BRAIN DETECTIVE

By Tim James

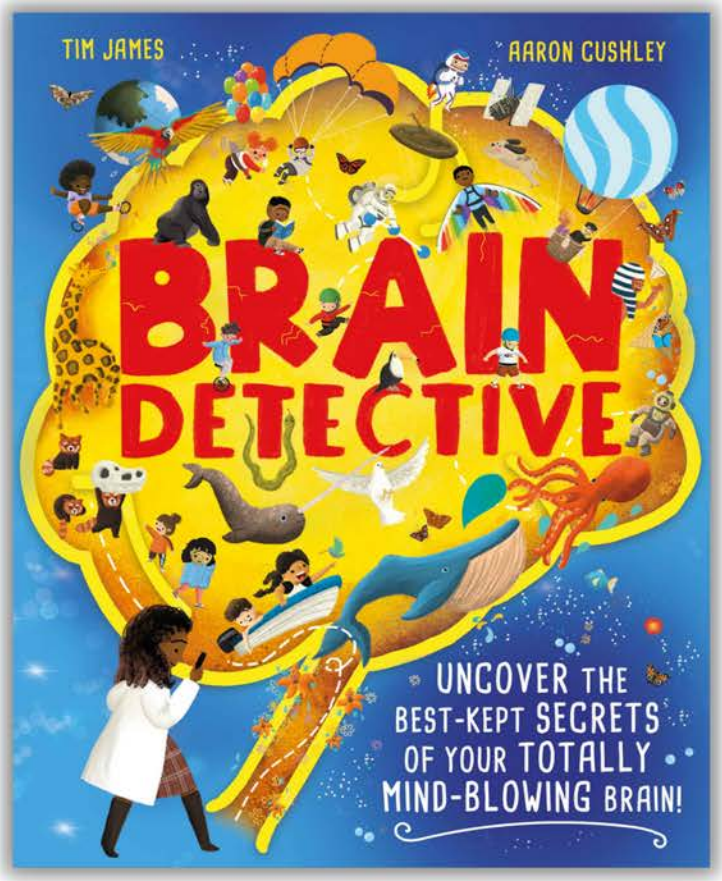
About the Book

Did you know that the world's most complicated computer is the one inside your head?

The brain is amazing. It controls everything we do. It makes us think, move, feel, sleep, remember, forget, imagine and have some pretty weird dreams. But it's also one of the most mysterious organs in the human body.

So grab your magnifying glass and become a BRAIN DETECTIVE!

Brain Detective is written by Tim James who is an author, teacher, public speaker, science consultant and YouTuber.



Activity 1 – Brain Detective Fact Sheet

Objective: Complete the fact file sheet with fascinating facts about the brain.

There are so many fascinating facts about the brain in *Brain Detective*. Discuss your favourite facts with a partner and fill in the fact sheet below. Share and compare your favourite facts with your classmates.

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Activity 2 – Ancient Investigators

Objective: Discuss each ancient investigator and select the most disgusting one.

Which ancient investigator is the most disgusting and why? Compare and share your reasons why with the class. Discuss your ideas with a partner and then with your classmates.

- Minds of Mummies
- Medieval Mysteries
- A Hole in the Head

MINDS OF MUMMIES

The first people to get a glimpse of a human brain were the ancient Egyptians. A papyrus (a material a bit like paper) written 3,700 years ago describes a man who got into an accident and wound up with a hole in his head, allowing people to stare inside and see the gooey mess.

The ancient Egyptians named what they saw 'the skull guts' because it looked similar to intestines, but they didn't have a clue what it did. They just knew it was slimy, so they figured its job was to make mucus and saliva that dripped down into the nose and mouth. Nice.

MEDIEVAL MYSTERIES

In the Middle Ages, brain detectives began to figure out that the brain controlled who you were. They noticed that people who suffered head injuries started acting differently.

A tenth-century doctor named Al-Zahrawi performed surgery on men who had too much fluid in the brain, which made them act sleepy. He invented a drill that could pierce through the skull to drain the fluid. He then sewed up the wounds with bits of goat intestine. Gross! This probably goes without saying, but don't try this at home!

A HOLE IN THE HEAD

The curious case of Phineas Gage gave brain detectives a big clue about how the brain controls personality. In 1848, Phineas was laying dynamite to clear ground for a train-track when it accidentally exploded. The blast shot an iron pole right through the bottom of his head, and it came flying out the top, along with his right eyeball and a tiny chunk of brain. It doesn't sound like it, but Phineas was actually lucky because the metal was so hot it burned the wound on his head shut, stopping him from losing blood and ensuring his survival.

Phineas recovered, but his personality became completely different. Previously, he had been a hard-working, focused, cheerful fellow, but afterwards he became short-tempered, lazy and foul-mouthed. I'm not surprised – I doubt I'd be Miss Jolly Pants if someone exploded a metal pole through my face!

Activity 3 - Meat-robots?

Objective: Discuss the quote below and explain your ideas.

On page 13 in the book, it says 'Humans are basically meat-robots who use neurons and nerves instead of cables and wires.'

Do you agree with the idea that humans are like meat-robots? Why?

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What definition can you come up with for humans to complete the sentence below? Make sure you include something about the brain.

Humans are.....

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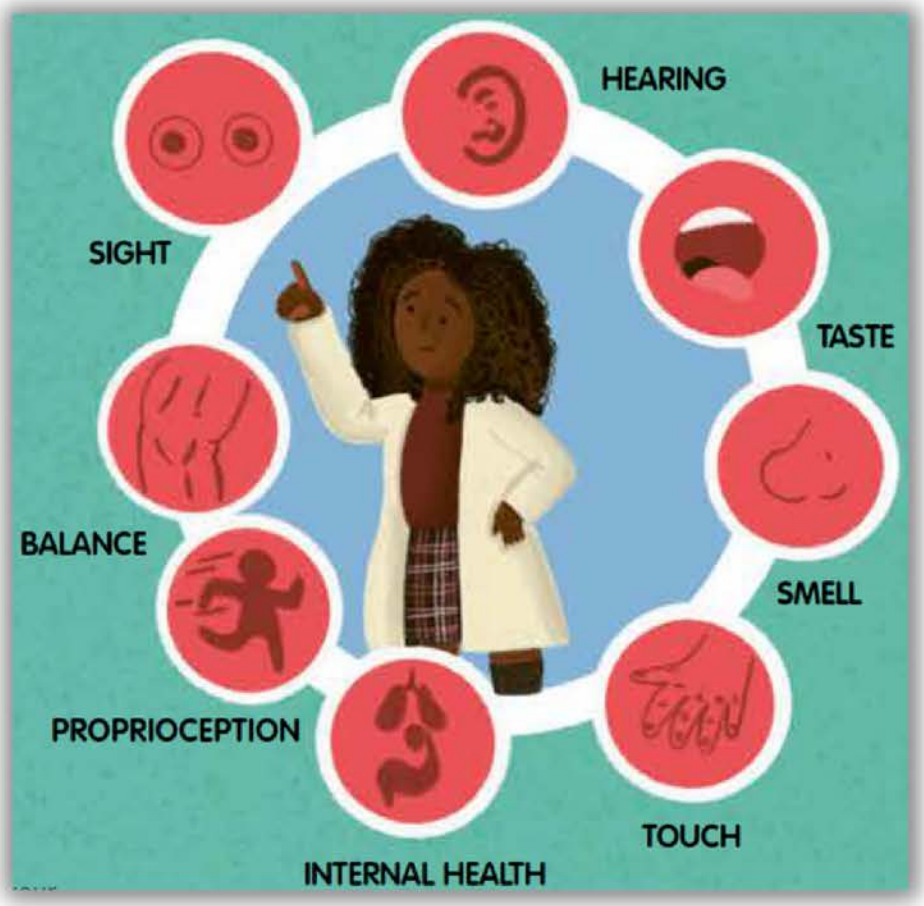
Activity 4 - The Senses and the Sixth, Seventh and Eighth Senses

Objective: Explain and compare each sense making reference to the brain.



Proprioception is the sense through which we detect the location of our body parts.

Look at all the senses, think about how our brain reacts differently to each sense. In piars, go through each sense from the picture and share ideas about how the brain works in each case.

Activity 5 - Eye-Raising Experiment

Objective: Prepare your answers based on the questions from the eye experiment below, compare and discuss your answers.

CASE STUDY

Eye-raising Experiment

In 1968, an American teacher named Jane Elliott carried out an experiment in her classroom. She told the children that eye colour was connected to cleverness (it isn't). The children who had been told they weren't clever suddenly started doing worse in lessons, as if they simply believed it because they had been told so. Apparently if you tell someone they're stupid they might start to become it.

A lot of people got angry with Jane Elliott for carrying out this experiment because it's mean to tell children they're stupid, but Elliott defended it because she wanted to make a point about how dangerous racism is. She wanted people to think about how they treated each other based on their appearance and what that would make people feel about themselves.

Discuss the questions below and share your ideas:

- What do you think about this experiment?
- Why is it important to always consider what we say to people based on their appearance?

Activity 6 – What makes people clever?

Objective: Create two lists and compare them with your fellow classmates.

WHAT MAKES PEOPLE CLEVER OR STUPID?

These examples don't tell us what causes cleverness because it's difficult to even decide what 'cleverness' means. We know there are some things that stop your brain working well – such as drinking alcohol and not getting enough sleep – but other things are less clear. One of the only things most scientists agree on is that reading a lot when you're young is good for your brain . . . so good choice buying this book. Go out and get more!

The extract says that it is difficult to define the word clever or cleverness. How many synonyms can you think of for the word clever?

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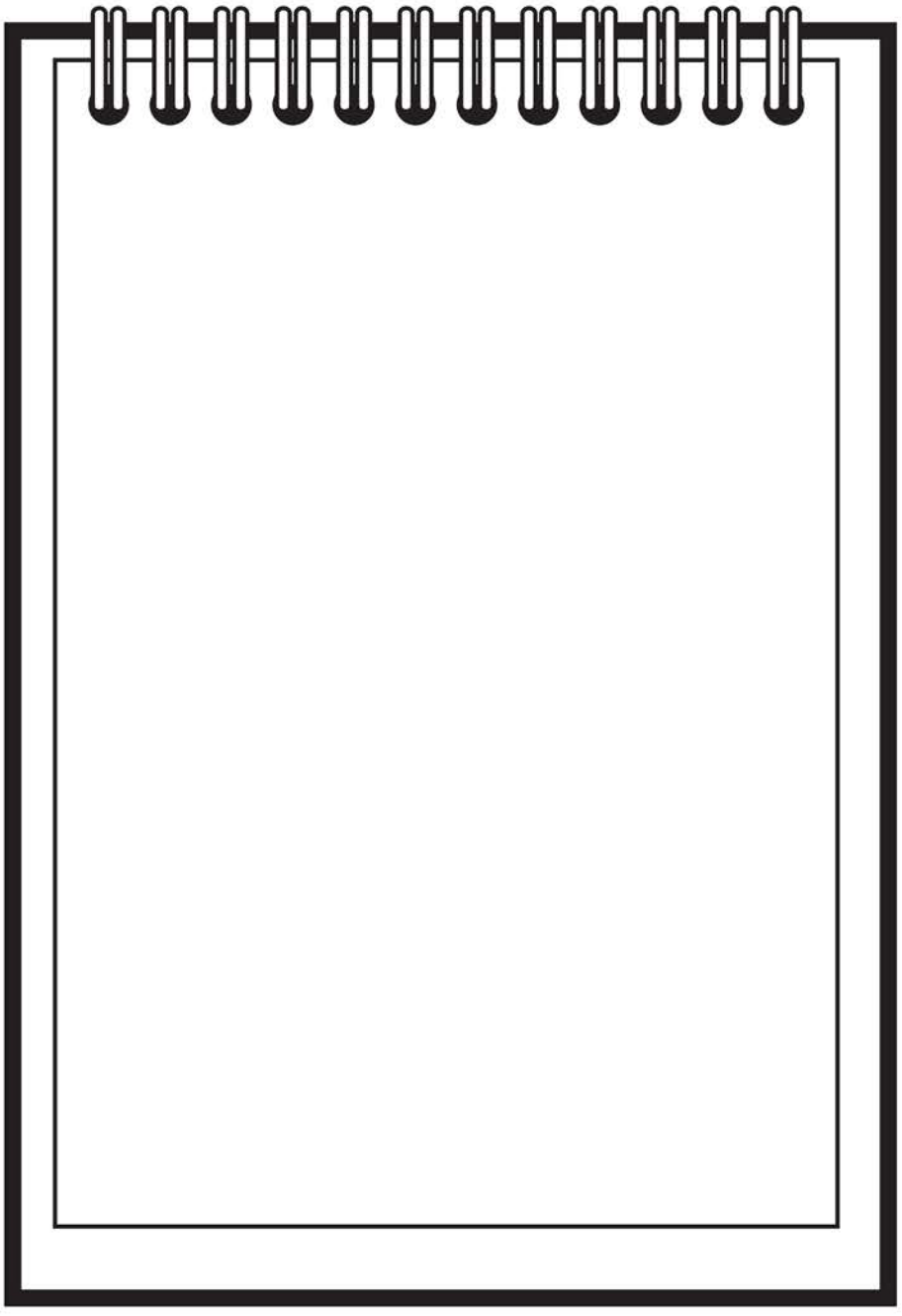
Can you work with a partner and make a list of all the things you think may stop your brain working so well?



Now do the opposite! Make a list of things that you think can help your brain work well.

Compare your lists with your classmates.
Do you agree on all the items on the list?

Why do you think scientists say that reading can be good for our brains?

Activity 7 - Have a go!

Objective: Identify the correct words in the text below. Design your own scrambled sentence for your partner to unscramble.

ASLO, SOTEIMNHG ITNRESEITNG IS TAHT MSOT POELPE CAN SILTL RAED A WROD EEVN WEHN THE LERETTS ARE IN THE WONRG ODRER AS LNOG AS THE FRSIT AND LSAT LEETTR ARE IN THE RGHIT PACLE. PETRTY COOL RGHIT?

How easy or difficult is it for you to read the text? Discuss this with a partner.

Can you write a sentence and mix up all the letters?

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Swap it with a partner and see if you can decode each other's sentences!

BRAIN MAINTENANCE

Your brain and my brain are organs just like any other body part and we need to look after them. There are a few really important things you can do to make sure your mind is being taken care of, and the good news is that mostly they're pretty easy – it's the same stuff you do to keep the rest of your body healthy!

SLEEP

Get lots of sleep. Nobody likes being told it's their bedtime, but if you miss a lot of sleep it's not good for your brain. You might have heard that you need eight hours of sleep a night, but this is only rough guidance ... scientists disagree on how many hours different people should get. Just make sure you're resting as much as your body needs.

EAT HEALTHY

Your brain needs nutrients from your food, just like your muscles do. Having a balanced diet with lots of fruit and vegetables will keep your brain ticking better than if you just have fizzy drinks and chocolate.

WORK-PLAY BALANCE

It's important to take breaks and not work solidly all the time or you'll tire out. But it's also not a good idea to just chill all the time. You need to keep your mind working and focused. The key is to have a little bit of both.

STAY HYDRATED

The brain is about 75% water, so if you aren't keeping your body supplied with lots of water, it isn't going to work as well!

EXERCISE

When you exercise your body starts to sweat, which allows you to get rid of a few chemicals you don't want to build up inside you. It also makes your brain release some of those good-mood neurotransmitters we met on page 28.

Activity 8 - Brain Maintenance

Objective: Describe everything you can do to take care of your brain. Consider your own lifestyle and what you are doing to take care of your brain.

It is important to look after our brain just like we would look after a precious item, a pet or a friend. Look at the pictures from page 48 and 49.

Use the pictures to discuss all the things we need to do to protect our brain.

Do you think some are more important than others? Use the list below to rank what you think is most important.

1.

2.

3.

4.

5.

Can you think of anything else which is important to keep your brain healthy?

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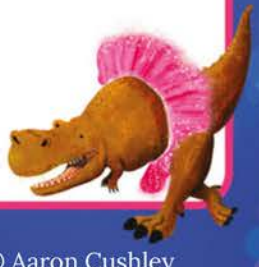
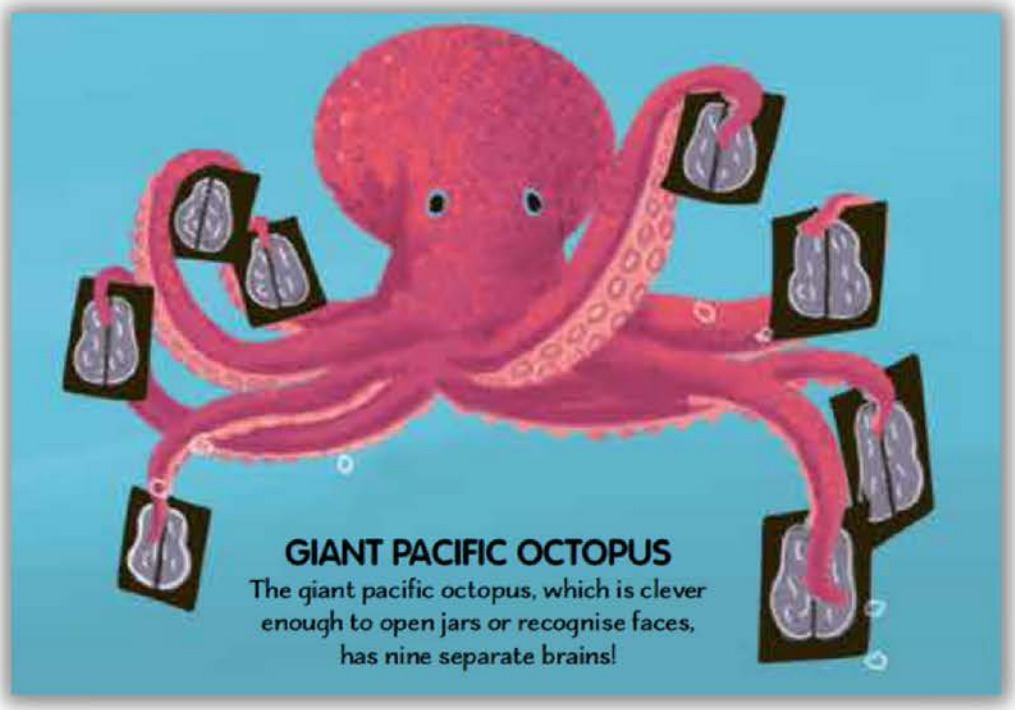
Now look at the text and the pictures together. Are you doing everything you can to take care of your brain? Share your ideas together, consider your exercise regime, your sleep habits and your diet.



Activity 9 - Critical Thinking Discussion Task

Objective: Select your preference and justify your reasons why. Compare your answers.



Would you rather be a Giant Pacific Octopus with nine separate brains or a human with just one brain? Share your ideas with your partner.

Activity 10

Objective: Compare each mystery and create a theory for each one.

BIG MYSTERY 1

What is it Made Of?

We still don't know much about what the brain is even made of! Sure, we know it has neurons and glial cells . . . but we don't know how many varieties they come in. There are at least a dozen different types of neurons and we don't have a clue which ones interact with which.

BIG MYSTERY 2

How Does it Solve Puzzles?

The brain doesn't just store a bunch of information like a file on a computer. It can learn new information, change what it knows, link things together and, most importantly, figure out things it doesn't already know. How does a big bag of salty water and fat somehow figure out how to build rockets, invent medicines and even understand the brain. Brain detectives are really brains studying brains . . . but how do their brains know how to do it?

BIG MYSTERY 3

Where Does Consciousness Come From?

We can build computers that can store information and solve puzzles, but no computer is alive. No computer can 'feel' itself existing and be aware that it is a real thing. Yet somehow our brains can. Using nothing more than a few electrical signals, your brain can give you a sense of being a person in the past, present and future. How it does this is one of the biggest mysteries of all!

Read through each mystery. What do you think of each one? What theories do you have for the three mysteries? Discuss your ideas with your classmates.

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Post-Reading Task

Now you have finished reading the book, summarise everything you have learned or discovered about the brain. Create a new blurb for the book based on your own understanding and consider the bits you liked the most.