



THE LAB REPORT

Today's joke

What did the sassy easter bunny say to the reactant in excess?

Dolly the Lamb

In 1996 a groundbreaking scientific achievement took place in Scotland where a team of scientists successfully cloned an adult mammal for the first time. This lamb was named Dolly, and her creation opened up an entirely new field of research known as cloning. Cloning is the process of creating a genetically identical organism. It involves producing an organism that has the same

DNA as another. There are two main types of cloning: reproductive cloning and therapeutic cloning. Dolly's creation is an example of reproductive cloning, where the goal is to create an organism that is an exact genetic copy of another. Before

Dolly, scientists had already cloned animals using cells from embryos. However, Dolly's birth was different because she was cloned from an adult cell, which was a major scientific challenge.

Dolly was an exact genetic copy of the sheep from which the cell was taken. This was a major breakthrough because, for the first time, an adult cell had been successfully used to clone an organism. Interestingly, Dolly wasn't an exact replica of the surrogate mother; instead, she was genetically identical to the donor sheep. This meant that the cloning process involved taking DNA from a fully developed animal and reprogramming it to behave like the DNA from an embryo. Dolly lived for 6 years before she was put down due to complications from a lung disease, which is young for a sheep. Interestingly, she showed signs of premature aging, which led some to believe that cloning might cause earlier aging in animals. Dolly's birth marked a massive milestone in biotechnology, and her legacy continues to influence research in genetics, cloning, and regenerative medicine. Scientists have since improved cloning techniques, and the process has led to developments in areas such as stem cell research and the genetic modification of animals.

By April McGowan and Samuel Johnson



BIOLOGY

Crabs as clothes?

In a world where demand for cheap, easy-to-produce clothing has never been higher, scientists have been working to produce a new sustainable material with which to make our clothes. Most synthetic polymers are produced from petroleum and coal (surprising to think about when you look at your school uniform!) which can't easily be recycled, whereas bio-based materials, such as Algae and fungi, actively sequester carbon dioxide and are easily decomposed & reused.

Several bio-based sustainable fibres are currently being used around the world; in Saudi Arabia they use date palm waste in textile production, in Morocco textiles have been developed from orange and olive waste, in Egypt clothing has been made from pineapple & banana leaf fibres. Such success in this technology has opened a whole new world of potential design and production for the fashion industry.

Among these revolutionary designs, algae has been recently proposed as a new means for producing textiles. Able to grow rapidly without the need for arable land or fresh water, Algae is easily sustainable. A polysaccharide called alginate is extracted from the cell walls of kelp and mixed with water to form a paste. This then undergoes physical & chemical processing to transform it into fibre filaments ready to form yarns. However, there are some problems in terms of durability, water resistance & performance that are being developed before this material is used to produced clothes.

Alongside algae, a company called TômTex has developed sustainable techniques to upcycle crustacean shell into bags, clothing and furniture. They use a biopolymer called chitosan from mushrooms & seashells, which reduces dependence on fossil fuels. The materials can mimic fabrics such as leather & suede, but scaling up production is expensive and as such this material isn't being used commercially.

Though some problems arise in terms of scaling up production and ensuring durability alongside quality, it is undeniable that the innovation from scientists worldwide so far is crucial in removing our dependence on non-renewable and harmful sources, such as fossil fuels, and is propelling us to a greener future. Just think, in 20 years your jumper could have once been a crab!

By Freya Windle



CHEMISTRY

Microsoft's new state of matter

As modern-day technology enhances further and further, humanity requires a way for these more complex problems to be solved. This is where quantum computers come in.

Whereas the traditional computer uses ones and zeros stored as bits for data, quantum computers use qubits, a data medium that can store a one, a zero, or both at the same time. This allows for a massive speed increase and allows previously unsolvable problems to be solved due to high density data storage.

Quantum computers open paths for complex problem solving that traditional computers cannot do. This creates opportunities ranging from advanced machine learning and cryptography to drug development and aircraft development. They can mathematically map how nature behaves with amazing precision. It also allows certain problems in chemistry and materials science to be solved, but we aren't quite at this stage yet due to limitations on the number of qubits once computer has.

However, Microsoft has announced a new quantum chip that is just the size of the palm of your hand, but with a new type of qubit. The topological qubit. Microsoft has essentially created a new state of matter. Not a solid, liquid gas or even plasma, but something called a topological superconductor. These open a path to developing a quantum system capable of scaling to a million qubits, much more than IBM's 1000. This shows that within a matter of years, quantum computing will be able to be used to tackle the most complex industrial and societal problems.

By Henry Cleverdon



PHYSICS



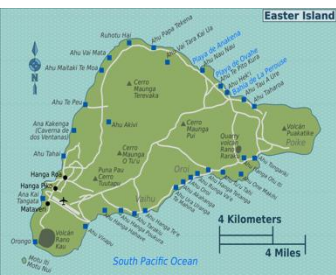
EASTER ISLAND

Easter Island, named due to its first European explorer discovering it on Easter Sunday in 1722, is a UNESCO world heritage site and a special territory of Chile. Although not known for its Easter eggs or fluffy bunnies, Easter Island is home to over 1000 Moai monumental statues, created by the Rapa Nui people. The statues stand up to 33 feet tall, weighing up to 82 tons each, and all face inland. Easter island is volcanic, mainly consisting of three extinct volcanoes, which produced a large amount of tuff rock - this is what the statues are carved from. The Pukau hats, which sit atop some of the statues, are carved from porous pumice found in the Puna Pau crater.

Recently, excavations uncovered bodies of the Moai, etched with undeciphered petroglyphs - previously, it was thought they did not have bodies. A recent study has led to the belief they were carved as the Rapa Nui believed the statues could produce agricultural fertility and therefore critical food supplies. This discovery indicates the idea that all of the statues were awaiting transport out of the quarry is wrong, and that instead the statues "were retained in place to ensure the sacred nature of the quarry itself. The Moai were central to the idea of fertility, and in Rapa Nui belief their presence here stimulated agricultural food production." Says director of the Easter Island Statue Project, Jo Ann Van Tilburg.

By Clove Gater

GEOLOGY



EMBRYOLOGY



Egg-cellent employment...

What do they do?

Embryologists perform laboratory-based tasks, patient consults, and work as part of a multi-disciplinary team of doctors, nurses, technicians and health care assistants to help patients with sub-fertility or infertility achieve their goal of a baby. You'll perform diagnostic services and therapeutic embryological procedures, such as in vitro fertilisation (IVF) and intracytoplasmic sperm injection (ICSI), at hospitals and clinics. Clinical scientists working in embryology often have an interest in science, medicine and computing.

Education pathway

You'll usually need a minimum of five 9-4 grade GCSEs, including maths, English and two science subjects to apply for at least 2 A-levels (or the equivalent).

Then you will need to apply for a science-based degree course at university, such as biology, microbiology or genetics. After university, you'd need to apply for a place on the NHS Scientist Training Programme where you'll work and study to become a clinical scientist in reproductive science (which includes embryology). This is a three-year, full-time, work-based learning and training programme that also includes academic study at master's level.

Salary

As a guide, Trainee clinical scientists on the NHS Scientist Training Programme have starting salaries of £35,392. Then once you are qualified, you're likely to earn between £43,742 to £50,056.

The highest grade at which clinical scientists work-range from £50,952 to £114,949, for the most senior roles.

Salary levels for clinical scientists working for private companies, universities, government bodies and other organisations may vary.

By Delaena Debre

EMBRYOLOGY



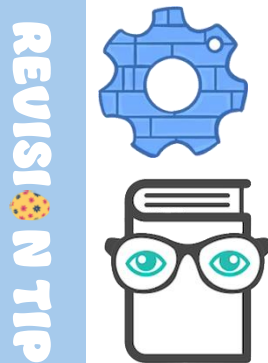
Fun fact: All the blood vessels in your body, if stretched out, would circle the Earth just once—not four times like once thought!

Websites

Now you need to be very careful from this point on because the websites that I am about to give you COULD be the deciding factor in whether you get that Grade 9 or not, trust me.

- Physics and Maths Tutor (PMT) - quite popular, but for good reason. This is an easy one to lock in with. Click the science you want, then the topic you want and just spam the past paper questions. Make use of the notes/pre-made flashcards provided too.
 - Chemrevise (this is just for chemistry)- click on 'AQA GCSE CHEMISTRY'. these notes are specification specific, so it only contains the exact information you need to know, no more no less, unlike silly textbooks that think it's funny to waste your precious time with extra (and mostly useless) info.
 - Studymind- similar to PMT- again DO ALL of the past paper questions.
 - Cognito- okay for this one I'm not saying anything, you need to see for yourself. Get on this website now.
- These websites are to a GCSE student, like sweet succulent honey to a bee. Don't let the exams cook you, you need to be the one to cook the exams. Exams are pieces of paper with words written on them. Show it who's boss.

By Ron Zaki



REVISION TIPS



Today's joke

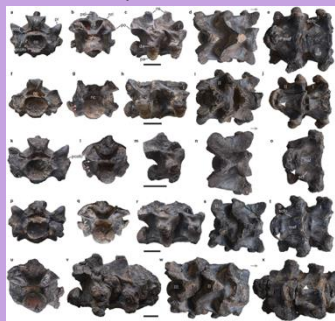
Stop being so egg-stral!

Find out about 

The Lab Report Competition on the next page 

India's sensssational discovery

In April last year, palaeontologists in India announced the discovery of a new species of ancient snake. The snake named 'Vasuki Indicus' after Vasuki - a serpent present in Hinduism, is estimated to have reached lengths of 15 metres, that's as long as a Humpback Whale and longer than a standard bus! If these estimates are true, then Vasuki Indicus would break the record of the extinct Colombian Titanoboa by 1 metre. Vasuki Indicus roamed the Earth in the Eocene (47 million years ago) making it 10 million years the Titanoboa's junior (with the latter having lived in the Paleocene 58 million years ago). The fossil was discovered in a mine in Gujarat India on an expedition searching for extinct Whales back in 2005 but was sidelined with the colossal vertebrae being believed to be those of an ancient crocodile. The huge vertebrae are 11cm wide and 6cm long making them a whopping 6 times as large as a human vertebra! While these vertebrae are slightly smaller than those of its Latin American cousin, it will take some more time for scientists to decide if the Vasuki Indicus really is the new king of the serpents or if the Titanoboa will retain its crown.



By Alfie Meise 13Tsc

Want to get involved in The Lab Report? Now's your chance!

We're challenging you to write a science-based article in an area that interests you, and we'll pick the best two to publish next issue. The article must be around 200 words, complete with a picture, and sent to TheLabReport@ccgrammarschool.onmicrosoft.com by Wednesday 30th of April. Please make sure you credit yourself with your name and form group.
Good luck!

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

Edited by Hermione Redwood