



LASER TAG
After seeing the first *Star Wars* film, George Carter was inspired to create a futuristic shooting game. That game is laser tag and it is played by thousands of children all over the UK today.



Lasers are projected onto a single floating particle.

Star Wars projections become a reality

One of the early scenes in *Star Wars: A New Hope* shows R2D2 projecting a 3D version of Princess Leia. It is one of the most famous images in science fiction and scientists have tried for decades to create this type of technology. They have been unsuccessful – until now.

In what they are calling the Princess Leia Project, researchers at Brigham Young University in the US, have projected lasers on a particle of plant fibre, creating a 3D image that is suspended in the air. The researchers did this by trapping a single piece of plant

fibre called cellulose in mid-air then heating it up, using an almost invisible laser. Heating up the cellulose allowed the researchers to push and pull it around. (If a single particle moves fast enough, our brains see it as a solid line, a bit like the effect when you wave a sparkler around in the dark.)

Next, the researchers created patterns by shining a second set of lasers in different colours onto the cellulose as it moved. Co-author of the research, Erich Nygaard, said, "We're using a laser beam to trap a particle, and then we can steer the laser beam around

to move the particle and create the image."

The researchers were able to create lots of different patterns and images using this method including a butterfly, a prism and rings that wrap around an arm. The images created were only tiny, but the researchers hope that one day they can create life-size projections.

Daniel Smalley, who wrote the study with Nygaard, says that doctors could use this technology to practise surgery on a projection of the patient before doing the operation in real life.

Other sci-fi inventions



Self-tying shoes
In the film *Back to the Future*, Marty McFly sees some cool inventions, including shoes that can tie themselves. In 2015, Nike developed some real self-tying shoes and sent them to Michael J. Fox, the actor who played Marty.



Iron Man suit
The US military is creating and testing an Iron Man-style suit called Talos (Tactical Assault Light Operator Suit). Talos can repel bullets and it has on-board computers to help the operator in the suit know what's happening around them.

Unfortunately, it's pretty heavy and it can't fly. Yet.



Replicator
Star Trek replicators make any object materialise, including food and parts for the ship. Our 3D printers can't make things appear out of thin air, but they can make lots of different things such as food, clothes, jewellery and even a bridge.



A skate fish.

DID YOU KNOW?
Genes determine characteristics (such as hair colour) that are passed down from a parent to a child.

Skate unlock secrets of walking

Skates are flat-bodied fish that are closely related to rays and sharks. They have little fins that allow them to move along the ocean floor. After seeing a video of a skate making walking-like movements across the bottom of a tank, Professor Jeremy Dasen and his team from New York University decided to study the genes of these fish to work out where they got their ability to "walk".

The team found that the skate's genes for movement were inherited

from a fishy ancestor that lived about 420 million years ago.

"It has generally been thought that the ability to walk is something that evolved as vertebrates transitioned from sea to land," said Dasen. "We were surprised to learn that certain species of fish also can walk."

These findings suggest that some ancient marine creatures knew how to walk long before humans' water-dwelling ancestors evolved to grow legs and walk on land.



Robot translates speech into sign language



The robot could help deaf people.

Sign language is a type of communication used by deaf people. Instead of verbal communication, deaf people can use hand signals and gestures to talk. For many deaf people, sign language is their only language so it can be hard to communicate with people who are not deaf. Now, students from the Belgian University of Antwerp have built a robot hand to help. Named Project Aslan (which stands for

Antwerp's Sign Language Actuating Node), the students made a 3D-printed hand that turns speech into sign language. It is connected to a computer and students can type words into a keypad and the robot hand will sign them. It is just a prototype (an early version of a product that is still being tested), but one day they hope to build a two-handed robot used for sign-language interpreting all over the world.



Fran Scott of the Royal Institution answers your questions



Why... do people yawn when someone else yawns?

We yawn when we're tired, right? Not necessarily. In fact, we know so little about yawning that we don't know the answer to this yet. Scientists are trying to work out exactly when we yawn; some think it happens when something scary is about to happen, others think we yawn when we're getting too hot. If people yawn as a signal of something

scary, then it makes sense that a yawn is catching so the warning spreads. If people yawn to cool their brain down, then we catch a yawn to cool our own brain, too. Catching a yawn is also a sign you understand other people's emotions. This is known as empathy. We only start developing empathy when we're four or five, and this is also when we start catching yawns.

Email questions to hello@theweekjunior.co.uk with the words **SCIENCE QUESTION** in the subject line. See more from Fran Scott in our 100-page special edition, *Science + Nature*, theweekjunior.co.uk/science-nature

The new SpotMini can open doors.

OOPS!
Boston Dynamics created a special robot called BigDog to be used by US Marines to carry supplies in war zones. However, it made so much noise it wasn't safe to use.



After you! Robodog opens doors

Scientists are building more advanced robots all the time, from Sophia the human-like robot to Olympic robot skiers. Now, a robotics company called Boston Dynamics has built a robot dog that can open doors.

The robot dog, called SpotMini, is a four-legged machine with an extendable arm attached to its head. In a video released on 12 February, Boston Dynamics shows a robodog without an extendable arm trying to reach for the door. When it fails, another SpotMini (one that does have

an extendable arm) comes and opens the door, then holds it open to allow the other SpotMini to walk through.

SpotMini is an improved version of the company's larger robot dog, Spot, and is powered by battery. It's about 84 centimetres high and weighs around 25 kilograms (30 kilograms, if you include the arm). Last year, the same company released a video showing a humanoid (human-shaped) robot, jumping and doing a backflip.

To watch SpotMini open a door, go to tinyurl.com/TWJ-robodog

DAN SMALLEY LAB/BRIGHAM YOUNG UNIVERSITY; JUN-AN CHEN; LUCAS ILM; BOSTON DYNAMICS; SHUBS; SHUTTERSTOCK