

What type of bears dissolve in water?

THE LAB REPORT



Why do we dream?

Every night as you fall asleep your brain begins telling stories. Dreams can be exciting, confusing or even scary, but why do we have them? What's really going on inside our brains every night while we sleep?

Dreaming mostly happens during a stage of sleep called Rapid Eye Movement where your brain is almost as active as when you're awake. However, during this time the part of your brain responsible for logical thinking is less active which explains why dreams can feel weird or unrealistic.

One theory is that dreams help to process memories. It suggests that while you sleep, your brain sorts the information taken in during the day, storing useful information and getting rid of unnecessary details.

Another theory is that dreams are a kind of practice for real life. This theory suggests that your brain creates scenarios so you can practise responding to situations, for example escaping danger or solving problems.

Dreams are one of the most mysterious parts of being human but science shows they are far from meaningless and play an important role in keeping our brains healthy and active. So, the next time you wake up from a strange dream, remember it could be your brain helping you in ways you don't even realise.

-Louisa O'Neill & Juanita Jabson

Fueling the future with photons!

Scientists have taken a major step towards a future where sunlight doesn't just power homes, it can now create fuel.

Researchers are working with special materials called carbon nitrides, which can absorb sunlight and trigger chemical reactions that make clean energy sources like hydrogen fuel or turn carbon dioxide into useful chemicals. Pretty futuristic stuff.

However, there is one slight issue with using energy from the sun, this being that most of the sun's energy usually gets wasted before anything useful happens.

The breakthrough came when scientists added tiny metal ions into microscopic pores inside the material. These ions help keep energy flowing long enough to do real chemical work instead of disappearing.

What's even better, the team used computer simulations to test dozens of metals virtually before trying them in the lab, speeding up discovery dramatically.

So, in conclusion, we now have a much smarter way to design materials that could one day let us store sunshine as fuel, helping power cars, industry, and cities with cleaner energy.

-Isabelle Donoghue and Poppy Williams



BIOLOGY

CHEMISTRY





The Coriolis effect



The Coriolis effect is a phenomenon observed when an object moves within a rotating frame of reference. While often referred to as a "force," it is more accurately described as a consequence of Newtonian mechanics because the observer is rotating along with their environment, the ground literally moves beneath the object as it travels.

In a laboratory setting, this is most demonstrated using a rotating platform. When a projectile, such as a ball, is launched from the centre of a disk toward the edge, it follows a perfectly straight line. However, once the disk is set to a constant angular velocity, the projectile appears to trace a curved arc from the perspective of a camera on the disk. To a stationary observer looking down from the ceiling, the ball still travels in a straight line, confirming that the curve of the ball is a result of the accelerating frame rather than a physical push.

On a global scale, this effect is the primary driver of atmospheric and oceanic circulation; the reasons for tropical storms. Understanding this phenomenon is essential for fields ranging from meteorology to long-range ballistics and transcontinental flight, where pilots and navigators must account for the Earth's rotation to reach their destinations.

-Kinus Krishnamoorthy & Obinna Uliem

PHYSICS



The 1.26th dimension!



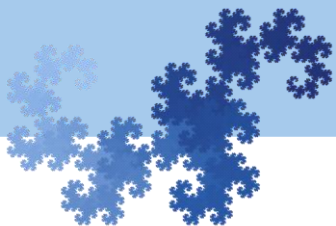
Do you ever look at a snowflake and notice its pattern is never-ending. That's the beauty of fractals.

A fractal is a complex, never-ending, geometric pattern. Fractals are infinitely complex patterns that are self-similar across different scales. They are created by repeating a simple process over and over in an ongoing feedback loop

A simple example is a tree. The trunk splits into branches, the branches split into smaller branches, and those split again into twigs. Each part looks like a smaller version of the whole tree.

Fractals don't fit into a neat integer dimension like a 1D line, or 2D plane. Instead, they're described using something called a fractal dimension, which can be a non-integer such as 1.26 for the Koch curve.

-Joseph Hopley & Sara Sehgal



MATHEMATICS

Did you know?

You can make your own mini fractal called the dragon curve, by folding a thin piece of paper repeatedly in the same direction. Unfolding the paper will leave it in the shape of a dragon!

SPACE FACT

Astronomers discovered that a massive dust cloud at the centre of our galaxy contains ethyl formate, the chemical responsible for the flavour of raspberries and the smell of rum.

AI ethicist



CAREERS

An AI ethicist studies how artificial intelligence affects people and society. They help companies create technology that is fair, safe and responsible. This includes checking for bias in AI systems, protecting privacy and making sure machines do not make harmful decisions. AI ethicists often work with programmers, scientists and businesses to solve problems linked to modern technology.

These careers are becoming more important as AI is used in schools, hospitals, transport and even social media. An AI ethicist may test chatbots, analyse data or create rules for how artificial intelligence should behave. It is a career that combines technology with human thinking and decision making.



Salary:

- Starter salary around £30,000
- Experienced workers can earn over £70,000
- Typical hours are 35 to 40 hours a week with some project deadlines

Entry requirements:

You will usually need

- 5 GCSEs including English, Mathematics and Science
- A Levels in subjects such as Computer Science, Psychology or Philosophy
- A degree related to technology, ethics, law or computer science
- Strong communication and problem-solving skills

-Varshini Ganesh & Aminah Hossain

Revision tips

Don't just read your notes and think that's revision, it won't stick. You need to actively test yourself, like doing questions or writing things from memory. That's what actually helps you remember.

Past papers are one of the best things you can do. Even if you feel unprepared, start anyway, they show you what you don't know and help improve exam technique.

Go over topics more than once. Forgetting is normal, coming back to topics is what helps them stay in your memory.

Have a simple plan so you know what you're doing, and don't ignore sleep. Being tired makes revision far less effective.

A good check is explaining things out loud. If you can't explain it clearly, you probably need to go over it again.

As mocks get closer, focus more on past papers and fixing mistakes instead of trying to learn everything new.

-Injila Bilal

Today's joke

Polar bears!

Thanks for reading!
**If you have any questions or articles for
future issues, please email us at
TheLabReport@ccgrammarschool.co.uk**

That's all from us , see you in our next issue !

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