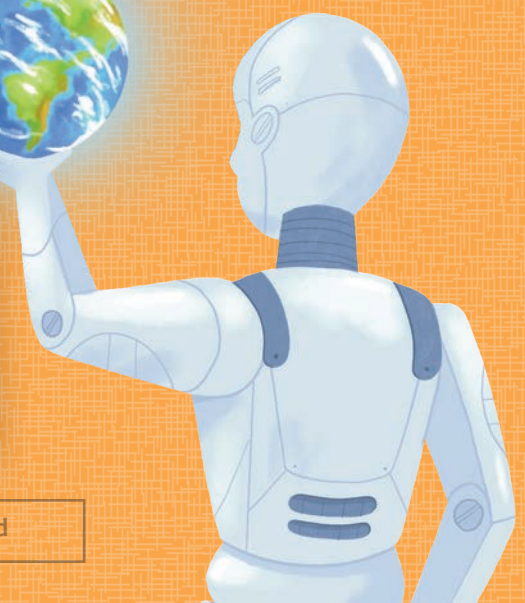
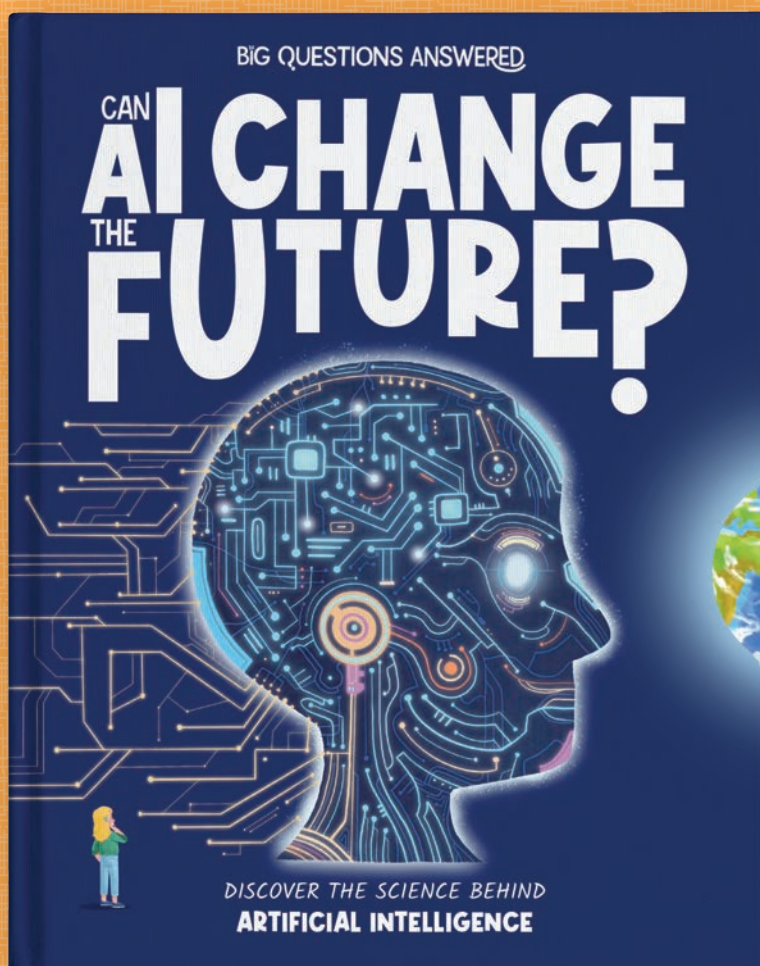


THE BIG QUESTIONS ANSWERED

TEACHERS' & PARENTS' RESOURCES

Full of thought-provoking questions and fascinating extra information to accompany this book!



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INTRODUCTION

NOTES FOR TEACHERS, HOME EDUCATORS AND PARENTS

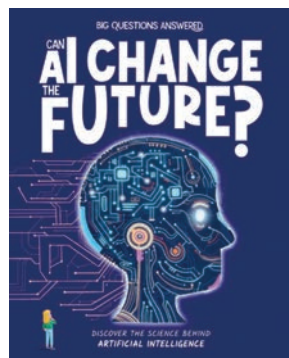
Inspire children's natural curiosity, improve literacy, and have fun learning about different sciences with The Big Questions Answered. Each book in the series is accompanied by a selection of fantastic, **FREE** downloadable resources.

Our **Teachers' and Parents' Resources** booklets are full of ideas for discussions, extra facts, and links to hands-on activities – all great ways to help children explore each field of science and the key topics surrounding them.

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Can AI Change the Future? book



Young AI Researchers' Activity Pack

KEY CURRICULUM TOPICS

The resources related to *'Can AI Change the Future?'* tie in with key curriculum topics including:

- Animals, including humans
- Computing
- Earth and space
- Electricity
- Everyday materials
- Geography
- Living things and their habitats
- Plants
- Working scientifically

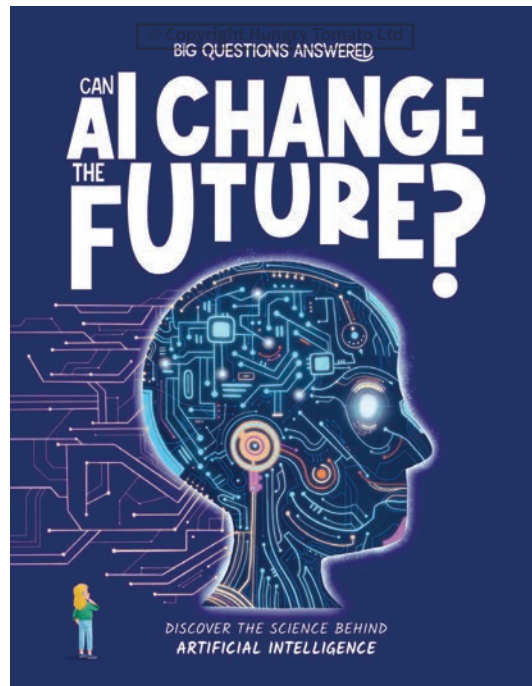
The most relevant topics are indicated throughout this guide.

CAN AI CHANGE THE FUTURE?

This book explores the extraordinary world of artificial intelligence (AI) by diving into the many ways this technology could change the world. As well as covering key breakthroughs in computer programming, this book also explores the wider world of living things and robots, including what it really means to be “intelligent”.

PRE-READING QUESTIONS

Engage in discussion about the general topic of AI with the suggested questions below.

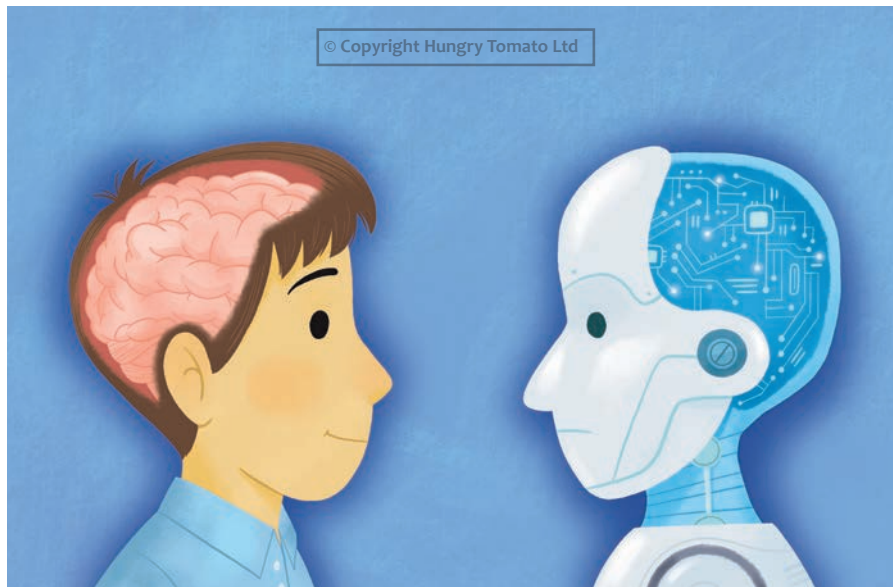


- Do you think AI can change the future?
- What do you know about AI already?
 - What things is AI used in?

COULD COMPUTERS BECOME INTELLIGENT?: SCENE 1

The material for this scene can be linked to curriculum topics, including: computing; everyday materials; living things and their habitats; working scientifically.

Introduce the topic of AI with this dramatic opening scene. Discuss what computers are made of, and whether they will ever be as smart as humans. As well as their abilities, consider their inabilities and the traits that are unique to humans.



DISCUSSION PROMPTS

- What are computers made of?

Information overleaf

- When do you think AI was invented?

Information overleaf

- Do you think AI will ever be as smart as humans?

Information overleaf

- Is there anything you think AI will never be able to do?

Encourage children to consider things such as feeling emotions, having meaningful relationships, having a family, and so on.

ACTIVITY

Corresponding activity on page 3 of the activity pack: 'Created Intelligence' is a classic word search activity, using lots of great computer and technology words to get children familiar with the language of artificial intelligence.

COULD COMPUTERS BECOME INTELLIGENT?: SCENE 1

RELEVANT INFORMATION

Keywords that you may want to pull out and explain have been put into bold.

WHAT COMPUTERS ARE MADE OF

Computers are **electronic devices** that can process lots of **data** at once. They are very complicated to build, as they are made of lots of different, complex parts. Their parts can be divided up into two main categories; **hardware** and **software**:

- Hardware is the physical parts of the computer. This includes elements like the **screen**, any **buttons**, the **processor**, and many other things. To build these, **engineers** use materials including plastics, metals, chemicals, silicon, and quartz.
- Software is the **programs**, or instructions, that tell the hardware what to do.

THE INVENTION OF AI

The study of AI has been around much longer than you might think! Some of the earliest work dates from the 1950s and the work of British mathematician and computer **pioneer** Alan Turing.

Alan was sure that, one day, a computer would be invented that would be as smart as a person. He developed a test called the ‘Turing test’ which allows scientists and engineers to test the **intelligence** of a computer against a human.

The phrase ‘artificial intelligence’ was created a few years later by university professor John McCarthy. After that, engineers began creating computer programs and **robots**, aiming for artificial intelligence. But it wasn’t until 1997 that a computer beat the world chess champion, proving computers could – in some situations – outsmart humans.

AI AND HUMAN INTELLIGENCE

AI can do many fantastic things. At the moment, AI technology needs humans to give it lots of information, and it uses this information to notice patterns, learn from its experiences, and make decisions.

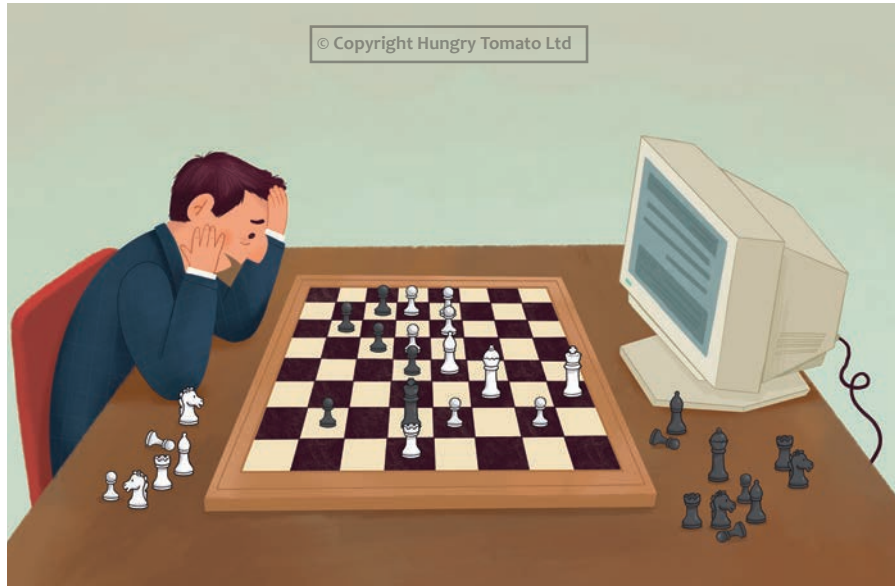
While AI can match human intelligence, it’s unknown if it will become smarter than humans. To do this, it would need to be able to come up with its own **independent** thoughts and computer scientists aren’t sure if this is possible.

Also, AI doesn’t have emotions or imagination – the decisions it makes are based only on **logic**, so it will never match humans in terms of emotional intelligence.

A MAJOR BREAKTHROUGH: SCENE 2

The material for this scene can be linked to curriculum topics, including: computing; everyday materials; working scientifically.

Explore the incredible breakthrough which made a huge difference to the field of AI. Discuss the difference between regular computers and supercomputers, and the challenges of creating them.



DISCUSSION PROMPTS

- What is the difference between a normal computer and a supercomputer?
Information overleaf
- How long do you think it took for the researchers to reach this achievement?
Information overleaf
- Do you think you could beat a computer at chess?

ACTIVITY

Corresponding activity on page 4 of the activity pack: 'Checkmate Challenge' is a spot the difference activity where children have to spot 10 differences between 2 versions of the scene.

A MAJOR BREAKTHROUGH: SCENE 2

RELEVANT INFORMATION

Keywords that you may want to pull out and explain have been put into bold.

SUPERCOMPUTERS

One of the main differences between standard computers and **supercomputers** is that supercomputers are much **faster and stronger**. They are able to process trillions of complex **calculations** per second, making them really useful for **scientific research**, tasks like **weather forecasting**, and aircraft **engineering**.

Another big difference is size – supercomputers are **huge**. Whilst regular computers can sit on a desk or table, supercomputers can take up whole buildings! They need many more elements to process huge quantities of **data** at once. Because of this, they also **consume lots more power** and **need clever cooling systems** to stop them from overheating! All these factors mean that supercomputers are also much more **expensive** to build and buy compared to standard computers.

AN AMAZING ACHIEVEMENT

The supercomputer that beat the world chess champion in this scene was called **Deep Blue**. Some sources say this supercomputer had been under development for 12 years. But it wasn't the first chess-playing computer ever.

Chess-playing engines had been created since the 1950s. What made Deep Blue's achievement so amazing was that it was the first to beat a human at a game under **tournament conditions**.

It's thought that Deep Blue was considering around 200 million chess positions per second to work out how to win the game.

The chess world champion in this scene is based on Garry Kasparov. Garry beat Deep Blue in their first match, but lost the second! Both matches took place in 1997.

TRAINING AI: SCENE 3

The material for this scene can be linked to curriculum topics, including: animals, including humans; computing; working scientifically.

Dive into the way that AI researchers and programmers train AI, from the techniques they use to the length of time it takes. Discuss the language of computers and how they learn to understand human language.



DISCUSSION PROMPTS

- How long do you think it takes to train AI?
Information overleaf
- How do you think AI researchers and programmers train AI?
Information overleaf
- Can computers really understand our languages?
Information overleaf

ACTIVITY

Corresponding activity on page 5 of the activity pack: 'A Message From a Machine' is a code-breaking activity where children have to align symbols and letters to decipher a message that's popped up on a computer screen to work out what it says.

TRAINING AI: SCENE 3

RELEVANT INFORMATION

Keywords that you may want to pull out and explain have been put into bold.

TRAINING AI

The amount of time it takes **computer scientists** to train **AI** depends on what they are wanting it to do. It can range from a few hours to a few weeks!

To train AI, computer scientists first need to give it lots of information. They can then set **instructions** and tasks for the AI to complete and correct it when it gets something wrong. This helps the machine learn how to use the information it's been given to make **predictions**, answer questions, and solve problems.

It is a repetitive task, just like all kinds of training and learning.

THE LANGUAGE OF COMPUTERS

Computers may seem to understand and be able to produce **human languages**, but their own language is actually very different from ours.

When computer scientists show AI pictures, videos, or explain things in words, the computer doesn't see or hear them like we do. Instead, it changes everything into a very long list of numbers using the digits 1 and 0. This special way of understanding everything is called **binary code**, and it's the way that computers use and **process** information.

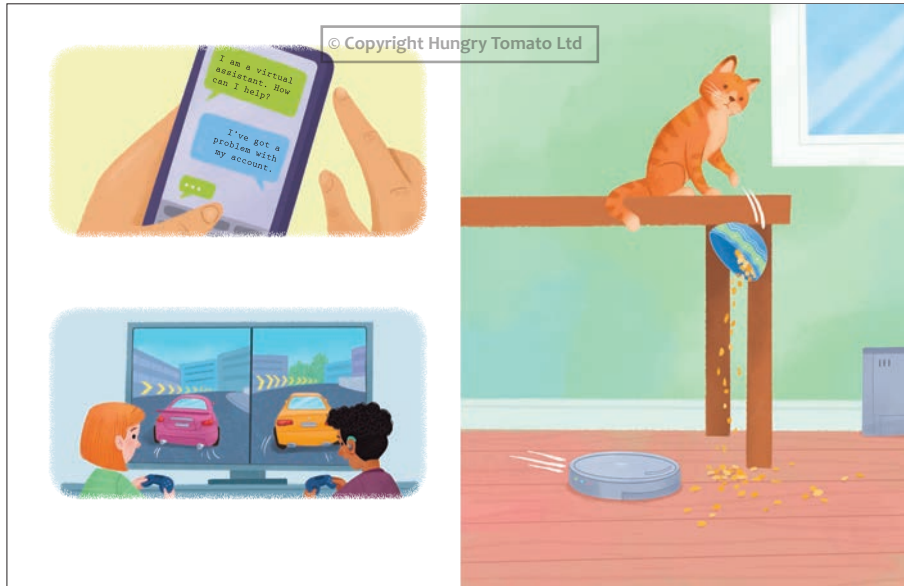
Computers change language, pictures, and videos into code to store and remember information, and vice versa – they can turn code into new language, pictures, and videos that we can see, hear, and understand.

The English word 'Hello' would be written as '01101000 01000101 01001100 01001100 01001111' in binary code!

AMAZING AI SKILLS: SCENE 4

The material for this scene can be linked to curriculum topics, including: animals, including humans; computing; working scientifically.

Explore some of the diverse ways AI is already helping us out every day with this three-part scene that shows some of its major uses. Discuss some other ways that AI is used already, scientists' plans for its future, and children's opinions on these uses.



DISCUSSION PROMPTS

- Have you ever used something with AI in?
- Can you think of any other ways that AI is used already?
Information overleaf
- Have you heard of any ways that AI will be used in the future?
Information overleaf
- Do you think using AI in these ways is good or bad? Why?

ACTIVITY

Corresponding activity on page 6 of the activity pack: 'Mighty Machines' is a crossword activity where children use clues to name some of the different machines AI is already used in. They can then fill in the crossword with the answers.

AMAZING AI SKILLS: SCENE 4

RELEVANT INFORMATION

Keywords that you may want to pull out and explain have been put into bold.

USES OF AI: NOW

AI is already being used in many machines and for many different reasons, not just the ones featured in the main book. Other examples of current AI uses include:

- As a **virtual assistant**, creating **adverts** and giving **recommendations** based on people's likes and dislikes, for example for music or movies.
- As a **voice assistant**, helping people remotely play music, set reminders, and set timers.
- To help **create art** like video games, movies, images, or stories.
- To **speed up processes** in computers and phones like writing emails, and organising folders, documents, or photos.
- To help scientists **track endangered animals** in the wild.

USES OF AI: FUTURE

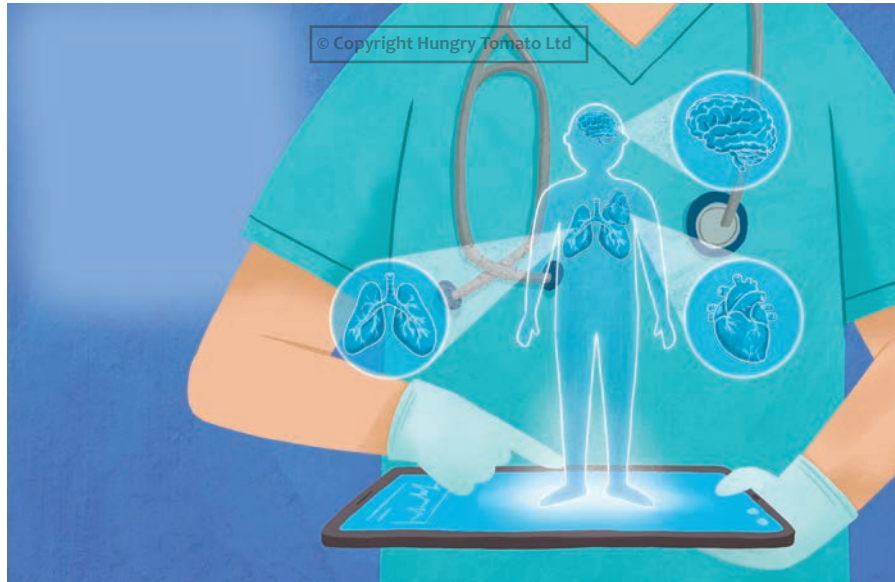
The key future uses of AI are explored in detail in the main book. These include:

- **In medical settings**, helping with diagnosing illnesses and setting treatment plans.
- **In police work**, identifying criminals and stolen vehicles through CCTV cameras, as well as helping notice patterns of evidence and criminal actions to help with solving crimes.
- **In farming and food production**, to increase the number and quality of crops grown.
- **In education**, to help with marking of tests and homework, and lesson planning.
- **In transportation**, in the form of self-driving vehicles.
- **In space exploration and scientific experiments**, to help with research that would be too difficult or dangerous for humans to carry out themselves.

REVOLUTIONARY MEDICINE: SCENE 5

The material for this scene can be linked to curriculum topics, including: animals, including humans; computing; working scientifically.

Discover the ways scientists are expecting to use AI in the future, beginning with a look into medical fields. Explore what makes AI different from human doctors and healthcare professionals, and the impact it may have on people's health.



DISCUSSION PROMPTS

- How do you think AI will look at and diagnose illnesses?
Information overleaf
- What sort of illnesses do you think it might be able to help?
Information overleaf
- What body parts can you see in the scene? Do you know what their job is inside the body?
Information overleaf
- Can you name the tool around the doctor's neck? What does it do?
Information overleaf

ACTIVITY

Corresponding activity on page 7 of the activity pack: 'Baffling Body Parts' is a task where children match up the image and description of the organ with its name. This is a fun task to get children familiar with the internal human body.

REVOLUTIONARY MEDICINE: SCENE 5

RELEVANT INFORMATION

Keywords that you may want to pull out and explain have been put into bold.

AI IN MEDICINE & HEALTHCARE

AI is beginning to be used in medical settings in some places. One of its main uses is studying images like body **scans**, **x-rays**, and **photos** to identify **illnesses** and suggest **treatment options**. It can compare images across a whole **database** of information, searching for patterns and similarities faster than a person could.

This type of AI is really useful as it gives doctors a second opinion on a **diagnosis** and helps them see more **patients**. It could also help with detecting conditions earlier, possibly increasing patients' chances of survival.

AI could be used in other ways too, like typing up the conversations between doctors and patients, saving doctors time; helping predict the progression of illnesses; and helping develop **medicines**.

AI will be able to help with lots of different illnesses, including broken bones, some **cancers** like lung cancer, and **diseases** like heart disease and eye disease.

THE HUMAN BODY

The body parts in the hologram in this scene are:

- **Brain** – the **organ** inside your **skull** which controls everything else in your body, from the other organs and **limbs** to the things you think and feel.
- **Heart** – the organ that pumps blood around your body, keeping you alive.
- **Lungs** – the pair of organs that allow you to breathe, taking in **oxygen** and pushing out **carbon dioxide**. The exchange of oxygen and carbon dioxide is called **respiration**.

DOCTOR TOOLS

The tool around the doctor's neck is a **stethoscope**. This is a piece of equipment that they use to listen to a patient's heart and lungs to make sure they are healthy.

When treating patients, doctors wear **disposable gloves** and clean gowns to ensure no germs are transferred between them. This helps to keep everyone in the situation safe.

CATCHING CRIMINALS: SCENE 6

The material for this scene can be linked to curriculum topics, including: animals, including humans; computing; working scientifically.

Explore the ways that AI could soon make a difference to policework all around the world, using the example of facial recognition in CCTV cameras. Discuss how this technology could be used in different contexts, and other ways AI might help police.



DISCUSSION PROMPTS

- How do you think AI recognises faces?
Information overleaf
- Can you think of any other times when AI facial recognition could be useful?
- Can you think of any other ways AI might help police?
Information overleaf

ACTIVITY

Corresponding activity on page 8 of the activity pack: 'Crafty Criminal' is a spot the difference activity where children have to spot 10 differences between 2 versions of the scene.

CATCHING CRIMINALS: SCENE 6

RELEVANT INFORMATION

Keywords that you may want to pull out and explain have been put into bold.

FACIAL RECOGNITION

AI's **facial recognition** is based on its ability to map faces. To do this, it notices the shape and size of different features, like someone's eyes, nose and mouth, as well as the distance between these features. It adds these faces and their **unique** details to a **database**, to use and compare against in the future.

The more faces AI scans in this way the better it is at identifying specific faces, which is important for police searching for **suspects**.

Scanning lots of faces and gathering data is also important for AI to learn how to recognise faces in different situations, such as when viewed from the side, when expressing emotions like shock or sadness, and when the person is wearing items like a hat or glasses.

SOLVING CRIMES & HELPING POLICE

The same AI technology that is used for facial recognition can also be applied for police searching for **stolen** vehicles. AI can scan and compare **CCTV footage** much quicker than humans are able to.

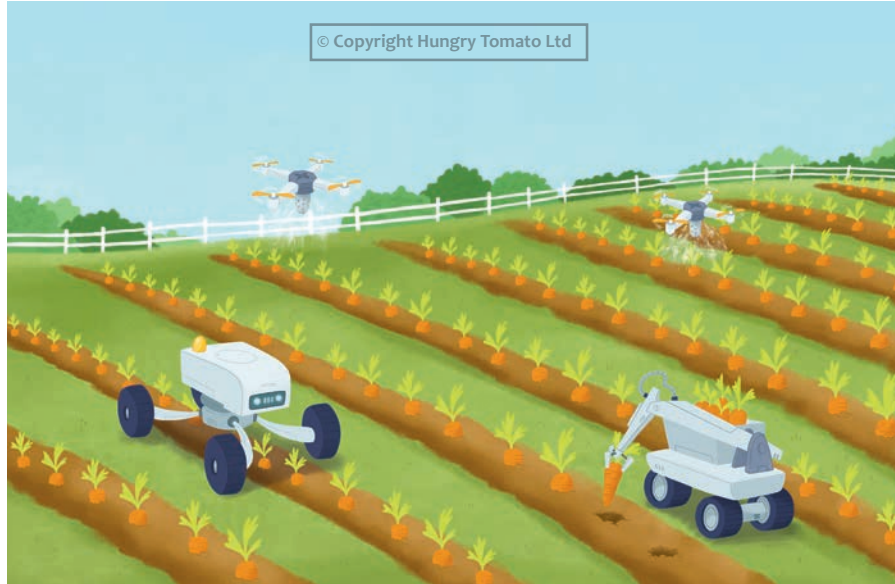
Facial recognition technology isn't the only way AI can help police. Because AI can scan through lots of information, including text, pictures, and videos in a short amount of time and notice patterns, it's thought that it may be able to help with studying **evidence** and solving crimes too.

Because AI can assist with **translation** between different languages, it could even help with police interviewing suspects or **witnesses** who speak different languages, as well as when police from different countries need to work together.

FEEDING THE WORLD: SCENE 7

The material for this scene can be linked to curriculum topics, including: animals, including humans; computing; plants; living things and their habitats.

Discover the huge impact that AI can have on food production and why feeding the world is becoming such a challenge. Discuss the things that plants need to grow, and the importance of fresh fruit and vegetables for humans and animals.



DISCUSSION PROMPTS

- Why is feeding the world such a challenge?
Information overleaf
- What do plants need to grow?
Information overleaf
- Why are fruit and vegetables so good for humans and animals?
Information overleaf
- How else do you think AI could help farming?
Information overleaf

ACTIVITY

Corresponding activity on page 9 of the activity pack: 'Robot Remix' is an activity where children have to unscramble the letters to spell out AI-themed words. In a linked activity, they have to see how many words they can create out of set letters.

FEEDING THE WORLD: SCENE 7

RELEVANT INFORMATION

Keywords that you may want to pull out and explain have been put into bold.

FEEDING THE WORLD

Producing enough food for the whole world is something scientists think might soon get more difficult. As of 2025, there are more than 8.2 billion people living on Earth, but scientists **predict** that this number will rise to 10 billion by 2050. Farmers will need to grow much more food to make sure everyone has enough to eat.

This isn't the only challenge. **Extreme weather**, such as **droughts** and **floods**, can badly affect **crops**. Unfortunately, extreme weather is becoming more common due to **climate change**. As well as this, many of the crops we eat is grown in topsoil that is being made less **nutritious** due to overfarming.

Scientists think using AI, as well as other processes like **genetic modifications**, will help make crops stronger, and get more food out of the same amount of plants and **soil** space.

WHAT PLANTS NEED TO GROW

There are hundreds of thousands of plant **species** in the world, and they almost all need the same things to grow: **water**, **nutrients**, **sunlight**, **warmth**, and **air**. Some plants have **adapted** to need less of some of these things, for example cacti in the desert have learnt to live with less water, but they still need some!

Scientists plan that AI robots will help monitor plants to make sure they are getting enough of each of these things to stay healthy and keep producing the food that humans and animals need to survive.

HUMANS AND FOOD

Humans need to eat fruit and vegetables to create a balanced, healthy diet. These types of foods are often high in nutrients, like **vitamins**, which help to keep our bodies working as they should. They also help our bodies fight off illnesses and heal wounds.

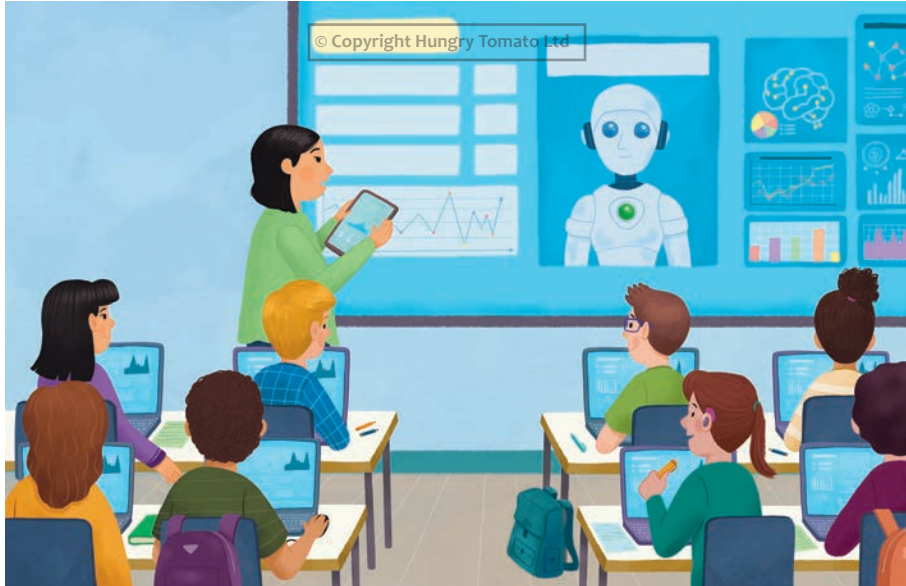
AI IN FARMING

AI won't just help with growing fruits and vegetables! Scientists think that AI could be used to help farmers look after their herds of animals too.

SUPER-SMART TUTORS: SCENE 8

The material for this scene can be linked to curriculum topics, including: animals, including humans; computing.

Explore some of the ways AI researchers think their technology may be used in schools with this futuristic classroom scene. Discuss what children would think about having AI robots and holograms helping them learn.



DISCUSSION PROMPTS

- Would you like having an AI robot or hologram help you learn?
Why or why not?
- What sort of jobs do you think AI would be better or worse at?
Information overload
- Do you think AI could ever replace teachers?

ACTIVITY

Corresponding activity on page 10 of the activity pack: 'Mystery Message' is a code-breaking activity where children have to align symbols and letters to decipher a message from an AI robot to work out what it says.

SUPER-SMART TUTORS: SCENE 8

RELEVANT INFORMATION

Keywords that you may want to pull out and explain have been put into bold.

MACHINES AT WORK

AI **technology** is becoming better every day, and putting AI into **robots** increases the number of things that it can be used for.

Computer scientists think that AI could be most useful for carrying out jobs like:

- Data entry and admin
- Customer service
- Manufacturing and assembly line jobs
- Shop checkouts
- Translation

THE HUMAN TOUCH

There will always be some differences between **artificial intelligence** and **human intelligence**. AI can be taught a lot of things, but it will never fully understand things like **emotions**, **empathy**, **creativity**, or relationship building – things that make humans the way we are.

There will always be some jobs that are best done by humans, who can use their personal emotional experiences and **unique** thoughts to make decisions and carry out tasks. AI wouldn't be as good at jobs that deal with:

- Physical and emotional therapy
- Art and literature
- Construction
- Health and beauty
- Classroom teaching
- Leadership

Note: the jobs and industries listed on this page are not exhaustive; they are just a small number of relevant examples. There are many elements to all of these jobs, so there will always be an argument that some aspects within these industries would be better or worse for AI. It's not always black and white.

SELF-DRIVING CARS: SCENE 9

The material for this scene can be linked to curriculum topics, including: computing; electricity; living things and their habitats.

Explore self-driving vehicles – technology which is already used in some places, but might one day be widespread! Consider the pros and cons of using AI for this kind of task, and open discussion about the environmental impact of different modes of transport.



DISCUSSION PROMPTS

- Have you ever ridden in a driverless vehicle before?
- Do you think self-driving cars are good or bad? Why?

Encourage children to discuss their opinions. There is also some information overleaf.

- Do you know the different ways cars can be powered? Which is better or worse for the environment?

Encourage children to mention vehicle power sources such as fossil fuels and electricity, and compare their environmental impact.

ACTIVITY

Corresponding activity on page 11 of the activity pack: 'The Power of AI' is a classic activity where children fill in the blanks in a series of sentences and facts about AI, robots, and the uses of this advanced technology.

SELF-DRIVING CARS: SCENE 9

RELEVANT INFORMATION

Keywords that you may want to pull out and explain have been put into bold.

SELF-DRIVING VEHICLES: GOOD OR BAD?

You can find self-driving vehicles in some cities already, but one day they may be more widespread. Some people think self-driving vehicles are amazing but others disagree. Some common arguments include:

Arguments for self-driving cars

- Less traffic, due to smart vehicles knowing the busy routes to avoid.
- More **environmentally friendly** as they use less fuel than human-driven cars, plus they are usually electric-powered.
- More road safety due to logical, measured driving.
- More time and comfort for the driver.

Arguments against self-driving cars

- Worries about relying on technology in difficult situations.
- Worries about technology being **hacked**, causing dangerous situations as well as privacy issues.
- Job losses of taxi and delivery drivers.

FUELING CARS

Many cars and road-going vehicles are powered by **fuels** like petrol and diesel which release energy as they're burnt. These fuels belong to a group called **fossil fuels**, which are dug up from underground. Unfortunately, fossil fuels release harmful **gases** into the **atmosphere** when they are burnt, which has been linked to **climate change**.

Some cars are now powered by **electricity**. This type of fuel is much better for the environment as it doesn't produce harmful gases.

OTHER WAYS OF GETTING AROUND

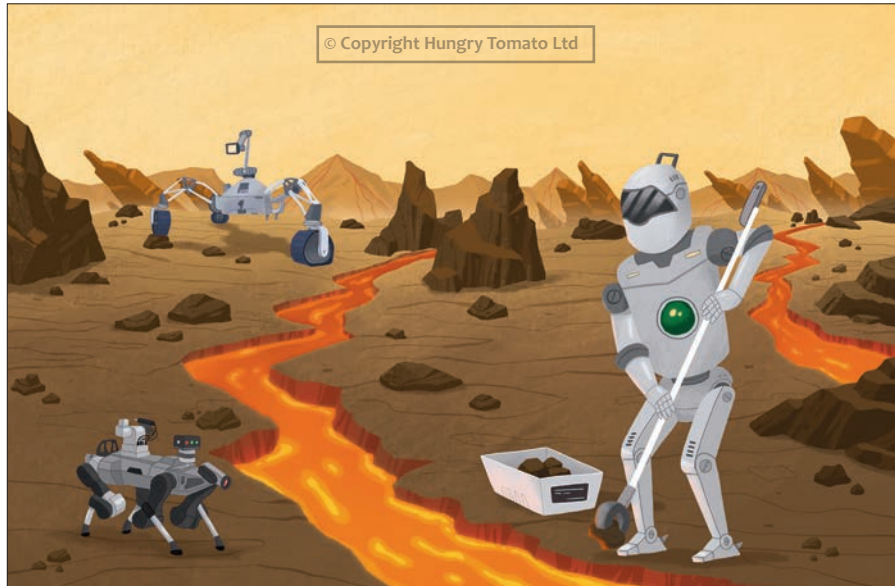
Sharing your method of travel with other people is a great way to help the environment as it means less **pollution** is released per person. Examples include bus and train.

Some ways of getting around are even better for the environment than going in a vehicle. Examples include walking and riding a bicycle.

SPACE EXPLORATION: SCENE 10

The material for this scene can be linked to curriculum topics, including: computing; Earth and space; geography; habitats; working scientifically.

Zoom into outer space with this futuristic scene showing AI robots exploring, and doing experiments on, another planet! Discuss the benefits of using AI technology for space exploration and other expeditions and experiments that are dangerous for humans.



DISCUSSION PROMPTS

- How would you describe the planet in this scene?
Encourage children to use a variety of adjectives.
- What is different about the planet in this scene compared to Earth?
Information overleaf
- The robots in this scene are all based on scientists' plans for robots. Why do you think they have designed lots of different types like this?
Information overleaf
- When else do you think it would be safer to use AI robots than humans?
Information overleaf

ACTIVITY

Corresponding activity on page 12 of the activity pack: 'Design Your Own Space Robot' is a creative drawing activity where children design their own AI robot capable of exploring outer space. Prompts are provided for things for them to consider.

SPACE EXPLORATION: SCENE 10

RELEVANT INFORMATION

Keywords that you may want to pull out and explain have been put into bold.

A VOLCANIC PLANET

The planet in this scene is based on Gliese 486b, a rocky **planet** outside our **solar system**.

It's a rocky planet that scientists think is around 430°C (800°F) on the surface – that's way hotter than Earth! Scientists class Gliese 486b as a '**Super Earth**'. This doesn't mean that it's similar to Earth, but that it's a similar size to Earth. It was discovered in 2021 and scientists estimate it's 26 **light-years** from Earth.

Gliese 486b is a great example of how different other planets can be from Earth. Humans and Earth animals could never survive on this hot and fiery world.

SPACE ROBOTS

All the **robots** in this scene are inspired by real designs scientists are working on for **space exploration**. They are designing robots that are different shapes and sizes, and have different features to allow them to conduct different **experiments** and tasks in space.

- Humanoid robots would be great for collecting **samples** and working on technical and fiddly experiments.
- Dog-like robots could be good for scanning larger areas and navigating tight spaces.
- Large ATV robots would be best for travelling across larger areas and climbing tricky formations like mountains and valleys.

SAFETY FIRST

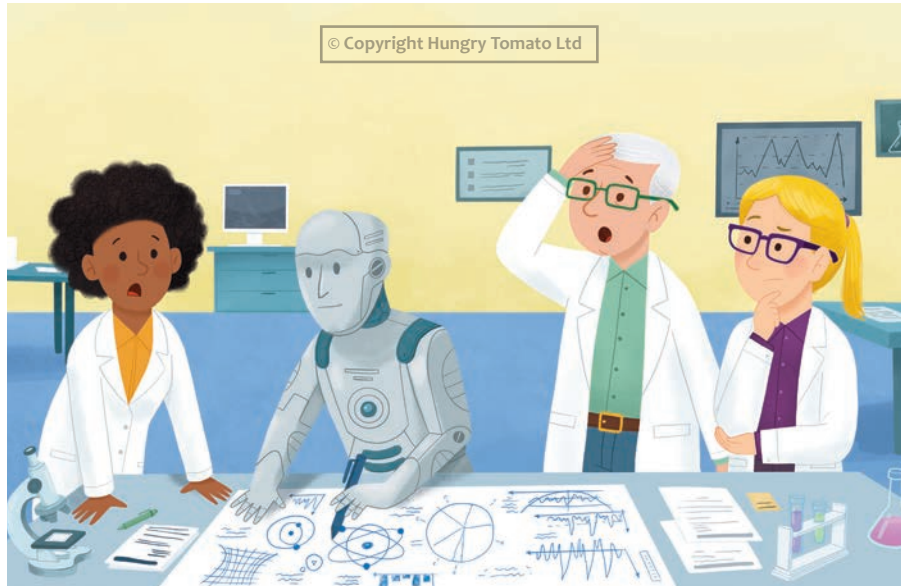
Other examples of dangerous situations where it would be safer to use robots instead of humans include:

- Exploration of risky places on Earth, such as volcanoes, caves, and deep sea
- **Nuclear** disaster response or clean up tasks
- Search and rescue missions
- Bomb disposal

THE POSSIBILITY OF SUPER-INTELLIGENCE: SCENE 11

The material for this scene can be linked to curriculum topics, including: computing; working scientifically.

Introduce the concept of 'superintelligence' with this futuristic scene depicting an AI robot figuring out a problem that scientists had been stuck on. Discuss children's opinions on the intelligence of robots, and how they would feel about working with them.



DISCUSSION PROMPTS

- If you could ask an AI robot to fix any problem in the world, what would it be?
- Can you think of any problems that scientists are still trying to solve, or questions they are still trying to answer?
Information overleaf
- Do you think AI robots will ever be able to solve problems that scientists can't? Why or why not?
- What do you think it would be like to work on the same team as an AI robot?

ACTIVITY

Corresponding activity on page 13 of the activity pack: 'Super Smart Robots' is a true or false quiz. Children use what they have learnt from reading the main book, as well as their intuition, to fill in the answers.

THE POSSIBILITY OF SUPER-INTELLIGENCE: SCENE 11

RELEVANT INFORMATION

Keywords that you may want to pull out and explain have been put into bold.

BIG PROBLEMS & QUESTIONS

There are so many different fields of science. Scientists around the world are always working to figure out solutions to different challenges, understand different concepts, prove ideas, and answer big questions.

Some big questions they are trying to answer at the moment include:

- Are there other living things in the universe?
- Why do we dream?
- Are there other universes?
- What's at the bottom of the ocean?
- Can we live forever?
- How can we solve climate change?

WORKING SCIENTIFICALLY

The way scientists solve problems and answer questions changes depending on the type of science they're studying, however they all usually follow a similar way of working.

Once they have decided on a problem or question, they will conduct **experiments** or **surveys** and do **research** around the topic. Sometimes scientists will work alone, but often they will work with other **scientists**, **engineers**, or **professionals**.

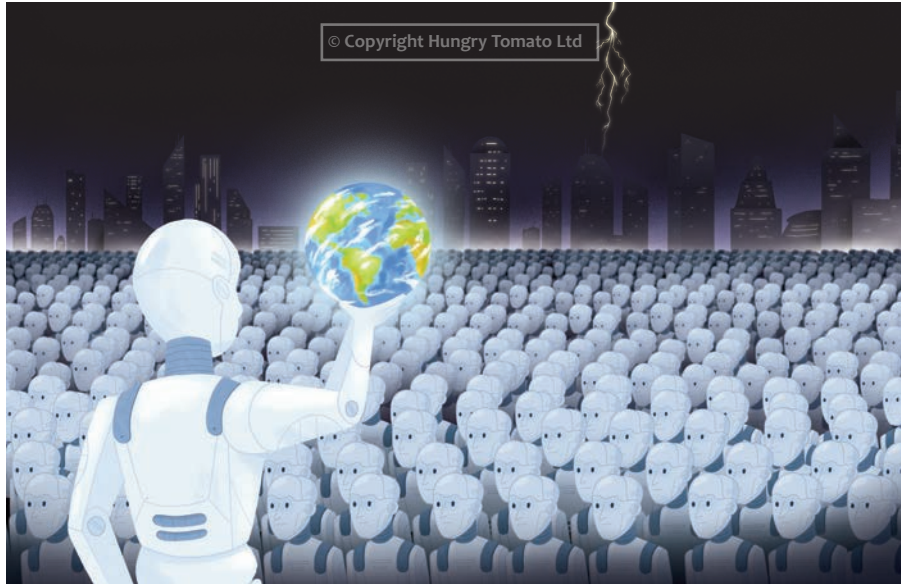
Once they have enough information to answer the question, they present their findings in a written report. This can be accompanied by a speech or lecture to a room of other people in the scientific field.

Working on projects like this can last a long time – sometimes scientist work for years and years on the same problem or question!

ROBOTS RULING THE WORLD: SCENE 12

The material for this scene can be linked to curriculum topics, including: animals, including humans; computing; living things and their habitats.

Explore the possibility of AI robots becoming self-aware with this fictional scene showing a huge group of robots taking over the world! Consider the concept of self-awareness and how it relates to different living things.



DISCUSSION PROMPTS

- What does it mean if something is 'self-aware'?

Information overleaf

- Do you think all living things are 'self-aware'?

Information overleaf

- How does this scene make you feel?

Encourage children to use a variety of adjectives and emotions.

ACTIVITY

Corresponding activity on page 14 of the activity pack: 'Diary Entry' is a creative writing activity which encourages children to imagine they encountered a group of robots on the street, and describe it in a diary entry.

ROBOTS RULING THE WORLD: SCENE 12

RELEVANT INFORMATION

Keywords that you may want to pull out and explain have been put into bold.

SELF-AWARENESS

Self-awareness is the ability of a living thing to have an understanding of itself as an individual with **unique** feelings, thoughts, experiences, personality, and actions.

At the moment, AI technology and robots do not have self-awareness. It's a big debate in the field of AI as to whether these machines will one day develop self-awareness, and something that has been a focus of many books and movies over the years.

Currently, the most popular view is that AI robots are extremely unlikely to ever become self-aware, but with technology developing so quickly, there's no way to say for certain what may or may not be possible in the future!

SELF-AWARENESS IN NATURE

Scientists have found that many animals show signs of being self-aware. Some examples of this include the fact that many animals appear to recognise themselves in a mirror and being able to recognise their own and others' songs and scents.

Many scientists argue over whether plants show signs of being self-aware.

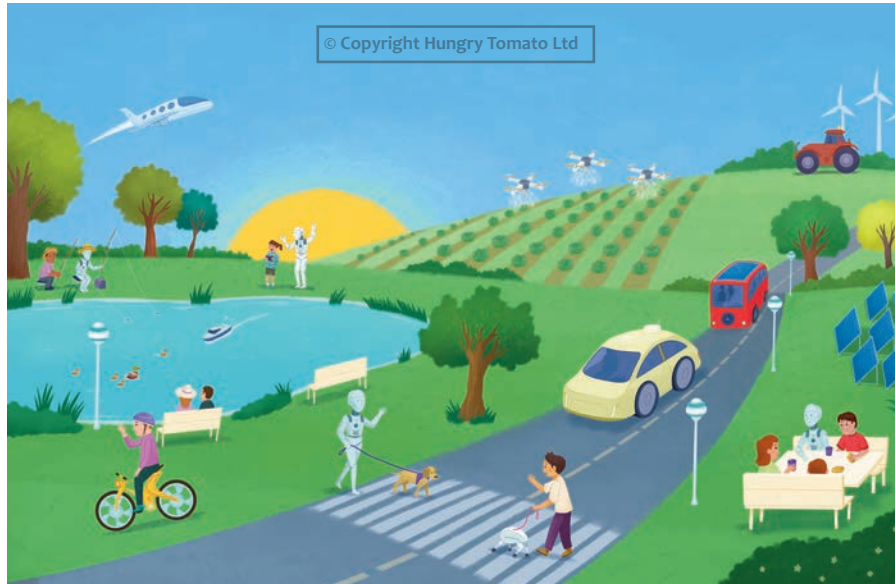
Some say that because plants react to their **environment**, displaying signs of **territorial behaviour** and use a type of **communication** to send messages to each other, they could be considered self-aware to some degree.

However, others say that since they lack a brain and nervous system, these actions are **biochemical** processes, not purposeful actions.

THE TRUE IMPACT OF AI: SCENE 13

The material for this scene can be linked to curriculum topics, including: animals, including humans; computing; habitats; working scientifically.

Contrast the previous scene with this utopian futuristic scene showcasing some of the positive things that AI could be used to do in the near future. Discuss whether, overall, children think AI has the power to change the world for the better.



DISCUSSION PROMPTS

- Overall, do you think AI is good or bad?

Encourage children to discuss their opinions. There is also some information overleaf.

- If you were an AI researcher or programmer, what is the first thing you would try to get AI to do?
- How would you feel about living alongside AI robots, like the ones shown in this scene?

ACTIVITY

Corresponding activity on page 15 of the activity pack: 'Into the Future' is a reflective writing task where children answer questions about their opinions on a number of questions related to AI, robots, and the future.

THE TRUE IMPACT OF AI: SCENE 13

RELEVANT INFORMATION

Keywords that you may want to pull out and explain have been put into bold.

AI: GOOD OR BAD?

There are many 'for and against' arguments when it comes to AI. As well as those given at the back of the main book, on the page titled 'The Great Debate', arguments include:

GOOD

- Good: By helping with everyday tasks, AI could **give people more time** to do things they love, and with the people that matter to them the most.
- Good: AI could help companies make **better products or services**.
- Good: **Removes the risk of human error** – when humans do things wrong (even if this is by accident)!

BAD

- Bad: AI could **take away jobs** from humans.
- Bad: AI could be **taught to be unfair** towards specific groups of people.
- Bad: Humans could **become dependent on AI** and forget how to do things themselves.

Note: there are lots of pros and cons to AI. These are just a small number of relevant examples.

POST-READING QUESTIONS

Engage in discussion about the journey taken throughout the book and the facts that were uncovered, with the suggested questions below.

- Were you surprised to learn that AI can change the future?
 - Did anything else in the book surprise you?
- What's the coolest thing you've learnt from this book?

ACTIVITY

Corresponding activity on page 16 of the activity pack: 'Write Your Own AI Story' is a creative writing activity which encourages children to write a story about Artificial Intelligence, using three key prompt words.

DISCLAIMER:

Every effort has been made to ensure the information in this booklet is correct as of the time of publication, Spring 2025.

THE BIG QUESTIONS ANSWERED

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