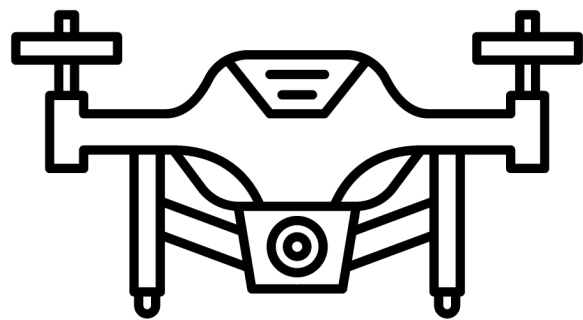
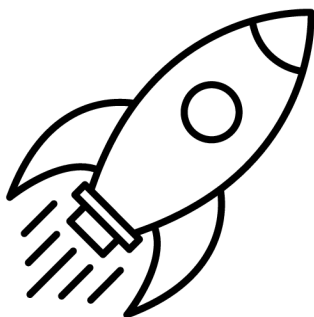
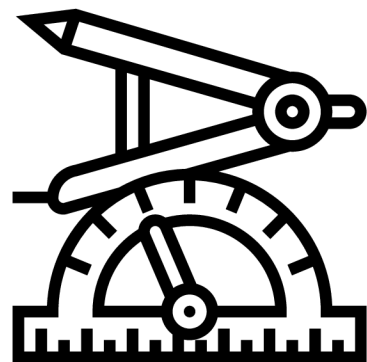
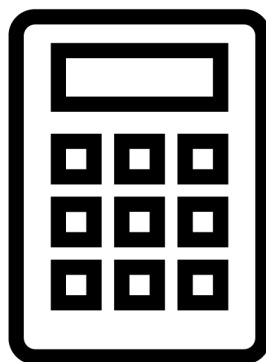
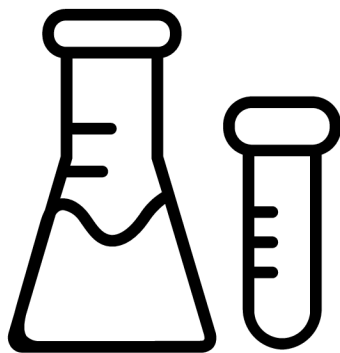


Finding the ME in STEM



Sharna's student activity pack

Imagining the Future

Let us take you on an incredible journey into the world of space exploration with the Callistan Cycle.

The Callistan Cycle is a series of five short stories from our Imagining the Future series that explore STEM areas like robotics, AI, climate change and resource management.

You can read, watch or listen to each story, for free.



Far Out! by Lili Wilkinson

As the seconds count down to the launch of humanity's first family into deep space, young stargazer Stella is sure that today is going to be the most exciting day of her life. But she has no idea of just HOW exciting and terrifying and important it will be. And what it will mean for the future of interstellar travel.

Join the Kaufmanns as they go FAR OUT! in a story that explores space and robotics.



SCAN ME



Calculating Apple Pie by Melissa Keil

Kal and her sister Arche are hurtling through space towards Callisto in a ship shaped like a beluga whale that is the size of a city block. Arche does something a bit (very!) reckless to try to help her sister feel a little less homesick.

Calculating Apple Pie explores future food production and coding and how tampering with it can cause serious real-world problems.



SCAN ME



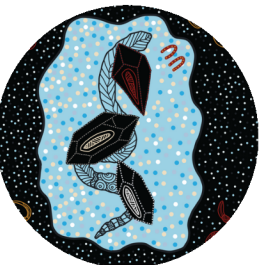
Semper by Rebecca Lim

Shang travelled to Callisto on the Hohmann transfer from Earth, which took almost six years. She sacrificed everything for the chance to explore distant moons for resources and critical minerals, but gets paired with a Drobo called Semper that always wants to play, like a real dog. Shang doesn't have time for games, so why has she been paired with such a useless Drobo?

Semper explores robotics, AI and mineral exploration.



SCAN ME



Proof by Gary Lonesborough

Tanner has been noticing that lots of people in his town on the lunar outpost on Callisto are getting sick. What is causing this mysterious illness plaguing his community? Tanner's sister Rachel thinks she knows what's causing it and takes Tanner on an eye-opening adventure where they discover a lot more than just the cause of the illness.

Proof explores filtration, waste management and environmental science.



SCAN ME



Earthbound by Alison Evans

Pen and their father have arrived on Earth. Pen's comms device isn't working, and when Pen tries to fix it, they hear a strange rhythmic sound coming from it. Determined to figure it out, Pen seeks the help of an android to help decipher the mysterious sound.

Earthbound explores transportation and telecommunication.



SCAN ME

Comprehension Questions

What does Sharna do and what does she use to do it?

What two things is Sharna not good at?

1.

2.

What two themes is Sharna interested in learning more about?

1.

2.

Name two things Sharna is good at.

1.

2.

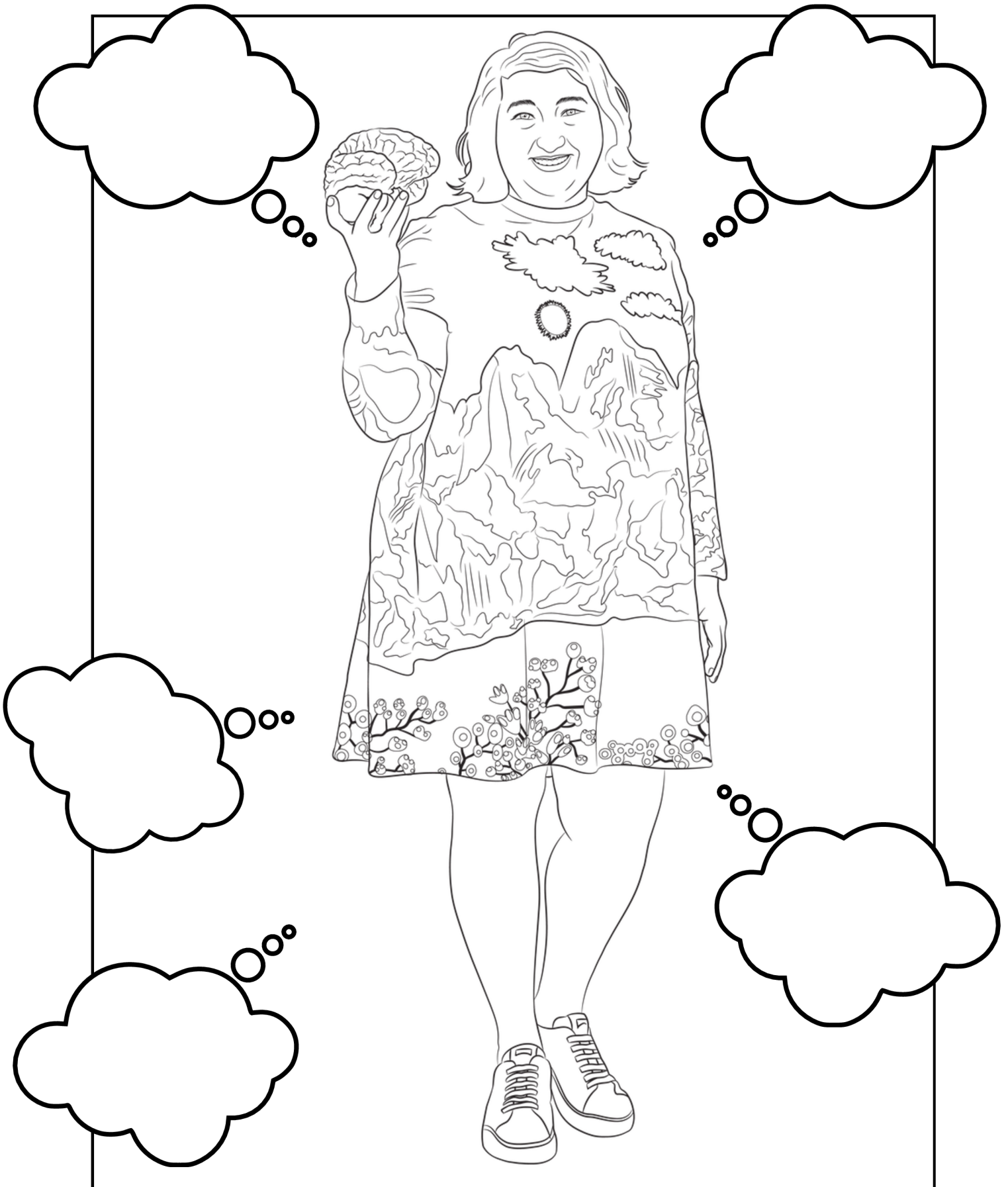
What was Sharna's goal growing up?

Where has Sharna's research taken her?

What did Sharna do when she decided her first degree wasn't quite right?

What does Sharna's work help people to do?

Meet Sharna. She's a neuroscientist who wants to know more about how to make our brains more resilient to aging. Fill in the bubbles with 5 STEM (Science, Technology, Engineering and Mathematics) skills she uses in her job. Which of these skills do you think is most important? Which do you think would be the hardest to develop? When you've thought of the skills, colour in the rest of the image.



Pathfinder Workwords

Neuroscientist

U R N C O H X N L E Y M C W Y X Q I M S F G N
T D E X L E I O A P W G U Y E Z F N I R I G E
H X O S T X N I S O J W O L P N R S L G N V U
H V N R E G N T T C G V F L E S Y S S T D K R
A C O Z E A H P U S C E G W O L N G J S I B O
G C O V A Z R E B O R O D E A R Y I F E N B T
L E I V O Q F C N R Y V P N L D U L A V G K R
H T N J A M T R H C T V A I H X T E C R S E A
Y O Z E E A T E Z I L A D D U Z E I N Z B S N
I T Y M T V A P H M T E X P E R I M E N T P S
R N O C J I N X N A H K F I L N Z M T W A A M
J R K T R F C O D E R N P K F B L Y S A R N I
Y S N E U R O S C I E N T I S T T M B M X Y T
G N I L E D O M L A N O I T A T U P M O C S T
A S P I N A L C O R D N O I T I N G O C J X E
N E L O E J X L D D P Q M M X J T R W W G E R

Find 19 words Sharna needs to do her job.

- | | |
|------------------------------|----------------------|
| 1. MICROSCOPE | 10. NEUROTRANSMITTER |
| 2. DATA ANALYSIS | 11. MEMORY |
| 3. EXPERIMENT | 12. COGNITION |
| 4. GENETICS | 13. NEUROLOGY |
| 5. COMPUTATIONAL
MODELING | 14. PERCEPTION |
| 6. BRAIN | 15. REFLEX |
| 7. SYNAPSE | 16. NEUROSCIENTIST |
| 8. CORTEX | 17. RESEARCH |
| 9. SPINAL CORD | 18. FINDINGS |
| | 19. LONGEVITY |



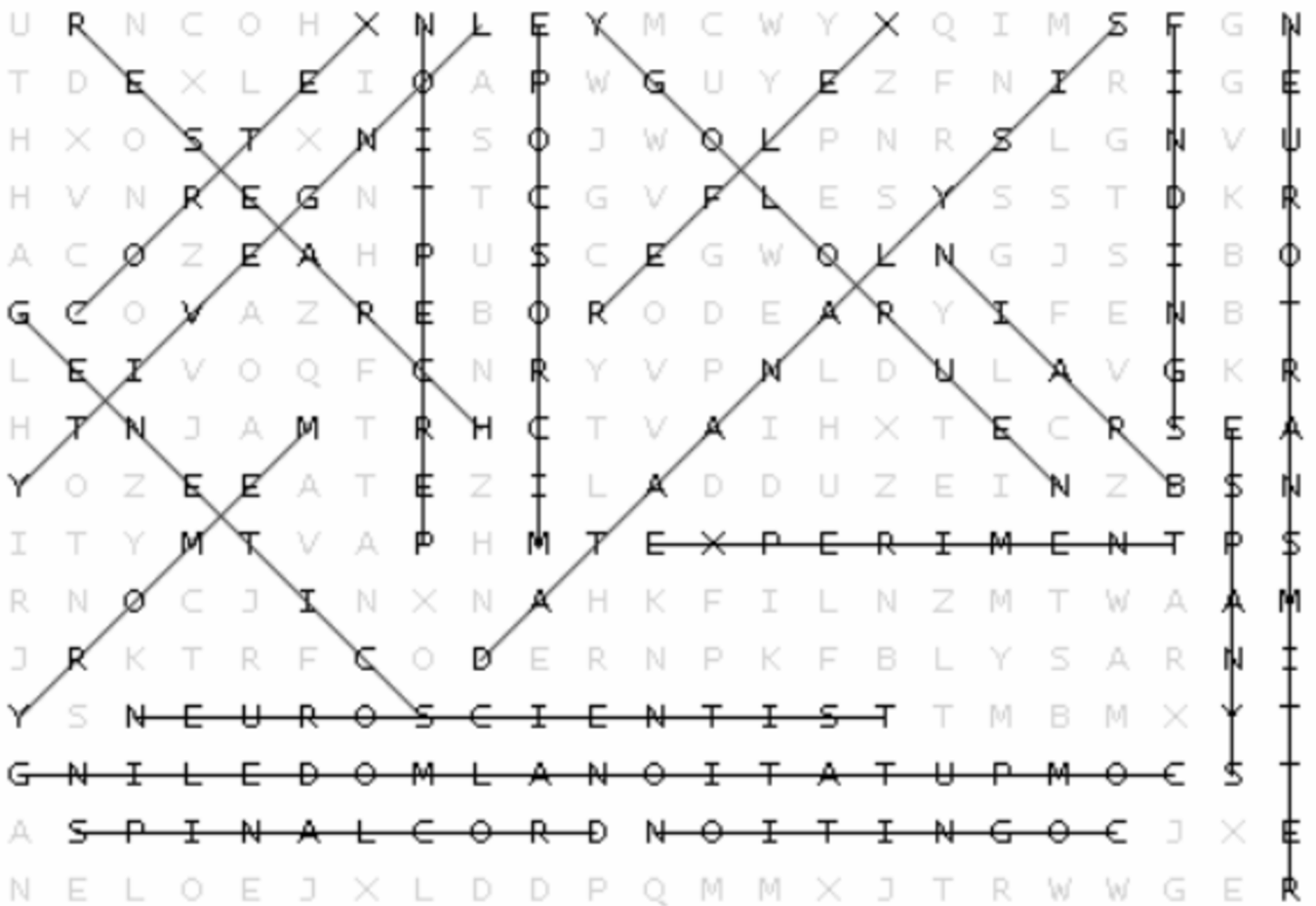
SCAN ME

Scan this QR code to find out more about Sharna.



Pathfinder Workwords

Answers



Let's reflect



Were any of these words new to you? Look them up and find out what they mean.

Which of these skills do you think you are best at, or would like to get better at?

1. _____

2. _____

3. _____

Can you think of anything else Sharna might need to do her job?

A day in the life of a neuroscientist

- 8.30am** I arrive at work slightly earlier than usual because today is a big day: we're about to start data collection on a new project! Months of work developing the experiment, getting approval from the ethics committee, training staff, and running pilot tests is finished! Our participant is due to arrive at 9am, so I arrive early to make sure everything is running smoothly. Our nuclear medicine technologist (NMT) confirms she has our medication for the PET scan ready, our radiographer confirms that the MRI scanner is all in order, and my research assistant confirms everything is ready for when the participant arrives.
- 9.00am** Our participant arrives. My job today is really just to make sure everything is running smoothly – my team are the real stars today. We bring the participant around to the scanner – today they will be having a combined PET and MRI scan. It is really important that they have not eaten since last night, and that they don't have any implants or other things that would make it dangerous to enter the scanner room. The radiographer goes through a detailed checklist to ensure they are safe to scan. Then the NMT checks the participant's blood sugar levels to ensure they are safe to receive the medicine. Lastly, the research assistant reminds the participant what they will do in the scanner, and make sure they're feeling comfortable about doing the scan. Yes, they are – we're ready to put them in the scanner!
- The radiographer helps the participant lie down on the scanner bed, and between them, the NMT & radiographer make sure they're nice and comfy. The NMT puts a needle in the vein of the participant's arm – this is how we will deliver the medicine that allows us to see the brain light up on the PET scan when it is active. The participant is moved into the scanner, then the experiment starts! Today, we are just interested in the participant's brain while they are at rest, and so they lie quietly, thinking of nothing in particular. Every 10 minutes, the NMT will go into the scanner room to take a tiny amount of blood to make sure the PET medicine is being delivered properly. Out in the console room, I can see that everything looks normal on the MRI, and that the experiment seems to be running smoothly, so I pop out to my office and leave the experts to do their job.
- 10.00am** Coffee time. I'm impressed I've held off so long! While in the kitchen, I run into the operations team who are responsible for making sure all the scanners and equipment are running smoothly. They mention there is a new project coming on board, and ask if I'd chat to the researchers about their project – sure! They also update me on the progress of some videos we filmed with famous football players about maintaining their brain health. They're looking great, I just need to confirm that all the scientific facts in the videos are accurate.
- 10.30am** After checking my emails (there are so many), I have the first of my 1:1 meetings with my PhD students. I have 9 students at the moment, and they're studying topics as diverse as the effects of pregnancy on the brain, how brain energy declines in ageing, and the effects of circadian rhythms on the brain. Today I only have 4 student meetings, and we chat about how their projects are going and if they need anything from me to help them complete their studies. Working with all these clever people is the best part of the day.
- 12.30pm** Lunch. I'm almost always starving by this point, and today I picked up sushi on my way in. I quickly gobble it down at my desk while responding to emails.
- 1.00pm** I start reading and making edits to a student's paper. Now that I supervise so many students a lot of the time the students are doing the analysis and writing the first draft. This draft is good! I print out the figures and draw all over the graphs to make sure I've understood everything properly. The brain images look amazing, but the student forgot to label which side is left and right. Whoops!
- 2.00pm** Time to review a paper. I'm an editor at 2 journals and so I read a lot of papers to see if they will be a good fit for our journal. This one looks pretty interesting – machine learning of MRIs to detect Alzheimer's disease.
- 3.00pm** Operations meeting. My facility supports a really large range of scientists across any field that uses imaging technology. I update everyone on progress on a few new projects. I hear that the new clinical trial pilot test went well and that the triceratops scan on the CT machine was a big success. Next week that team will be scanning lumps of wood – maybe not quite as exciting as a dinosaur.
- 4.00pm** Zoom meeting with collaborators about a conference we're organising. Discussion revolves around international speakers and where we should host it. I tune out a bit and sneakily look at my emails.
- 5.00pm** Home time. I should run out the door, but I pop by the scanner and chat with the NMT and radiographer. Everything went well today, and the data is uploaded ready to analyse. We're all excited about scanning lots of people for the new study and what the results will be!

Neuroscientist

Sharna is a neuroscientist. She is interested in finding out more about how life experiences, like careers, playing puzzles, and becoming parents impacts our brains. Find out more at:

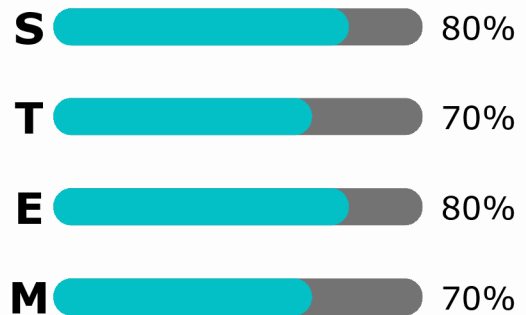
futureyouaustralia.com.au/pathfinders/sharna



It is so cool that I can peer into people's brains and see it working in action."

STEM Meter

How much Science, Technology, Engineering and Mathematics (STEM) does this job use?



Source: jobsandskills.gov.au

5 reasons why you should do this job

- 1** Find out more about the human brain
- 2** Help scientists solve mysteries
- 3** Help people live longer, happier lives
- 4** Work in a team with interesting people
- 5** Travel the world to share your research

3 STEM skills required for this job

Research

Computer Science

Chemistry

Subjects to develop these skills

Science, HASS

Digital Technologies

Science