Westcliff High School for Girls

Sixth Form - Sciences

Wider Reading for University Preparation and Personal Statement Writing

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References

http://www.univ.ox.ac.uk/applying-to-univ/staircase12/

https://www.ox.ac.uk/admissions/undergraduate/courses/suggested-reading-and-resources?wssl=1

https://www.kings.cam.ac.uk/study/undergraduate/reading-lists

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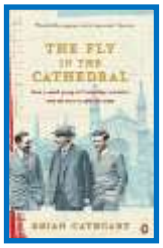
Sciences

All Sciences

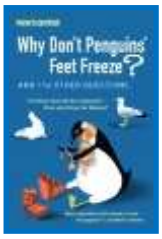


The Fly In The Cathedral: How A Small Group Of Cambridge Scientists Won The Race To Split The Atom, Brian Cathcart

The splitting of the atom, performed in a shabby Cambridge lab in April 1932, was a triumph of ingenuity over adversity. John Cockcroft and Ernest Walton, under the stern gaze of the brilliantly eccentric Lord Rutherford, cobbled together handmade or recycled components – while American rivals had state-of-the-art equipment – to make one of the great scientific breakthroughs of all time. This remarkable tale of success on a shoestring – packed with larger-than-life characters, struggles against the odds, personal tragedy, love and bloody-minded determination – makes for one of the most inspiring stories of scientific derring-do ever told.

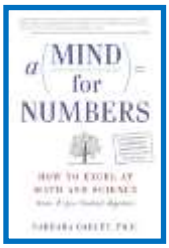
Stuff Matters: The Strange Stories Of The Marvellous Materials That Shape Our Man-Made World, Mark Miodownik

Everything is made of something…from the everyday objects in our homes to the most extraordinary new materials that will shape our future, 'Stuff Matters' reveals the inner workings of the man-made world, the miracles of craft, design, engineering and ingenuity that surround us every day. From the teacup to the jet engine, the silicon chip to the paperclip, from the ancient technologies of fabrics and ceramic to today's self-healing metals and bionic implants, this is a book to inspire amazement and delight at mankind's creativity.



Why Don't Penguins' Feet Freeze?, *New Scientist*

This new collection from *New Scientist* includes recent answers never before published in book form, and also old favourites from the column's early days. Yet again, many seemingly simple questions turn out to have complex answers. And some that seem difficult have a very simple explanation. *New Scientist*'s 'Last Word' is regularly voted the magazine's most popular section as it celebrates all questions – the trivial, idiosyncratic, baffling and strange. This new selection of the best is popular science at its most entertaining and enlightening.



A Mind For Numbers: How To Excel At Math And Science (Even If You Flunked Algebra), Barbara Oakley

Engineering professor Barbara Oakley knows firsthand how it feels to struggle with math. She lets us in on the secrets to effectively learning math and science-secrets that even dedicated and successful students wish they'd known earlier. Contrary to popular belief, math requires creative, as well as analytical, thinking. Most people think that there's only one way to do a problem, when in actuality, there are often a number of different solutions – you just need the creativity to see them. For example, there are more than 300 different known proofs of the Pythagorean Theorem. In short, studying a problem in a laser-focused way until you reach a solution is not an effective way to learn math. Rather, it involves taking the time to step away from a problem and allow the more relaxed and creative part of the brain to take over.

Science Fiction Selection

Fahrenheit 451, Ray Bradbury

The prophetic classic novel set in a not-too-distant future where books are burned by a special task force of firemen. Guy Montag is a fireman. His job is to burn books, which are forbidden, being the source of all discord and unhappiness. Even so, Montag is unhappy; there is discord in his marriage. Are books hidden in his house? The Mechanical Hound of the Fire Department, armed with a lethal hypodermic, escorted by helicopters, is ready to track down those dissidents who defy society to preserve and read books.

Neuromancer, William Gibson

The Matrix: a world within a world, a graphic representation of the databanks of every computer in the human system; a consensual hallucination experienced daily by billions of legitimate users in the Sprawl alone. And by Case, computer cowboy, until his nervous system is grievously maimed by a client he double-crossed. Japanese experts in nerve splicing and microbionics have left him broke and close to dead. But at last Case has found a cure. He's going back into the system. Not for the bliss of cyberspace but to steal again, this time from the big boys, the almighty megacorps. In return, should he survive, he will stay cured.

Brave New World, Aldous Huxley

Aldous Huxley's 1932 dystopian classic 'Brave New World' predicts – with eerie clarity – a terrifying vision of the future, which feels ever closer to our new reality. Far in the future, the World Controllers have created the ideal society. Through clever use of genetic engineering, brainwashing and recreational sex and drugs all its members are happy consumers. Bernard Marx seems alone harbouring an ill-defined longing to break free. A visit to one of the few remaining Savage Reservations where the old life still continues, may be the cure for his distress...Huxley's ingenious fantasy of the future sheds a blazing light on the present and is considered to be his most enduring masterpiece.

A Wrinkle In Time, Madeleine L'Engle

When Charles Wallace Murry goes searching through a 'wrinkle in time' for his lost father, he finds himself on an evil planet where all life is enslaved by a huge pulsating brain known as 'It'. How Charles, his sister Meg and friend Calvin find and free his father makes this a very special and exciting mixture of fantasy and science fiction, which all the way through is dominated by the funny and mysterious trio of guardian angels known as Mrs Whatsit, Mrs Who and Mrs Which.

Nineteen Eighty Four, George Orwell

Winston Smith works for the Ministry of Truth in London, chief city of Airstrip One. Big Brother stares out from every poster, the Thought Police uncover every act of betrayal. When Winston finds love with Julia, he discovers that life does not have to be dull and deadening, and awakens to new possibilities. Despite the police helicopters that hover and circle overhead, Winston and Julia begin to question the Party; they are drawn towards conspiracy. Yet Big Brother will not tolerate dissent – even in the mind. For those with original thoughts they invented Room 101…'Nineteen Eighty Four' is George Orwell's terrifying vision of a totalitarian future in which everything and everyone is slave to a tyrannical regime.

The Invisible Man, H.G. Wells

With his face swaddled in bandages, his eyes hidden behind dark glasses and his hands covered even indoors, Griffin the new guest at The Coach and Horses is at first assumed to be a shy accident-victim. But the true reason for his disguise is far more chilling: he has developed a process that has made him invisible, and is locked in a struggle to discover the antidote. Forced from the village, and driven to murder, he seeks the aid of an old friend, Kemp. The horror of his fate has affected his mind, however and when Kemp refuse to help, he resolves to wreak his revenge.

The Time Machine, H.G. Wells

When a Victorian scientist propels himself into the year 802,701 AD, he is initially delighted to find that suffering has been replaced by beauty, contentment and peace. Entranced at first by the Eloi, an elfin species descended from man, he soon realises that this beautiful people are simply remnants of a once-great culture now weak and childishly afraid of the dark. They have every reason to be afraid: in deep tunnels beneath their paradise lurks another race descended from humanity the sinister Morlocks. And when the scientist's time machine vanishes, it becomes clear he must search these tunnels, if he is ever to return to his own era.

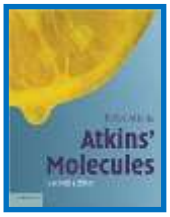
War Of The Worlds, H.G. Wells

The night after a shooting star is seen streaking through the sky from Mars, a cylinder is discovered on Horsell Common in London. At first, naive locals approach the cylinder armed just with a white flag only to be quickly killed by an all-destroying heat-ray, as terrifying tentacled invaders emerge. Soon the whole of human civilisation is under threat, as powerful Martians build gigantic killing machines, destroy all in their path with black gas and burning rays, and feast on the warm blood of trapped, still-living human prey. The forces of the Earth, however, may prove harder to beat than they at first appear.

20,000 Leagues Under The Sea, Jules Verne

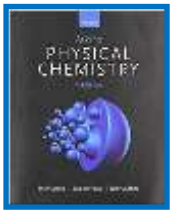
Professor Aronnax, his faithful servant, Conseil, and the Canadian harpooner, Ned Land, begin an extremely hazardous voyage to rid the seas of a little-known and terrifying sea monster. However, the 'monster' turns out to be a giant submarine, commanded by the mysterious Captain Nemo, by whom they are soon held captive. So begins not only one of the great adventure classics by Jules Verne, the 'Father of Science Fiction', but also a truly fantastic voyage from the lost city of Atlantis to the South Pole.

Chemistry



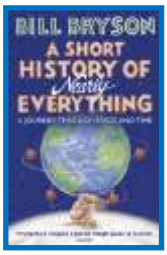
Atkins' Molecules, Peter Atkins

In 'Atkins' Molecules', we see the molecules responsible for the experiences of our everyday life – including fabrics, drugs, plastics, explosives, detergents, fragrances, tastes and sex. With engaging prose Peter Atkins gives a non-technical account of an incredible range of aspects of the world around us, showing unexpected connections, and giving an insight into how this amazing world can be understood in terms of the atoms and molecules from which it is built. The second edition includes dozens of extra molecules, graphical presentation, and an even more accessible and enthralling account of the molecules themselves.



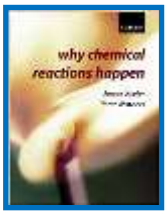
Physical Chemistry, P.W. Atkins

The text has been enhanced with additional learning features and maths support to demonstrate the absolute centrality of mathematics to physical chemistry. Increasing the digestibility of the text in this new approach, the reader is brought to a question, then the maths is used to show how it can be answered and progress made. The expanded and redistributed maths support also includes a greatly increased number of 'Chemist's toolkits' which provide students with succinct reminders of mathematical concepts and techniques right where they need them. Checklists of key concepts at the end of each topic add to the extensive learning support provided throughout the book, to reinforce the main take-home messages in each section.



A Short History Of Nearly Everything, Bill Bryson

Bill Bryson describes himself as a reluctant traveller, but even when he stays safely at home he can't contain his curiosity about the world around him. 'A Short History of Nearly Everything' is his quest to understand everything that has happened from the Big Bang to the rise of civilisation – how we got from there, being nothing at all, to here, being us. His challenge is to take subjects like geology, chemistry and particle physics, and see if there isn't some way to render them comprehensible to people who have never thought they could be interested in science. The ultimate eye-opening journey through time and space, revealing the world in a way most of us have never seen it before.



Why Chemical Reactions Happen, James Keeler

By tackling the most central ideas in chemistry, 'Why Chemical Reactions Happen' provides the reader with all the tools and concepts needed to think like a chemist. The text takes a unified approach to the subject, aiming to help the reader develop a real overview of chemical processes, by avoiding the traditional divisions of physical, inorganic and organic chemistry. To understand how chemical reactions happen we need to know about the bonding in molecules, how molecules interact, what determines whether an interaction is favorable or not, and what the outcome will be. Answering these questions requires an understanding of topics from quantum mechanics, through thermodynamics, to 'curly arrows'. In this book all of these topics are presented in a coherent and coordinated fashion, showing how each leads to a deeper understanding of chemical reactions.

Parasite Rex, Carl Zimmer

For decades parasites were the pariahs of science. Only recently have biologists begun to appreciate that these diverse and complex organisms are the most highly evolved life forms on earth. In this work, Carl Zimmer takes the reader on a tour of the strange and bizarre world that parasites inhabit, and recounts the voyages of these wonders of creation. Parasites can: rewrite DNA; rewire the brain; genetically engineer viruses as weapons; and turn healthy hosts into the living dead. This book follows researchers in parasitology as they attempt to penetrate the mysteries of these omnipotent creatures which control evolution, ecosystems and perhaps the future of the human race.

Chemistry Fiction Selection

Trouble With Lichen, John Wyndham

Francis Saxover and Diana Brackley, two scientists investigating a rare lichen, discover it has a remarkable property: it retards the aging process. Francis, realising the implications for the world of an ever-youthful, wealthy elite, wants to keep it secret, but Diana sees an opportunity to overturn the male status quo by using the lichen to inspire a feminist revolution. As each scientist wrestles with the implications and practicalities of exploiting the discovery, the world comes ever closer to learning the truth …'Trouble With Lichen' is a scintillating story of the power wielded by science in our lives and asks how much trust should we place in those we appoint to be its guardians?

Oxford University Resource Hub – Chemistry

https://www.bps.ac.uk/education-engagement/ambassadors-scheme-and-engagement/ambassadors-scheme/ambassador-resources

https://www.youtube.com/watch?v=dU5oOeXRTjE&list=PLWTqyLGDhzHBbu6oEgiHEFayR5xe-ukXs&index=15&t=0s

https://edu.rsc.org/future-in-chemistry/

https://www.rsc.org/periodic-table

https://www.rsc.org/

https://www.thenakedscientists.com/

https://www.youtube.com/watch?v=tPMW5q7EHpw&list=PLWTqyLGDhzHBbu6oEgiHEFayR5xe-ukXs&index=2&t=0s

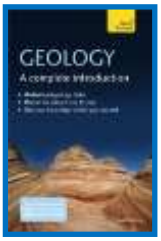
Earth Science/Geography

Atmosphere, Weather and Climate, Roger Barry

Acknowledged as the most comprehensive guide to the earth's weather processes, climatic conditions, and human impacts on climate change, it contains the most topical issues of global change and responses to climate, and the latest scientific ideas, expressed in a clear, non-mathematical manner. Includes: extended coverage of regional climates (Australasia, sub-arctic and polar regions, and the former USSR); updated analysis of global warming, desertification, mid-latitude synoptic systems, local climates, the role of the oceans and atmosphere/earth/ocean interactions; new sections on thunderstorms, teleconnections, typhoon paths over Asia, Australian monsoons, boreal forest and tropical urban climates; discussion of environmental impacts of climate change and predicted changes over the next millennium; and coverage of the 1995 IPCC results on climate trends and projected responses.

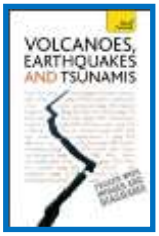
An Inconvenient Truth, Al Gore

The truth about the climate crisis is an inconvenient one meaning we are going to have to change the way we live our lives. Our climate crisis may appear to be happening slowly, but in fact it has become a true planetary emergency and we must recognise we are facing a crisis. So why is it some leaders seem not to hear the clarion warnings? Are they resisting the truth because they know the moment they acknowledge it, they will face a moral imperative to act? Is it simply more convenient to ignore the warnings? Perhaps, but inconvenient truths do not go away just because they are not seen, rather, their significance grows. Al Gore, former Vice President of the United States, has been a passionate advocate of action to halt climate change for many years. He writes about the urgent need to solve the problems of climate change, presenting comprehensive facts and information on all aspects of global warming in a direct, thoughtful and compelling way, using explanatory diagrams and dramatic photos to highlight key issues.



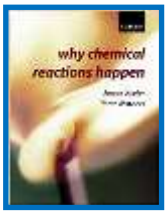
Geology: A Complete Introduction, David Rothery

What processes and physical materials have shaped the planet we live on? Why do earthquakes happen? And what can geology teach us about contemporary issues such as climate change? From volcanoes and glaciers to fossils and rock formations, this user-friendly book gives a structured and thorough overview of the geology of planet Earth and beyond. Geology: A Complete Introduction outlines the basics in clear English, and provides added-value features like a glossary of the essential jargon terms, links to useful websites, and examples of questions you might be asked in a seminar or exam. Topics covered include the Earth's structure, earthquakes, plate tectonics, volcanoes, igneous intrusions, metamorphism, weathering, erosion, deposition, deformation, physical resources, past life and fossils, the history of the Earth, Solar System geology, and geological fieldwork. There are useful appendices on minerals, rock names and geological time. Whether you are preparing for an essay, studying for an exam or simply want to enrich your hobby or expand your knowledge, this is your essential guide.



Volcanoes, Earthquakes And Tsunamis: Teach Yourself, David Rothery

Is this the right book for me? It covers plate tectonics, the intricacies and effects of each phenomenon as well as the impact they have on each other, how they can be predicted and, if possible, controlled. Includes: How the Earth moves; Family relationships; Types of volcano; Volcanic hazards; Volcanoes and climate; Monitoring volcanoes; Living with volcanoes; Tectonic earthquakes; Living with earthquakes; Tsunamis. Learn effortlessly with a new easy-to-read page design and interactive features: One, five and ten-minute introductions to key principles to get you started. Author insights with lots of instant help with common problems and quick tips for success. Tests in the book and online help to keep track of your progress. Extra online articles give a richer understanding of the subject. Quick refreshers to help you remember the key facts as well as innovative exercises illustrate what you've learnt and how to use it.



Colliding Continents: A Geological Exploration Of The Himalaya Karakoram And Tibet, Mike Searle

The crash of the Indian plate into Asia is the biggest known collision in geological history, and it continues today. The result is the Himalaya and Karakoram – one of the largest mountain ranges on Earth. The Karakoram has half of the world's highest mountains and a reputation as being one of the most remote and savage ranges of all. Mike Searle, a geologist at the University of Oxford and one of the most experienced field geologists of our time, presents a rich account of the geological forces that were involved in creating these mountain ranges. Using his personal accounts of extreme mountaineering and research in the region, he pieces together the geological processes that formed such impressive peaks.

Earth Science/Geographical Fiction Selection

Heart Of Darkness, Joseph Conrad

A haunting Modernist masterpiece and the inspiration for Francis Ford Coppola's 'Apocalypse Now', 'Heart of Darkness' explores the limits of human experience and the nightmarish realities of imperialism. Conrad's narrator Marlow, a seaman and wanderer, recounts his physical and psychological journey in search of the infamous ivory trader Kurtz: dying, insane, and guilty of unspeakable atrocities. Travelling upriver to the heart of the African continent, he gradually becomes obsessed by this enigmatic, wraith-like figure. Marlow's discovery of how Kurtz has gained his position of power over the local people involves him in a radical questioning, not only of his own nature and values, but also those of western civilisation.

Memoirs Of A Geisha, Arthur Golden

A young peasant girl is sold as servant and apprentice to a renowned geisha house. Many years later she tells her story from a hotel in New York, opening a window into an extraordinary half-hidden world of eroticism and enchantment, exploitation and degradation and summoning up a quarter of a century of Japan's dramatic history.

The Territory, Sarah Govett

Noa lives in what's left of a Britain where flooding means land is scarce. Everyone must sit an exam at 15: if you pass you can stay in the Territory, if you fail you must go to the Wetlands. Rich families can buy their children an upgrade to help, but 'Norms' like Noa must succeed on their own merits. Noa is a bright, funny teenager, not sure which boy she likes, devoted to her friends. The book follows her as she and her friends face the exam. Who will pass and who will fail?

The Kite Runner, Khaled Hosseini

Afghanistan, 1975: 12-year-old Amir is desperate to win the local kite-fighting tournament and his loyal friend Hassan promises to help him. But neither of the boys can foresee what will happen to Hassan that afternoon, an event that is to shatter their lives. After the Russians invade and the family is forced to flee to America, Amir realises that one day he must return to Afghanistan under Taliban rule to find the one thing that his new world cannot grant him: redemption.

A Thousand Splendid Suns, Khaled Hosseini

Mariam is only 15 when she is sent to Kabul to marry Rasheed. Nearly two decades later, a friendship grows between Mariam and a local teenager, Laila, as strong as the ties between mother and daughter. When the Taliban take over, life becomes a desperate struggle against starvation, brutality and fear. Yet love can move a person to act in unexpected ways, and lead them to overcome the most daunting obstacles with a startling heroism.

The Jungle Book, Rudyard Kipling

'The Jungle Book' is a classic story of friendship between man and beast. Saved from the jaws of the evil tiger Shere Khan, young Mowgli is adopted by a wolf pack and taught the law of the jungle by lovable old Baloo the bear and Bhageera the panther.

The Girl With The Dragon Tattoo, Stieg Larsson

Forty years ago, Harriet Vanger disappeared from a family gathering on the island owned and inhabited by the powerful and secretive Vanger clan. Her body was never found, yet her uncle is convinced it was murder – and the killer is a member of his own tightly knit but dysfunctional family. He employs disgraced financial journalist Mikael Blomkvist and the tattooed, truculent computer hacker Lisbeth Salander to investigate. When the pair link Harriet's disappearance to a number of grotesque murders from 40 years ago, they begin to unravel a dark and appalling family history. Blomkvist and Salander are about to find out just how far they are prepared to go to protect themselves.

Call Of The Wild, Jack London

Set in Alaska during the Klondike Gold Rush of the late 1890s, 'Call of the Wild' is about Buck, the magnificent cross-bred offspring of a St Bernard and a Scottish Collie. Stolen from his pampered life on a Californian estate and shipped to the Klondike to work as a sledge dog, he triumphs over his circumstances and becomes the leader of a wolf pack. Records the 'decivilisation' of Buck as he answers 'the call of the wild', an inherent memory of origins to which he instinctively responds.

A Game Of Thrones, George R.R. Martin

Summers span decades. Winter can last a lifetime. And the struggle for the Iron Throne has begun. As Warden of the north, Lord Eddard Stark counts it a curse when King Robert bestows on him the office of the Hand. His honour weighs him down at court where a true man does what he will, not what he must…and a dead enemy is a thing of beauty. The old gods have no power in the south, Stark's family is split and there is treachery at court. Worse, the vengeance-mad heir of the deposed Dragon King has grown to maturity in exile in the Free Cities. He claims the Iron Throne.

Love In The Time Of Cholera, G.G. Marquez

Florentino Ariza is a hopeless romantic who falls passionately for the beautiful Fermina Daza, but finds his love tragically rejected. Instead Fermina marries distinguished doctor Juvenal Urbino, while Florentino can only wait silently for her. He can never forget his first and only true love. Then, 51 years, nine months and four days later, Fermina's husband dies unexpectedly. At last Florentino has another chance to declare his feelings and discover if a passion that has endured for half a century will remain unrequited, in a rich, fantastical and humane celebration of love in all its many forms.

The No. 1 Ladies' Detective Agency, Alexander McCall Smith

Wayward daughters. Missing Husbands. Philandering partners. Curious conmen. If you've got a problem, and no one else can help you, then pay a visit to Precious Ramotswe, Botswana's only – and finest – female private detective. Her methods may not be conventional, and her manner not exactly Miss Marple, but she's got warmth, wit and canny intuition on her side, not to mention Mr J.L.B. Matekoni, the charming proprietor of Tlokweng Road Speedy Motors. And Precious is going to need them all as she sets out on the trail of a missing child, a case that tumbles our heroine into a hotbed of strange situations and more than a little danger…

Sarah's Key, Tatiana de Rosnay

Sarah, a 10-year-old Jewish girl, is arrested by the French police in the middle of the night, along with her mother and father. Desperate to protect her younger brother, she locks him in a cupboard and promises to come back for him as soon as she can. Paris, May 2002. Julia Jarmond, an American journalist, is asked to write about the 60th anniversary of the Vel' d'Hiv' roundup – the infamous day in 1942 when French police rounded up thousands of Jewish men, women and children, in order to send them to concentration camps. Sarah's Key is the poignant story of two families, forever linked and haunted by one of the darkest days in France's past. In this emotionally intense, page-turning novel,

Tatiana de Rosnay reveals the guilt brought on by long-buried secrets and the damage that the truth can inflict when they finally come unravelled.

East Of Eden, John Steinbeck

California's fertile Salinas Valley is home to two families whose destinies are fruitfully, and fatally, intertwined. Over the generations, between the beginning of the 20th century and the end of the First World War, the Trasks and the Hamiltons will helplessly replay the fall of Adam and Eve and the murderous rivalry of Cain and Abel. East of Eden was considered by Steinbeck to be his *magnum opus*, and its epic scope and memorable characters, exploring universal themes of love and identity, ensure it remains one of America's most enduring novels.

Treasure Island, R.L. Stevenson

When a mysterious sailor dies in sinister circumstances at the Admiral Benbow inn, young Jim Hawkins stumbles across a treasure map among the dead man's possessions. But Jim soon becomes only too aware that he is not the only one who knows of the map's existence, and his bravery and cunning are tested to the full when, with his friends Squire Trelawney and Dr Livesey, he sets sail in the Hispaniola to track down the treasure. With its swift-moving plot and memorably drawn characters – Blind Pew and Black Dog, the castaway Ben Gunn and the charming but dangerous Long John Silver – Stevenson's tale of pirates, treachery and heroism was an immediate success when it was first published in 1883 and has retained its place as one of the greatest of all adventure stories.

Anna Karenina, Leo Tolstoy

In 1872 the mistress of a neighbouring landowner threw herself under a train at a station near Tolstoy's home. This gave Tolstoy the starting point he needed for composing what many believe to be the greatest novel ever written. In writing Anna Karenina he moved away from the vast historical sweep of 'War and Peace' to tell, with extraordinary understanding, the story of an aristocratic woman who brings ruin on herself. Anna's tragedy is interwoven with not only the courtship and marriage of Kitty and Levin but also the lives of many other characters. Rich in incident, powerful in characterisation, the novel also expresses Tolstoy's own moral vision.

The Adventures Of Tom Sawyer, Mark Twain

Taken from the famous episodes of the whitewashed fence and the ordeal in the cave to the trial of Injun Joe, 'The Adventures of Tom Sawyer' is redolent of life in the Mississippi River towns in which Twain spent his own youth. A somber undercurrent flows through the high humour and unabashed nostalgia of the novel; however, for beneath the innocence of childhood lie the inequities of adult reality – base emotions and superstitions, murder and revenge, starvation and slavery.

For more context about this book, read:
https://www.theguardian.com/books/booksblog/2011/jan/05/censoring-mark-twain-n-word-unacceptable

Hallowed Ground, Paul Twivy

Namibia – a country of foggy skeleton coasts; buried goldmines, shocking secrets and awe-inspiring sand dunes. Across the face of its deserts are hundreds of miles of 'fairy circles': vast enough to be seen from space. They grow and die with the same lifespan as humans, yet no one has been able to explain why or how they appear. One day, three teenagers and their families arrive from different parts of the globe. Helped by bushmen, the buried possessions of a Victorian explorer, and a uniquely spotless, golden leopard, they solve the mystery of the African Circles. What will they discover beneath this hallowed ground? And how will it change the future of the planet above it?

Journey To The Centre Of The Earth, Jules Verne

The father of science fiction, Jules Verne, invites you to join the intrepid and eccentric Professor Liedenbrock and his companions on a thrilling and dramatic expedition as they travel down a secret tunnel in a volcano in Iceland on a journey which will lead them to the centre of the earth. Along the way they encounter various hazards and witness many incredible sights such as the underground forest, illuminated by electricity, the Great Geyser, the battle between prehistoric monsters, the strange whispering gallery, giant insects and the vast subterranean sea with its ferocious whirlpool.

Chinese Cinderella, Adeline Yen Mah

Jung-ling's family considers her bad luck because her mother died giving birth to her. They discriminate against her and make her feel unwanted yet she yearns and continuously strives for her parents' love. Her stepmother is vindictive and cruel and her father dismissive. Jung-ling grows up to be an academic child, with a natural ability for writing. Only her aunt and grandfather offer her any love and kindness. The story is of survival in the light of the mental and physical cruelty of her stepmother and the disloyalty of her siblings. Jung-ling blossoms in spite of everything and the story ends as her father agrees to let her study in England.

Falling Leaves: The True Story Of An Unwanted Chinese Daughter, Adeline Yen Mah

An unwanted Chinese daughter growing up during the Communist Revolution, blamed for her mother's death, ignored by her millionaire father and unwanted by her Eurasian stepmother. A story of greed, hatred and jealousy; a domestic drama is played against the extraordinary political events in China and Hong Kong. Written with the emotional force of a novel but with a vividness drawn from a personal and political background, 'Falling Leaves' has been an enduring bestseller all over the world.

Oxford University Resource Hub – Geography

http://geographical.co.uk/

https://www.bbc.co.uk/programmes/b006r4wn

https://www.gresham.ac.uk/watch/?subject=science&subcat=environment

https://www.gresham.ac.uk/watch/?subject=science

https://www.nationalgeographic.com/

https://www.youtube.com/watch?v=wDoYNeQW2r4&list=PLWTqyLGDhzHBbu6oEgiHEFayR5xe-ukXs&index=4&t=0s

https://www.youtube.com/watch?v=s-CZu83wqHY

http://www.bgs.ac.uk/discoveringGeology/home.html

Engineering/Physics

The Fly In The Cathedral, Brian Cathcart

How a Group of Cambridge Scientists Won the International Race to Split the Atom. Recreating the frustrations, excitements, and obsessions of 1932, the 'miracle year' of British physics, Brian Cathcart reveals in rich detail the astonishing story behind the splitting of the atom.

The Wonders Of The Solar System, Brian Cox

Professor Brian Cox takes us on a journey of discovery where alien worlds from your imagination become places we can see, feel and visit: from the giant ice fountains of Enceladus to the liquid methane seas of Titan and from storms twice the size of the Earth to the tortured moon of Io with its giant super-volcanoes – this is the Solar System as you have never seen it before. You will be introduced to the planets and moons beyond our world, finding the biggest, most bizarre, most powerful natural phenomena. Using the latest scientific imagery along with cutting edge CGI and some of the most spectacular and extreme locations on Earth, Brian will show us Wonders never thought possible. Employing his trademark clear, authoritative, yet down-to-earth approach, Brian will explore how these previously unseen phenomena have dramatically expanded our horizons with new discoveries about the planets, their moons and how they came to be the way they are.

The Wonders Of The Universe, Brian Cox

This is another insightful and mind-blowing exploration of space. This time Professor Cox shows us our universe as we've never seen it before. 13.7 billion years old. 93 billion light years wide. It contains over 100 billion galaxies, each containing hundreds of billions of stars. This infinite, vast and complex Universe has been the subject of human fascination and scientific exploration for thousands of years. The wonders of the Universe might seem alien to us and impossible to understand, but away from the telescopes, the labs and the white coats, Professor Brian Cox uses the evidence found in the natural world around us to explain its simple truths. The same laws of light, gravity, time, matter and energy that govern us here on Earth are the same as those applied in the Universe. Using 3D CGI imagery, his expert knowledge and his infectious enthusiasm, Professor Cox shows us that if we can understand the impact of these governing laws on Earth it will bring us a step closer to an understanding of our Universe.

Why Does E = mc^2 ?, Brian Cox and Jeff Forshaw

What does E=mc^2 actually mean? Dr. Brian Cox and Professor Jeff Forshaw go on a journey to the frontier of 21st century science to unpack Einstein's famous equation. Explaining and simplifying notions of energy, mass, and light, while exploding commonly held misconceptions, they demonstrate how the structure of nature itself is contained within this equation. Along the way, we visit the site of one of the largest scientific experiments ever conducted: the now-famous Large Hadron Collider, a gigantic particle accelerator capable of recreating conditions that existed fractions of a second after the Big Bang. A collaboration between one of the youngest professors in the United Kingdom and a distinguished popular physicist, this is one of the most exciting and accessible explanations of the theory of relativity.

Surely You're Joking Mr Feynman!: Adventure Of A Curious Character, Richard P. Feynman

Winner of the Nobel Prize for Physics in 1965, Richard Feynman was one of the world's greatest theoretical physicists, but he was also a man who fell, often jumped, into adventure. An artist, safecracker, practical joker and storyteller, Feynman's life was a series of combustible combinations made possible by his unique mixture of high intelligence, unquenchable curiosity and eternal scepticism. Over a period of years, Feynman's conversations with his friend Ralph Leighton were first taped and then set down as they appear here, little changed from their spoken form, giving a wise, funny, passionate and totally honest self-portrait of one of the greatest men of our age.

The Elegant Universe, Brian Greene

In a rare blend of scientific insight and writing as elegant as the theories it explains, Brian Greene, one of the world's leading string theorists, peels away the layers of mystery surrounding string theory to reveal a universe that consists of 11 dimensions where all matter is generated by the vibrations of microscopically tiny loops of energy. Greene uses everything from an amusement park ride to ants on a garden hose to explain the beautiful yet bizarre realities that modern physics is unveiling. Dazzling in its brilliance, unprecedented in its ability to both illuminate and entertain, 'The Elegant Universe' is a tour de force of scientific writing – a delightful, lucid voyage through modern physics that brings us closer to understanding how the universe works.

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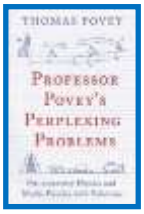


Professor Povey's Perplexing Problems: Pre-University Physics and Puzzles With Solutions, Thomas Povey

Whether you are an aspiring scientist or an old-hand, pitting yourself against these 109 problems will test your ability to think, and inspire you with curiosity and enthusiasm for physics. Presented with charm and wit, the questions span the gap between high-school and university-entrance standard material. Detailed answers are lightened with a fascinating and refreshing blend of scientific history, application and personal anecdote. The author shows us that behind every single one of these questions lies a new way of thinking about subjects we thought we had understood. He argues that engaging with the unfamiliar is key to forming deeper insights and developing intellectual independence.

Engineering/Physics Fiction Selection

Solar, Ian McEwan

Michael Beard is a Nobel prize-winning physicist whose best work is behind him. A compulsive womaniser, Beard finds his fifth marriage floundering. But this time it is different: his wife is having the affair, and he is still in love with her. When Beard's professional and personal worlds collide in a freak accident, an opportunity presents itself for Beard to extricate himself from his marital mess, reinvigorate his career and save the world from environmental disaster.

Hidden Figures, Margot Lee Shetterly

Set amid the civil rights movement, the true story of NASA's African-American female mathematicians who played a crucial role in America's space program. Before Neil Armstrong walked on the moon, a group of professionals worked as 'Human Computers', calculating the flight paths that would enable these historic achievements. Among these were a coterie of bright, talented African-American women. Segregated from their white counterparts, these 'colored computers' used pencil and paper to write the equations that would launch rockets, and astronauts, into space. Moving from World War II through NASA's golden age, touching on the civil rights era, the Space Race, the Cold War, and the women's rights movement, 'Hidden Figures' interweaves a rich history of mankind's greatest adventure with the intimate stories of five courageous women whose work forever changed the world.

Oxford University Resource Hub – Engineering/Physics

https://www.engineering.com/

https://exoplanets.nasa.gov/

https://www.newscientist.com/

https://i-want-to-study-engineering.org/

https://what-if.xkcd.com/

https://exoplanets.nasa.gov/alien-worlds/ways-to-find-a-planet/

https://www.gresham.ac.uk/watch/?subject=science&subcat=physics

https://www.thenakedscientists.com/

https://isaacphysics.org/about

https://www.engineergirl.org/

http://www.sixtysymbols.com/

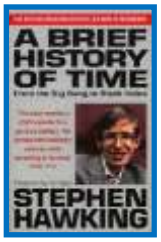
Mathematics

1089 And All That, David Acheson

David Acheson's extraordinary little book makes mathematics accessible to everyone. From very simple beginnings he takes us on a thrilling journey to some deep mathematical ideas. On the way, via Kepler and Newton, he explains what calculus really means, gives a brief history of pi, and even takes us to chaos theory and imaginary numbers. Every short chapter is carefully crafted to ensure that no one will get lost on the journey. Packed with puzzles and illustrated by world famous cartoonists, this is one of the most readable and imaginative books on mathematics ever written.

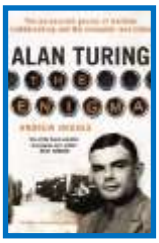
Mathematics : A Very Short Introduction, Timothy Gowers

The aim of this book is to explain, carefully but not technically, the differences between advanced, research-level mathematics, and the sort of mathematics we learn at school. The most fundamental differences are philosophical, and readers of this book will emerge with a clearer understanding of paradoxical-sounding concepts such as infinity, curved space, and imaginary numbers. The first few chapters are about general aspects of mathematical thought. These are followed by discussions of more specific topics, and the book closes with a chapter answering common sociological questions about the mathematical community (such as 'Is it true that mathematicians burn out at the age of 25?').



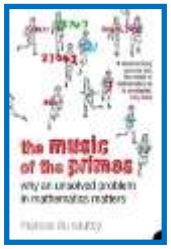
A Brief History Of Time, Stephen Hawking

Was there a beginning of time? Could time run backwards? Is the universe infinite or does it have boundaries? These are just some of the questions considered in an internationally acclaimed masterpiece which begins by reviewing the great theories of the cosmos from Newton to Einstein, before delving into the secrets which still lie at the heart of space and time.



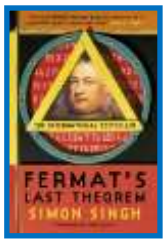
Alan Turing: The Enigma, Andrew Hodges

Andrew Hodges's biography of Alan Turing describes the brilliant Cambridge mathematician who masterminded the cracking of the German Enigma code and indeed was the father of the modern computer.



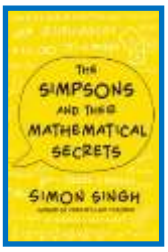
The Music Of The Primes, Marcus De Sautoy

Prime numbers are the very atoms of arithmetic. They also embody one of the most tantalising enigmas in the pursuit of human knowledge. How can one predict when the next prime number will occur? Is there a formula which could generate primes? These apparently simple questions have confounded mathematicians ever since the Ancient Greeks. In 1859, the brilliant German mathematician Bernard Riemann put forward an idea which finally seemed to reveal a magical harmony at work in the numerical landscape. The promise that these eternal, unchanging numbers would finally reveal their secret thrilled mathematicians around the world. Yet Riemann never publicly provided a proof for his hypothesis and his housekeeper burnt all his personal papers on his death. Whoever cracks Riemann's hypothesis will go down in history, for it has implications far beyond mathematics. In business, it is the lynchpin for security and e-commerce. In science, it has critical ramifications in Quantum Mechanics, Chaos Theory, and the future of computing. As yet, it remains unsolved. In this breathtaking book, mathematician Marcus du Sautoy tells the story of the eccentric and brilliant men who have struggled to solve one of the biggest mysteries in science.



Fermat's Last Theorem, Simon Singh

The story of the solving of a puzzle that has confounded mathematicians since the 17th century. The solution of Fermat's Last Theorem is the most important mathematical development of the 20th century. In 1963, a schoolboy browsing in his local library stumbled across the world's greatest mathematical problem: Fermat's Last Theorem, a puzzle that every child can understand but which has baffled mathematicians for over 300 years. Aged just 10, Andrew Wiles dreamed that he would crack it. Wiles's lifelong obsession with a seemingly simple challenge set by a long-dead Frenchman is an emotional tale of sacrifice and extraordinary determination. In the end, Wiles was forced to work in secrecy and isolation for seven years, harnessing all the power of modern maths to achieve his childhood dream.

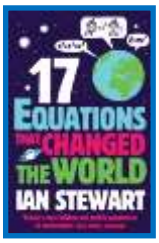


The Simpsons And Their Mathematical Secrets, Simon Singh

Some have seen philosophy embedded in episodes of The Simpsons; others have detected elements of psychology and religion. Simon Singh instead makes the compelling case that what The Simpsons' writers are most passionate about is mathematics. He reveals how the writers have drip-fed morsels of number theory into the series over the last 25 years; indeed, there are so many mathematical references in The Simpsons, and in its sister program, Futurama, that they could form the basis of an entire university course. Using specific episodes as jumping off points, from 'Bart the Genius' to 'Treehouse of Horror VI', he brings to life the most intriguing and meaningful mathematical concepts, ranging from pi and the paradox of infinity to the origins of numbers and the most profound outstanding problems that haunt today's generation of mathematicians.

Linear Algebra And Geometry, David Smart

A useful text which aims to be accessible to student who have only limited access to a teacher. In addition to ample practice exercises, with answers, there are six project exercises which encourage students to carry out more extended pieces of work.



17 Equations That Saved The World, Ian Stewart

From Newton's Law of Gravity to the Black–Scholes model used by bankers to predict the markets, equations, are everywhere – and they are fundamental to everyday life. This book examines 17 ground-breaking equations that have altered the course of human history. He explores how Pythagoras's Theorem led to GPS and Satnav; how logarithms are applied in architecture; why imaginary numbers were important in the development of the digital camera, and what is really going on with Schroedinger's cat.

Mathematics Fiction Selection

Alice In Wonderland, Lewis Carroll

So begins the tale of Alice, following a curious White Rabbit down a rabbit-hole and falling into Wonderland. A fantastical place, where nothing is quite as it seems: animals talk, nonsensical characters confuse, Mad Hatter's throw tea parties and the Queen plays croquet. Alice's attempts to find her way home become increasingly bizarre, infuriating and amazing in turn.

Beyond Infinity, Eugenia Cheung

Even small children know there are infinitely many whole numbers – start counting and you'll never reach the end. But there are also infinitely many decimal numbers between zero and one. Are these two types of infinity the same? Are they larger or smaller than each other? Can we even talk about 'larger' and 'smaller' when we talk about infinity? Eugenia Cheng reveals the inner workings of infinity. What happens when a new guest arrives at your infinite hotel – but you already have an infinite number of guests? How does infinity give Zeno's tortoise the edge in a paradoxical foot-race with Achilles? And can we really make an infinite number of cookies from a finite amount of cookie dough? Wielding an armoury of inventive, intuitive metaphor, Cheng draws beginners and enthusiasts alike into the heart of this mysterious, powerful concept to reveal fundamental truths about mathematics,
all the way from the infinitely large down to the infinitely small.

An Abundance Of Katherines, John Green

This is a beautiful tale of love, loss and not so fool proof mathematic equations. When it comes to relationships, Colin Singleton's type is girls named Katherine. And when it comes to girls named Katherine, Colin is always getting dumped. Nineteen times, to be exact. On a road trip miles from home, this anagram-happy, washed-up child prodigy has $10,000 in his pocket, a bloodthirsty feral hog on his trail, and an overweight Judge Judy-loving best friend riding shotgun – but no Katherines. Colin is on a mission to prove The Theorem of Underlying Katherine Predictability, which he hopes will predict the future of any relationship, avenge Dumpees everywhere, and finally win him the girl. Love, friendship, and a dead Austro-Hungarian archduke add up to surprising and heart-changing conclusions in this ingeniously layered comic novel about reinventing oneself.

The Oxford Murders, Guillermo Martinez

On a balmy summer's day in Oxford an old lady who once helped decipher the Enigma Code is killed. After receiving a cryptic anonymous note containing only the address and the symbol of a circle, Arthur Seldom, a leading mathematician, arrives to find the body. Then follow more murders – an elderly man on a life-support machine is found dead with needle marks in this throat; the percussionist of an orchestra at a concert at Blenheim Palace dies before the audience's very eyes, seemingly unconnected except for notes appearing in the maths department, for the attention of Seldom. Why is he being targeted as the recipient of these coded messages? All he can conjecture is that it might relate to his latest book, a bestseller about serial killers and the parallels between investigations into their crimes and certain mathematical theorems. It is left to Seldom and a postgraduate mathematics student to work out the key to the series of symbols before the killer strikes again.

The Curious Incident Of The Dog At Night Time, Mark Haddon

The Curious Incident of the Dog in the Night Time is a murder mystery novel like no other. The detective, and narrator, is Christopher Boone. Christopher is 15 and has Asperger's, a form of autism. He knows a very great deal about maths and very little about human beings. He loves lists, patterns and the truth. He hates the colours yellow and brown and being touched. He has never gone further than the end of the road on his own, but when he finds a neighbour's dog murdered he sets out on a terrifying journey which will turn his whole world upside down.

Arcadia, Tom Stoppard

In a large country house in Derbyshire in April 1809 sits Lady Thomasina Coverly, aged 13, and her tutor, Septimus Hodge. Through the window may be seen some of the '500 acres inclusive of lake' where Capability Brown's idealised landscape is about to give way to the 'picturesque' Gothic style: 'everything but vampires', as the garden historian Hannah Jarvis remarks to Bernard Nightingale when they stand in the same room 180 years later. Bernard has arrived to uncover the scandal which is said to have taken place when Lord Byron stayed at Sidley Park. Tom Stoppard's absorbing play takes us back and forth between the centuries and explores the nature of truth and time, the difference between the Classical and the Romantic temperament, and the disruptive influence of sex on our orbits in life – 'the attraction', as Hannah says, 'which Newton left out'.

Oxford University Resource Hub – Mathematics

https://www.youtube.com/singingbanana

https://www.gresham.ac.uk/watch/?subject=mathematics

https://plus.maths.org/content/

https://www.bbc.co.uk/programmes/b00srz5b

https://undergroundmathematics.org/

https://amsp.org.uk/

https://wild.maths.org/

https://nrich.maths.org/frontpage

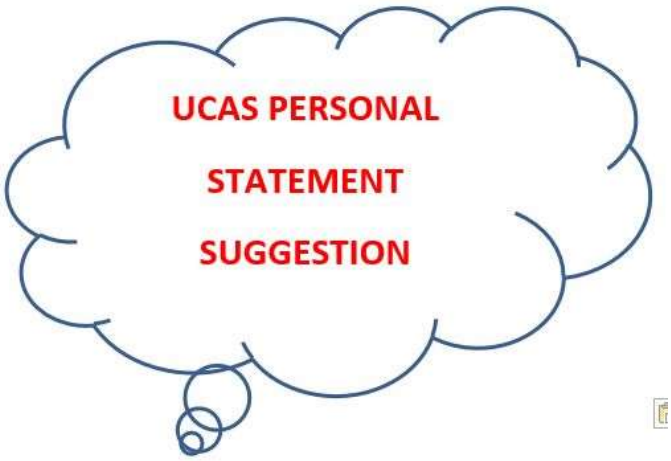
https://sport.maths.org/content/KS5

https://www.youtube.com/watch?v=4ucTSZYatDk&list=PLWTqyLGDhzHBbu6oEgiHEFayR5xe-ukXs&index=8&t=0s

https://isaacphysics.org/about

https://www.youtube.com/channel/UCvp7jsbXjx2k8sGEkdtWCAw

https://www.numberphile.com/



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