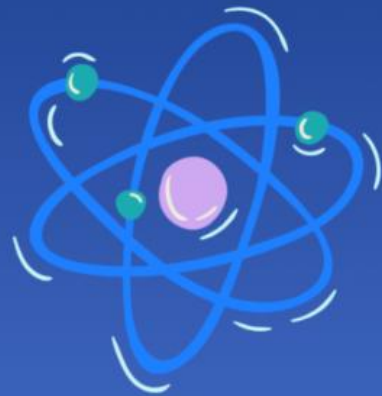


Darrick Wood's

Monthly Molecule



April Edition

Contents

What On Earth Is A Kernel?.....	3
The Hidden Journey Of A Germ.....	5
The Psychology Of Fashion.....	9
Beyond school – Workshops and Opportunities that may interest you	12
Book Recommendations.....	14
Games and Puzzles.....	16

Edited by Jasveer Thind 12VHA

Cover by Chloe Ancaja 12ABE

Writing for the **Monthly Molecule** is a great opportunity to explore your curiosity and share your ideas with others. It helps you develop important skills like communication, research, and critical thinking, which are valuable across all subjects. Importantly, it is also something that can significantly strengthen your **personal statement**. Universities are not just looking for good grades, they look for evidence of **genuine interest, independent learning, and super-curricular engagement**. Writing an article shows that you have gone beyond the classroom to explore a topic in depth, understood it, and communicated it clearly, which is exactly what top universities value.

In terms of **careers**, this experience is especially relevant for fields such as medicine, science, engineering, and research. These careers require you to **analyse information, think critically, and explain complex ideas in a clear and accessible way**, all skills you develop by writing for the magazine. It also demonstrates initiative, creativity, and commitment, which are highly valued by employers. Being able to talk about your article in an interview gives you a strong, real example of your skills and interests, helping you stand out from other applicants.

What on Earth is a Kernel?

By Eren Kaşlı - 10YH

Every day you use your computer. You use software such as google chrome or Firefox to browse the web, Microsoft Word to make documents, and play Minecraft maybe. And thanks to your operating system, you are able to use those multiple programs that can work together in harmony, not breaking each other.

This is thanks to your operating system. Your operating system (most likely Microsoft Windows, Mac OS, or GNU/Linux), consists of various programs, such as your file manager to open and create files, your settings app, etc. It also has the menus and buttons and icons that allow you to open your programs and use your computer. All of these run in the **user space**.

And then you have your hardware, such as your keyboard, your graphics card, your CPU (which runs programs, which consist of instructions), your monitor etc.



Now, you will need to know one important fact – your programs cannot directly interact with the hardware. Nothing in the **user space** can interact with the hardware. That's because programs in the user space run in restricted mode – aka they can only access certain instructions, such as performing basic logic and arithmetic tasks, as well as doing **syscalls** (note this down for later).

We have our hardware and software. But they cannot interact with each other; they need another program that will allow the two to communicate. This is where the kernel comes in. The kernel is a piece of software that, in its



most basic form, allows software running in restricted mode to be able to use the hardware. The kernel runs in privileged mode, which means that it can run just about any instruction the CPU offers, including those that directly interact with the hardware.



Programs use **syscalls** to request the kernel to do certain operations on its behalf. Such as telling the kernel to print something on the screen, (equivalent to `print` in python)

However, our programs still cannot do anything, that is because there is no way to actually run them. This is where our init program comes into play. The kernel runs one and only one program. This program is responsible for launching other programs. It runs in **user space** (so in **restricted mode**). It also launches our **shell**. The shell can be a CLI – where you type commands to do operations like it's the 1980's, or most likely a Desktop Environment – where you have icons and windows and buttons to use your computer and run programs. Your file manager and settings app and other system utilities also belong to the shell.



Now we have a lovely (and grossly oversimplified) diagram of how your operating system works. Now obviously there are lots of things we haven't covered here, such as the window server, graphics API etc., but if we did cover all of these, this article would be incredibly long. Hopefully you have learnt something from this article, and have a lovely rest of your day.

The Hidden Journey of a Germ: What Really Happens During Infection

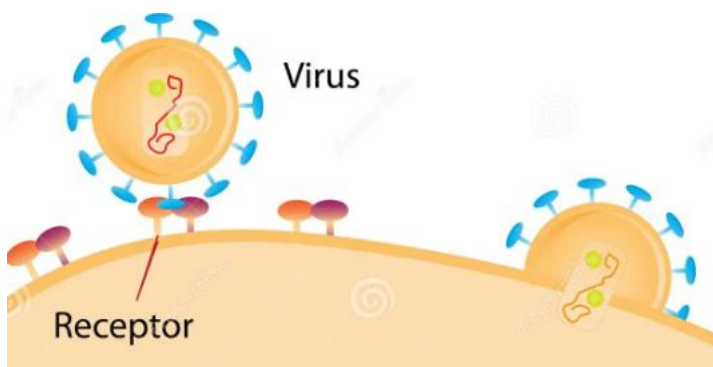
By Jasveer Thind - 12VHA

Every time someone coughs, sneezes, or even just talks, tiny droplets are released into the air. These droplets are usually invisible, but some of them can carry microscopic pathogens such as viruses or bacteria. They are incredibly small — only a few micrometres across — yet once they enter the body they can start a surprisingly complex chain of events.



Step 1: Entering the Body

If one of these droplets is breathed in, the germ can land in the respiratory tract. The cells lining the nose, throat and lungs are warm and moist, which makes them an ideal place for microbes to settle.



Viruses infect cells by attaching to special **receptor proteins** on the cell surface. You can think of this a bit like a key fitting into a lock. Once attached, the virus can enter the cell and begin using the cell's machinery to make many copies of itself.

Bacteria behave slightly differently. Instead of taking over cells in the same way, many bacteria release chemicals or enzymes that allow them to spread through tissues. They reproduce through a process called **binary fission**, where one bacterium splits into two, allowing their numbers to increase very quickly.

Step 2: The Immune System Responds

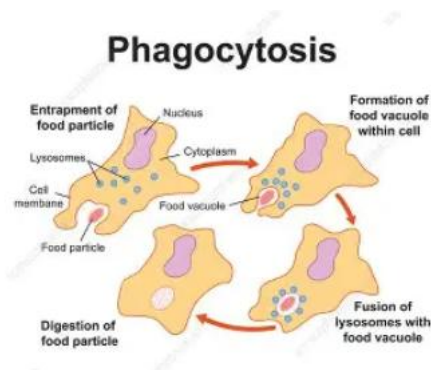
The body does not ignore these invaders for long. As soon as foreign microbes are detected, the **immune system** begins to respond.

First, physical defences such as **mucus and tiny hair-like structures called cilia** help trap and sweep microbes away from the lungs.

If pathogens get further into the body, **phagocytes**, a type of white blood cell, can surround and digest them.

Other immune cells called **lymphocytes** recognise specific molecules on the surface of microbes known as **antigens**.

- **T cells** help destroy infected cells.
- **B cells** produce **antibodies**, proteins that stick to microbes and help stop them spreading.



Step 3: Why We Feel Ill

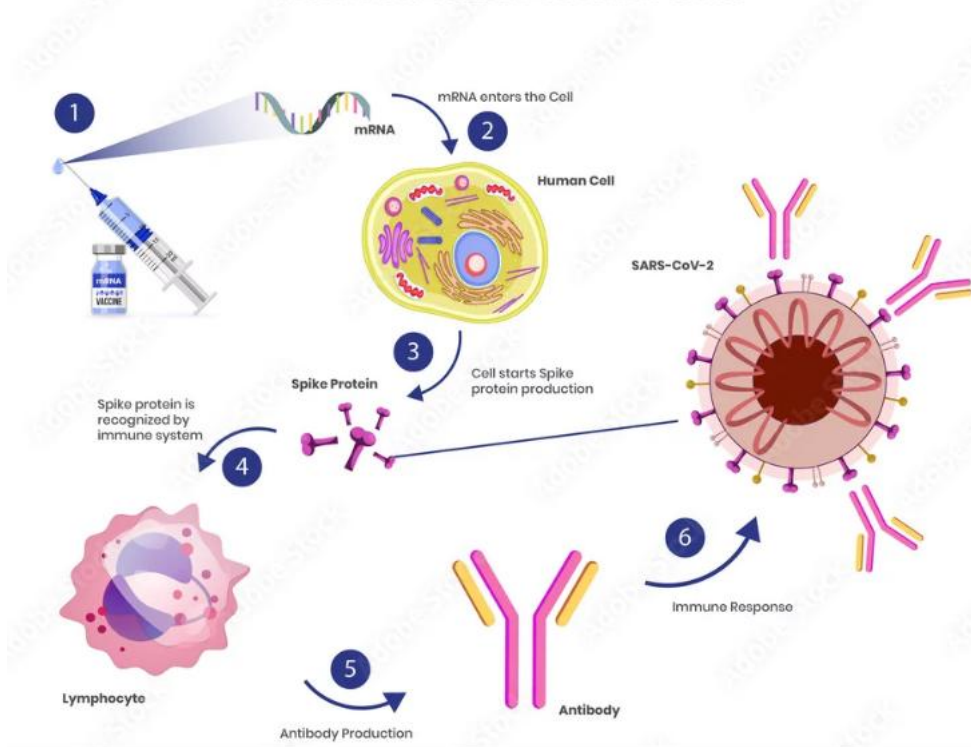
Interestingly, many symptoms of illness are not caused directly by the germ itself, but by the body's attempt to fight it.

A **fever** occurs when the brain raises body temperature to make conditions less favourable for microbes. **Inflammation** happens when blood vessels widen so that more immune cells can reach the infected area. Symptoms such as tiredness, headaches and swelling are signs that the immune system is actively working.

Although these symptoms can be unpleasant, they are often part of the body's natural defence.

Step 4: How Vaccines Help

How does mRNA vaccine work



Vaccines work by preparing the immune system in advance. They introduce a harmless form of an antigen — sometimes a weakened virus, an inactivated bacterium, or just a small fragment of a pathogen.

This allows the immune system to create **memory cells** without the person becoming seriously ill. If the real pathogen enters the body later, these memory cells recognise it quickly and trigger a much faster immune response, often stopping the infection before symptoms develop.

Why Understanding Infection Matters

Microbes can change and evolve rapidly. Some bacteria develop **antibiotic resistance**, and viruses can mutate to form new strains. Because of this, scientists are constantly studying how infections spread and how the immune system responds.

Understanding these processes helps researchers design better medicines, improve vaccines and protect communities from outbreaks.

Infection and the immune response are not just topics in a biology textbook — they are ongoing biological processes happening around us all the time.

Fun Fact: Your Gut is a Secret Immune **Powerhouse**



*Did you know that about **70%** of your immune system lives in your gut?*

The trillions of bacteria in your intestines aren't just there to help digest food, they also train your immune system to recognize good microbes from harmful ones. A healthy gut microbiome can even influence how your body responds to infections and vaccines! So, your immune system isn't just in your blood it's quietly working inside your digestive system too.

The psychology of fashion

By Mahiya Sahay - 10YC

Each person gets dressed at least 29,000 times during the course of their lives.

Have you ever stared at your wardrobe that's full of clothes, completely baffled? What should you wear? You need to plan according to the weather, your destination, the people surrounding you, etc. It is a big decision.

But science has proven there's more to it than just randomly selecting the shirt in the corner of your wardrobe. The outfit you pick every day is a subconscious verdict your brain has decided. It could be based on mood, memory, culture, where in the world you are, gender, personal identity or social norms.

Fashion is a psychological mechanism with meaningful effects on self-esteem, identity, and social interactions. Clothing is both an aesthetic and expressive tool that is selected by individuals not only for its appearance but also to convey one's values.

Each garment we clothe ourselves in reflects a series of decisions shaped by factors of our identity. Clothes serve as a silent but intensely expressive language, speaking volumes about our inner, subconscious needs.

People having confidence in their appearance is a powerful motivator for better dressing habits. Clothes are the closest thing to our bodies; they're our second skin.

Body type awareness contributes to a positive body image and influences clothing choices that can support mental health. Dressing to suit one's body is an act of self-care that is healthy for a person's peace of mind. Forcing the wrong clothes onto somebody who doesn't fit that category is just a costume. It isn't natural. It's a negative way of dressing up, hiding away, feeling uncomfortable in your own body.

Fashion serves as a strategic psychological buffer. For many people, clothing is about protection, not just from the elements, but also from judgment and self-doubt. It allows the person to determine how much to reveal of their true self.

There is a type of dressing called 'Dopamine dressing'. It is the art of wearing clothes, colours, and textures that intentionally boost one's mood, confidence, and happiness. It involves donning on clothes somebody loves, triggering the release of the "feel-good" hormone, dopamine. Essentially, it acts as a "dose of joy".

Doing that, ensures a person's happiness is secure. It prioritizes how they feel over being on trend. It is entirely subjective. What sparks joy for one person may not for another.

Many people struggle with issues surrounding identity, trauma, or social anxiety on a regular basis. However, by choosing how to style yourself, a person can feel completely control- every move is their own and not a result of pressure to fit in. They can choose how they want to be seen by others, crafting their own image however they want to.

How we dress sometimes also goes back to our childhood. From early childhood, many are taught that clothing is not just about modesty or utility, but also about fitting in and standing out, conforming to, or rebelling against cultural norms. People might have been praised for 'dressing appropriately' or 'stylishly' before, subconsciously creating a link between clothing and acceptance.

Clothes play a big role in showing others our inner persona. However, in contradiction to that, we are also creatures of society, clothing is being of society's most powerful silent codes.

When we wear clothes with symbolic meaning, such as a lab coat or business suit, we begin to adopt the associated behaviours. It might help us build focus, self-assurance, and professionalism, increasing feelings of power. Studies showed participants wearing a "lab coat" performed better on attention-related tasks than those without.

Workout clothes can motivate us to be more active, as they prime the brain for physical exertion.

For centuries, clothing has been linked with gender. For example, trousers signifying masculinity, skirts embodying femininity. Even specific colours can mean societal roles.

Today, however, the world has undergone a big shift. Designers create according to their heart, dismissing the traditional gender aesthetics. It is now common to see men in skirts, women in oversized blazers, and non-binary individuals embracing fashion that feels true to their personal identity.

There are unspoken rules (suits for interviews, black for funerals, etc) that we instinctively follow, however it is not suppressing anyone, rather showing respect to the situation.

The relationship between colour and emotion couldn't be further away from each other. I guess the old saying, "opposites attract", must be true after all.

Some days we wear a bright yellow to summon optimism during a dreary weather, and other times, greys that we dress ourselves in might feel like emotional camouflage. Colours are also known to influence the ways in which our nervous system might be stimulated. Blue, for example, makes us feel relaxed.

If we, as humans, are worrying if something is appropriate or if we don't feel confident in what we're wearing, we get stressed. This means that we don't have the cognitive capacity to deal with the problem at hand (cognition is the mental process of acquiring knowledge and understanding through thought, experience, and the senses).

That is why lots of very successful people tend to wear clothes that are more inclined towards comfortable for work. It may be things like a t-shirt and jeans as Mark Zuckerberg wears. By putting on the same items every day, he has more mental capacity for important issues. He doesn't have to put effort into deciding what to wear every day.



Fun fact:

Four different personality types were identified through research.

Morning light,

Dream light,

Firelight and

Starlight

All reflect different personalities depending on the pallet of colours you wear.

Do you know which one you are?

Beyond school – Workshops and Opportunities that may interest you

Recommended for years 9 and above

What if I am not sure about my future?

By Casey Joel - 12AHE



Many students choose the sixth form pathway to get into university. But, how would you even know what pathway you want to take? Whilst it is expected to attend open days in sixth form, they are available to any year group. This means that, you can go to a university exploring campus life, developing an insight into the examinations that take place. Attending a university does not dictate your decision to attending a sixth form, college or apprenticeship but it can support you in finding your passions and interests. Within open days you will get to explore libraries, lecture halls and discuss any inquires with both students and higher educators. On the UCAS website open days are simple to find and book for free. When booking you are asked to provide a subject of choice so whilst you can attend numerous open days it would be suitable to do some short research into what jobs are available to your interest. NOTICE: always look out for email messages since many careers staff – like Ms collier – will send out workshops and opportunities that you can take part in!

What if I am aiming higher?

By Jasmine Hooles - 12HHC

If you are aiming higher, it can be difficult to know where to start. There are many resources available to you online, that can guide you along the right pathways of where to start when considering options for your future. For example, a good starting place is to investigate super curricular activities. These are activities that you complete outside of school to gain a deeper insight into your subject area of interests. Regarding science, this may include reading news articles about new scientific discoveries or reading science related books. University websites often have super curricular reading recommended links. It is important to take time into super curriculars, as it shows a real passion and devotion to a subject. You can also look out for outreach events at universities. Every year Oxford University have a summer school called

UNIQ where students can enjoy taster sessions in their chosen subjects. These events are particularly insightful in helping to guide you as to whether your chosen pathway will work for you. As well as this, many universities have mailing lists- if you sign up to these you can ensure that you never miss the latest events and opportunities. There are also a variety of online opportunities, such as lecture series. These enable you to gain a greater understanding of various topics. For example, I have participated in the Newcastle mini medical school lecture series, which covered topics such as the heart, euthanasia, dementia and other diseases.



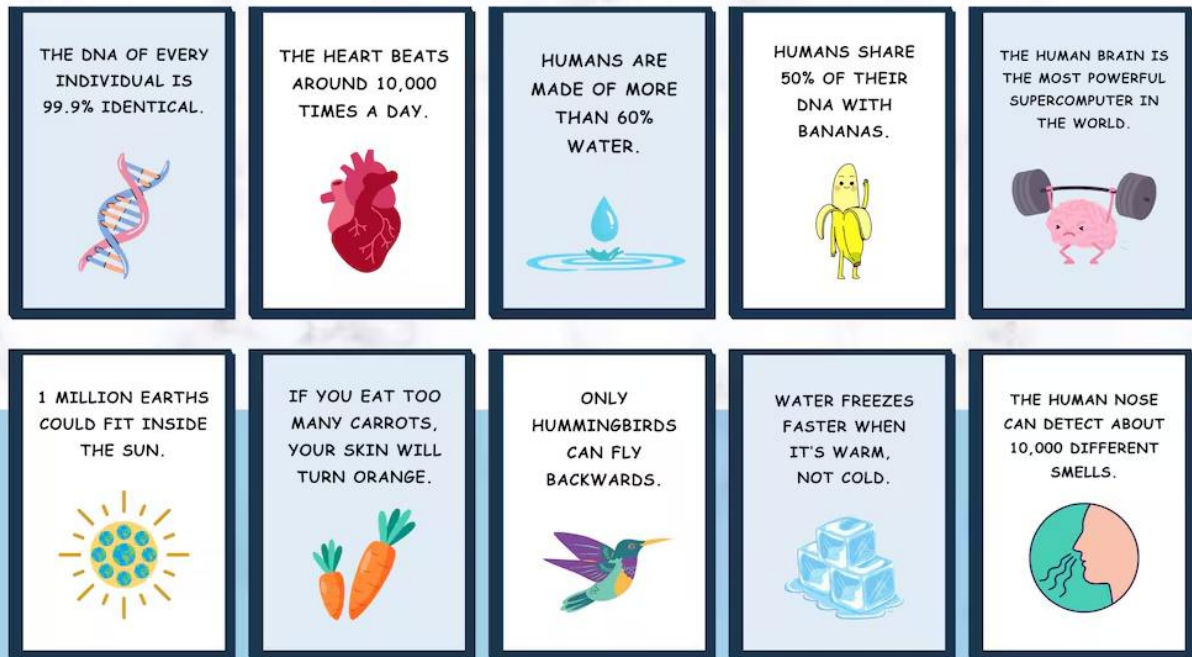
What if I want to develop an insight into university life?

By Ruby Clare - 12HHC

If you want to develop an insight into what life at university (or even life further on in your education) will be like, a great place to start is looking in the school careers bulletin. This can provide you with many different opportunities, whether you wish to explore apprenticeships, university or are just looking to jump straight into the world of work. For example, I came across a Future Medics Conference run by ICSM at Imperial College London on the careers bulletin. Quite a few students from our sixth form attended this event and found it to be extremely engaging and insightful, and a perfect way to explore your passion for your desired subject. At the conference, we experienced two taster lectures for endocrinology and haematology. After this, we split off into 5 groups to undergo a series of workshops related to different aspects of medicine. This conference is just one example of many different super curricular activities which you can do to gain an insight into what life at university will be like for you. If you are interested in exploring your prospective subject, look out for any relevant opportunities sent to your email address, or research online to find different lectures to watch or different apprenticeship opportunities for you.



Science Fun Facts



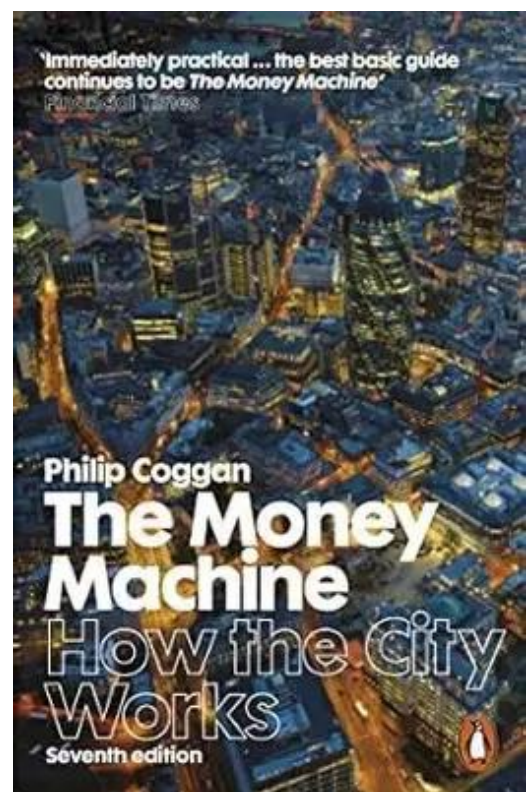
Book Recommendations:

The Money Machine by Philip Coggan

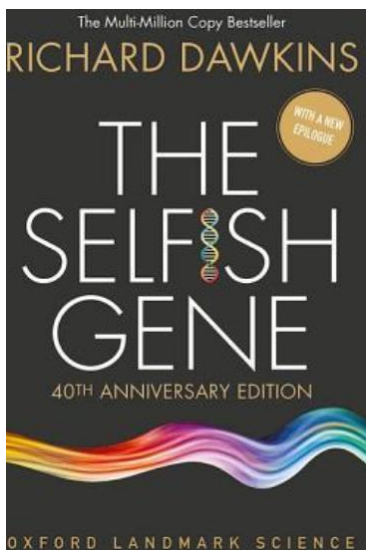
By - Daniel Zheng 12GRE

The Money Machine by Philip Coggan explains how modern finance and the economy actually work in simple terms.

It shows how money is created, especially through banks lending rather than just governments printing it. The book breaks down key institutions like central banks, financial markets, and governments, and how they interact. It teaches why debt is central to economic growth—but also a source of financial crises. You learn how events like the 2008 Financial Crisis happened and what they reveal about the system's risks.



The Selfish Gene by Richard Dawkins



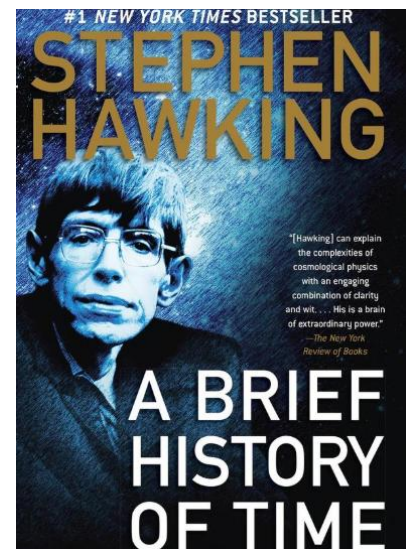
This book explores the idea that evolution is driven by genes rather than whole organisms. Richard Dawkins argues that genes act in a “selfish” way, meaning they aim to replicate and pass themselves on to the next generation, even if this sometimes appears to go against the interests of the individual organism. Through this perspective, behaviours such as cooperation, altruism, and even aggression can be explained as strategies that help genes survive. The book introduces key biological concepts like natural selection,

inheritance, and evolution in a more philosophical and thought-provoking way than a textbook. It also challenges common misconceptions—for example, that evolution works “for the good of the species.” Instead, it shows how complex behaviours can emerge from simple genetic survival mechanisms.

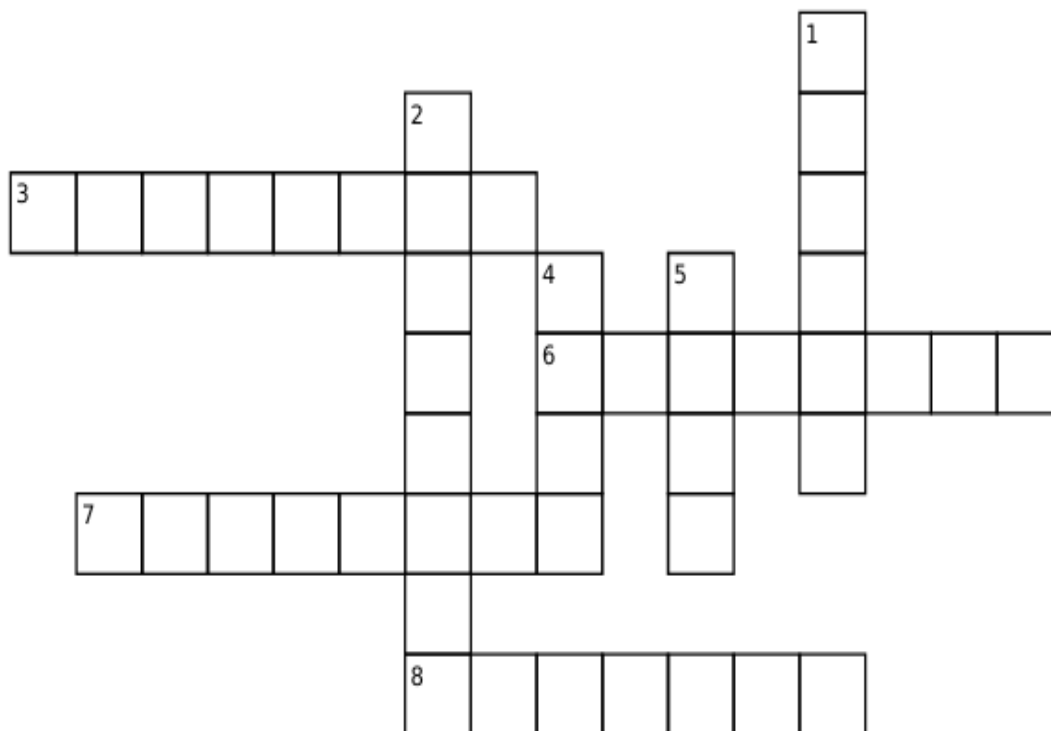
A Brief History of Time by Steven Hawking

This book explains some of the biggest questions in science, such as how the universe began, what black holes are, and whether time has a beginning or an end. It combines ideas from physics, astronomy, and mathematics to build a picture of how the universe works, starting from basic concepts and gradually introducing more complex theories.

Although some parts can be challenging, the book is designed to make advanced scientific ideas accessible without needing a strong maths background. It explores key concepts like gravity, space-time, and the Big Bang, while also encouraging readers to think about the limits of scientific knowledge and what we still don’t understand about the universe.



Games and Quizzes



Down:

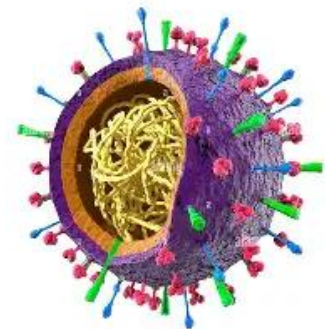
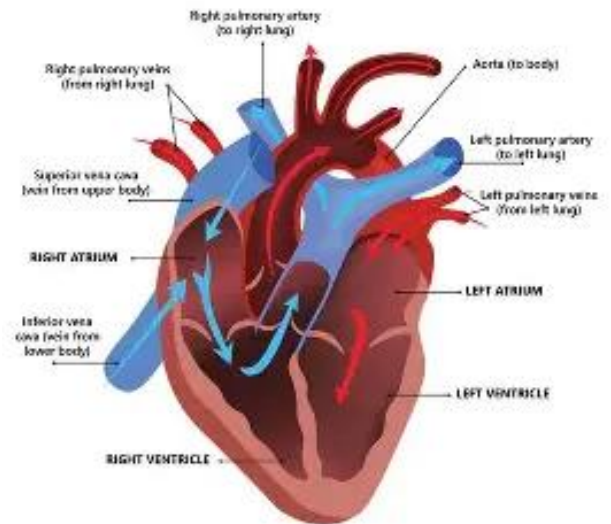
1. A soluble base with a pH greater than 7
2. Two or more atoms chemically bonded together
4. A substance with a pH less than 7
5. The smallest unit of an element

Across:

3. A process where substances change into new substances
6. A substance that speeds up a reaction without being used up
7. A substance made from two or more elements bonded together
8. A substance made of only one type of atom

True or False: Questions

1. Viruses can reproduce on their own without a host cell.
2. Bacteria are living organisms.
3. The heart is part of the nervous system.
4. Photosynthesis only happens at night.
5. Antibiotics can be used to treat bacterial infections.
6. All microorganisms are harmful to humans.
7. Gravity only exists on Earth.
8. Energy cannot be created or destroyed.
9. The nucleus is found in all cells.
10. Water is made up of two hydrogen atoms and one oxygen atom.
11. The brain controls the body's responses and actions.
12. Light travels slower than sound.
13. Enzymes slow down chemical reactions.
14. The Earth revolves around the Sun.
15. Electricity can flow through an open circuit.



Wordsearch

A L I Y T I L I B A B O R P M
L G E N Z Y M E S P S R I Y I
G R C I R C U I T I A T N G O
O A T R E N O A S D N O A O N
R V I C L E R O I N O E E L I
I I O Y R O M A O P I T L O C
T T X S I S T Y A O T X U N B
H Y I C O I E D B C A X C H O
M Y D I O I A O I U R Y E C N
D I A N G L S B N C I M L E D
N M T M I S E I Y E P L O T N
A R I C A B A T N S S A M O I
P H O T O S Y N T H E S I S C
E I N C O C I A L O R T Y S O
C O A I R E T C A B A C O I B

Photosynthesis

Enzymes

Molecule

Circuit

Respiration

Bacteria

Oxidation

Probability

Antibody

Osmosis

Gravity

Algorithm

DNA

Ionic Bond

Radiation

Technology

ANSWERS: Chemistry Crossword

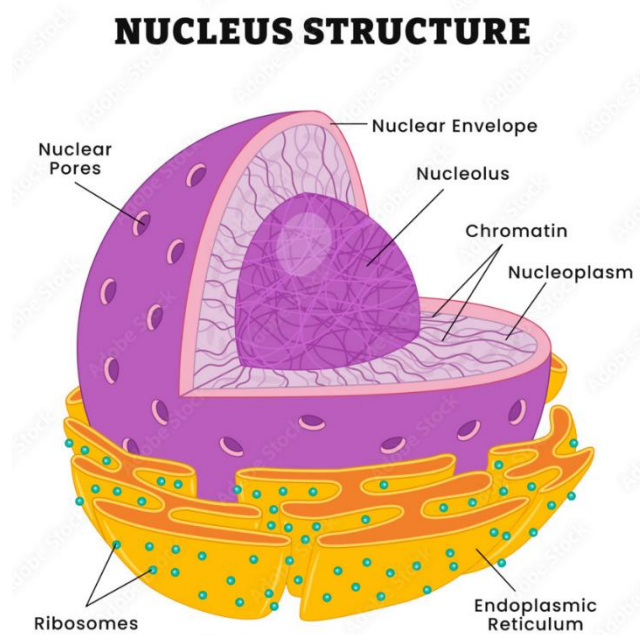
1. **Alkali**- A soluble base with a pH greater than 7
2. **Molecule**- Two or more atoms chemically bonded together
4. **Acid**- A substance with a pH less than 7
5. **Atom**-The smallest unit of an element

Across:

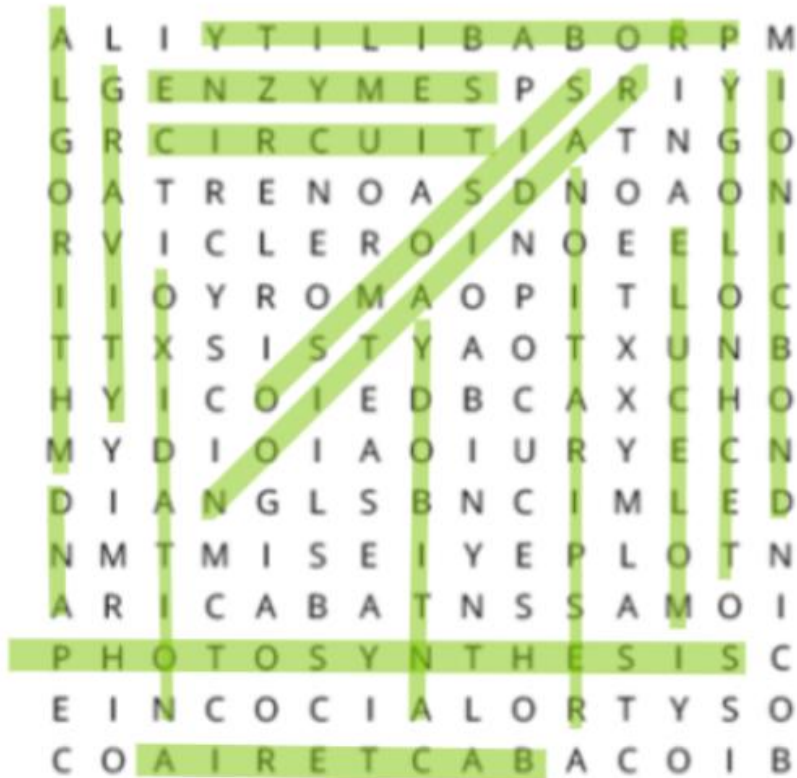
3. **Reaction**-A process where substances change into new substances
6. **Catalyst**- A substance that speeds up a reaction without being used up
7. **Compound**- A substance made from two or more elements bonded together
8. **Element**-A substance made of only one type of atom

True or False: Answers

1. False
2. True
3. False
4. False
5. True
6. False
7. False
8. True
9. False
10. True
11. True
12. False
13. False
14. True
15. False



Wordsearch: Answers



Photosynthesis
Enzymes
Molecule
Circuit

Respiration
Bacteria
Oxidation
Probability

Antibody
Osmosis
Gravity
Algorithm

DNA
Ionic Bond
Radiation
Technology

