAR**.

BUMP! I've landed! Pieces of meteor that make it to Earth are called **METEORITES**. Nice to meet you!

PLANET EARTH

***GRAVITY** is a powerful, invisible force that causes objects to attract towards each other. It formed the stars and planets, and is the reason Earth orbits the sun. It also stops us from floating off into space!

JOB: SPACE GEOLOGIST

In the 1960s **Ursula Marvin** became one of the **first female geologists** to study rocks brought back from the NASA Apollo moon missions. She also went **meteorite hunting** in the Antarctic and discovered unusual meteorites, flung to Earth millions of years ago after an impact on the moon!



Studying **space rocks** can reveal all sorts of **secrets** about what the universe is made from, how old it is and the forces that shape it.

I wear my **meteorite** necklace to feel a little closer to space. It is full of **stardust** and **wonder**, just like you Luna!

WE ARE ALL MADE OF STARDUST

Our bodies are made up of substances called **elements**. The elements in our bodies were created by the first ever **stars** around **14 billion** years ago!

Right now **gravity** is keeping our feet on the ground, but you need to be prepared for when there's not enough to stop you **floating away!**

