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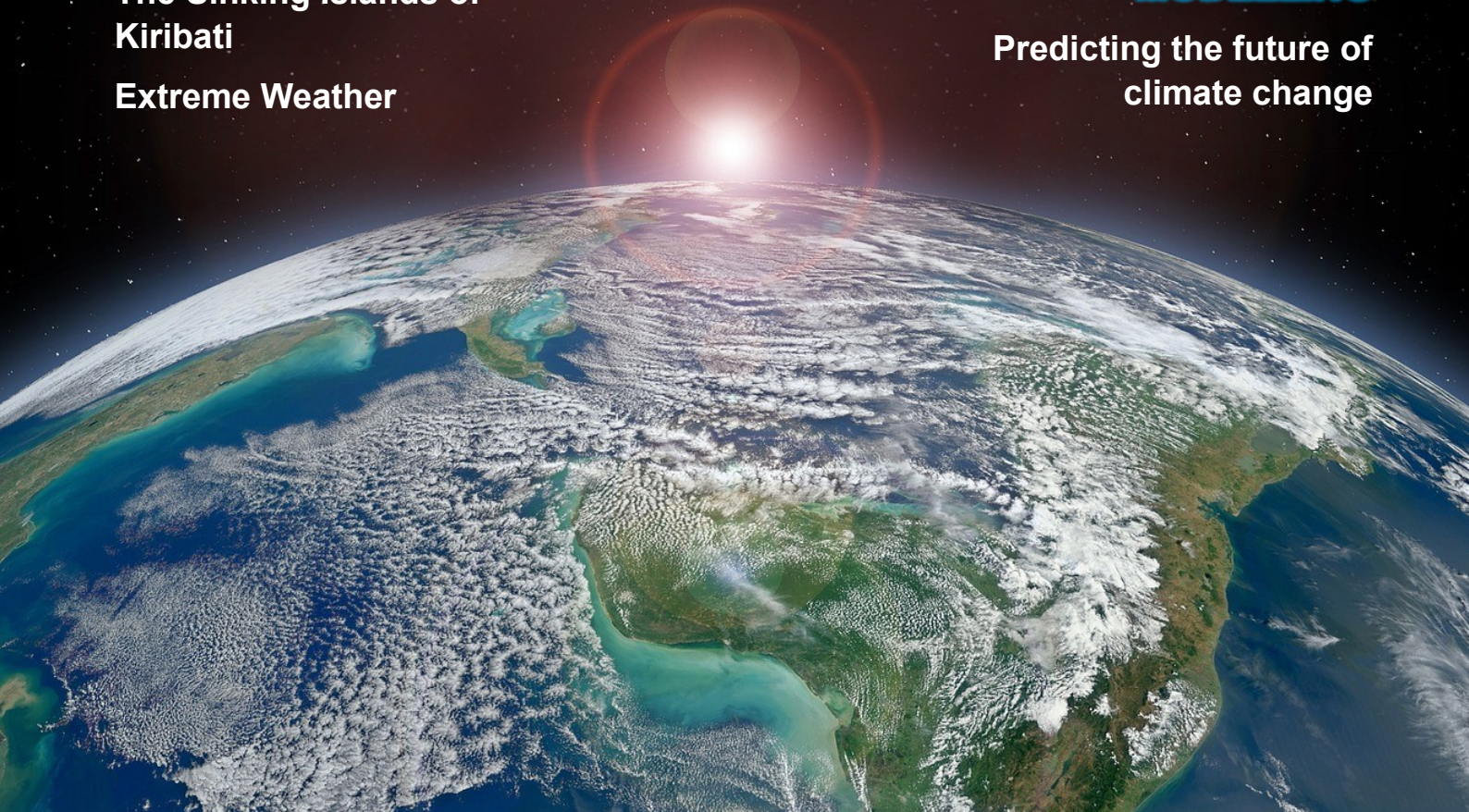


The Importance of COP26 for the Future of the Planet

By Miss Denison
(Head of Geography)

COP26 was the 2021 United Nations climate change conference, the 26th annual summit of its kind. For nearly thirty years, since the first conference in Berlin in 1995, the UN has been bringing together almost every country on earth for global climate summits – called COPs – which stands for 'Conference of the Parties'. World leaders arrived in Scotland from 31 October to 12 November for twelve days of talks. Most experts believed that COP26 had a unique urgency as climate change is a top global priority.

Under the Paris Agreement created at COP21 in Paris 2015, countries committed to bring forward national plans setting out how much they would reduce their emissions- known as Nationally Determined Contributions (NDCs) and agreed that every five years they would come back with an updated plan, which would reflect their highest possible ambition at that time. Glasgow was therefore the moment for countries to update their plans and make renewed commitments, which was particularly important as the commitments made in Paris did not come close to achieving this goal.

With a report from the Intergovernmental Panel on Climate Change (IPCC) released in August 2021, which concluded that global temperatures are very likely to rise to 1.5°C above pre-industrial levels in the next few decades and that human-generated greenhouse gas emissions are unequivocally the cause, action needed to be taken at Glasgow. The world can look to inspiration for change from Climate Heroes already found on the continent of Africa. Women like Isatou Ceesay (Queen of Recycling in Gambia) and Vanessa Nakate (founder of the Rise Up Climate Movement in Africa) show us with their work and activism how change can be brought about at not only a local level but a national one.

Several key agreements came out of the Glasgow summit including on issues of deforestation, methane reduction, agricultural innovation and increasing the resilience of two billion people in the world's poorest countries. On the extended thirteenth day of the summit, a pact was finally agreed upon with a disappointment felt by most activists seeing a reduction in the strength of language surrounding the "phasing down", rather than "phasing out" of coal. It therefore remains to be seen how effective this important summit was in meeting its earth-saving aims.

Wilson's School also saw this conference as an important moment to raise the awareness of climate change amongst staff and students and to hear from the voices of the students for whom this issue will be the defining issue of their lifetime. Therefore, in this newsletter you will find a collection of articles, including a poem, from students across a variety of departments and year groups giving their opinion on the importance of this conference, but more importantly setting out their thoughts on its impacts and potential future solutions.

What is the Anthropocene?

By Vivaan (Y9)

This week, global leaders from all over the world gathered in Edinburgh, in order to discuss a topic only aliens wouldn't know about: climate change. COP26 took place this year as a part of something bigger, a part of the global effort to combat climate change. But we often find ourselves wondering how we ended up in this rather precarious situation. Why are we the ones having to face a literal existential crisis?

And so I present to you a rather controversial topic: the Anthropocene. To understand the Anthropocene, we need to understand how the Earth was before it ended up as the rock floating through space we all know and love. The Earth has a jam-packed history full of ice ages, mass extinctions, asteroid collisions, super volcanic eruptions and much more, and the smallest unit we've decided to split up the Earth's history into are called epochs.

We've split the Earth's 4.5 billion year history into little segments called epochs

and we could be at the start of a new segment, the Anthropocene. The International Union of Geological Sciences is responsible for formalising the history of our Earth into epochs and currently, by definition, we are still in an epoch called the Holocene. The Holocene has had a relatively short span of just over 11,500 years, but the Anthropocene seems to be the new kid on the block; a new epoch starts to see its emergence when there's been a profound impact on the Earth's rock itself. This time, our actions: habitat destruction, environmental pollution and animal extinctions have been so great, they'll definitely make an impact on the geology of crust, some scientists say.

So what does this mean for you? Surely some artificial and arbitrary boundary in the history of the Earth won't affect your daily lives, will it? Well, the push for the formal declaration of the Anthropocene is more than scientific curiosity. A statement of such importance will hopefully be a method of encouraging the normal people to fight more against a radically changing world; it should encourage them to reduce carbon emissions and slow down biodiversity loss. So don't be reliant on a message from further up: take matters into your own hands and protect what matters to you.

What is the History of our Relationship with the Climate?

By Zach and Dylan (Y9)

Romans and Greeks had a surprisingly modern view of climate change and the environment, even practising vegetarianism. One Greek historian in particular, named Plutarch, wrote about environmental issues, saying, "Water is the principle, or the element, of things. All things are water." This is proved by the Romans' extensive water distribution and sewage networks, through aqueducts and other architectural feats, whilst manufacturers that produced smoke were built away from their citizens so they weren't affected by air pollution.

Roman Emperor Justinian in the sixth century even declared that, "By the law of nature these things are common to mankind - the air, running water, the sea and consequently its shores." However, they were advanced further still, when they invented a way to warm the interior of homes with solar energy - an idea first implemented by the Greeks but advanced by the Romans. The technique worked through placing glass in the rays of the sun to capture more of the heat and store it within the masonry of their homes and bath-houses.

Despite this, climate change also had a role to play in the downfall of the Roman Empire through the increasing volcanic activity towards the empire's decline. In the beginning of the Roman Empire, builders benefited from warm, wet and stable weather that supported economic growth in an agricultural society. The very foundations of Rome were built from this favourable climate and so as it declined, the fall of its cities were inevitable. Ice core experts and dendro-chronologists have found that from the 530s -540s there was immense volcanic activity - the worst that had been seen in a thousand years, which during this time of

political fragmentation, only worsened the state of the empire. Overall, the fall of Rome still remains the greatest setback of human history, including when it comes to environmental protection.

Furthermore, both the Greek and Roman civilisations had something in common - they were undermined by their exploitation of the environment. The Greeks started a trend of deforestation and in the centuries to come it spread to the Roman Empire as well. But whereas the Greeks had noticed the impacts they had on the environment and realised that they were stripping the land bare, the Romans viewed their environment as something to be used for human benefit, to be used as a tool instead of to be protected. Plato once described the area around Athens as “What now remains compared with what then existed is like the skeleton of a sick man, all the fat and soft earth having wasted away, and only the bare framework of the land being left." Quite amusingly, one of the Greeks’ main enemies in terms of the environment were goats, the “horned locusts'' that destroyed much of the vegetation wherever they were introduced.

On the other hand, the Romans not only used the wildlife for food but for entertainment in their “games”. Thousands of beasts were pitted against each other in

lethal matches for the people’s entertainment. One celebration of the Romans conquest of modern Romania involved the killing of eleven thousand animals in “games”. The depletion of soils, and the exhaustion of mines were also factors in the fall of Rome's Empire. So, both the Roman Empire and Greek civilisation were toppled partially by the fact that they suffered too heavily from deforestation and the Greeks were beaten by goats!

COP26: Who is at the Table and Why this Matters?

By Alex (Y13)

COP26 marks the twenty-sixth meeting of UN countries to aim to tackle climate change. Much focus is often given to what is said, but, perhaps, it is equally important to analyse who says it as this may give us an insight into the possibility of targets being realised. Whilst COP26 is ostensibly a meeting of one hundred and ninety seven states, it involves, both officially and unofficially, a far wider range of parties – each of whom can influence the path of action to tackle climate change. The most obvious category involved is, perhaps, states or governments represented by teams of delegates and their leaders within the COP conference room. Many states do, indeed, recognise the importance of tackling climate change, but it is important to take note of other motivations political leaders may have at COP26. These motivations, though far from obvious or explicit, do not necessarily prevent action to tackle climate change but may dilute the purity of concern.

Closer to home, we can take the example of our own Government and Boris Johnson's actions. It may be unclear as to whether his jocular and boosterish remarks like "isn't it easy being green" or "feeding humans to animals" to solve biodiversity truly reflects stark enlightenment away from the days he endorsed climate change deniers or a continuation of such thoughts. Nevertheless, the headline-grabbing slogans do demonstrate a powerfully political desire for prestige and attention in his involvement with COP26. COP26 marks an opportunity for Johnson to resolve many non-climate related issues and boost his own political appearance and he is highly aware of this and eager to capitalise on the situation. First and foremost, the opportunity allows Johnson to define the role of the "Global Britain" he promised in his manifesto in a time when the country's international standing is becoming increasingly ambiguous with its severing of ties with groups such as the EU. Johnson can use prominence at COP26 to define Britain as a climate champion on the world stage, boosting both our and his own political prestige.

Furthermore, the choice of the Glasgow location, though in parts, for the area's climate credentials, is not apolitical. By hosting a UK event in Scotland, Johnson aims to increase a sense of union between the four nations of the UK in a political climate of increased anti-union sentiment in Scotland with the rise of the SNP. The Government's choice of a non-London or even non-English location is a deliberate political choice to counter suggestions of a London-centric political system and appease, if not win over, regional supporters of independence. Therefore, it is clear that state involvement in COP26 has clearly political and non-climate motivations. Such motivations are not exclusive to the Johnsonian Government either: Joe Biden,

for example, will use this conference as a moment to define the US's role on the world stage, hoping to divert attention away from the previous administrations and its aftermath .

Their subsequent, state involvement in COP26 is therefore certainly not exclusively about 'solving' climate change: this is but a small portion of politicians' and statesmen's concerns. Some criticise this ulterior motivation: climate change activists often condemn COP26 as a mere photo opportunity for political point-scoring with prominent activist Greta Thunberg summarising the leaders' words as "blah blah blah". The argument suggests that ulterior motives sully genuine concern for the climate and, thus, weaken the nature of achievements reached.

Conversely, others would suggest such ulterior motives are either beneficial or negligent in the current conference. The political motivations could bolster a desire for change as politicians realise the potential immediate and personal impacts of failure. Furthermore, the involvement of state representatives from countries on the frontline, experiencing devastating climate impacts such as frequent floods and the prospect of total submergence such as in the Marshall Islands if targets are not met, ensure that genuine climate motivations are not ignored. State representatives become aware of the very real impact of their failure and understand the potential for climate disasters in their own regions if allowed to continue.

Overall, on the issue of politicians' motivations, it will remain unclear as to whether political ambitions aid climate action or sully and destroy genuine concerns and ambition to improve the climate. The real results will not be observed for decades after the short-term vote-winning schemes have ceased to work.

A more controversial group involved is that of big businesses and corporations. Whilst for most – and particularly the most highly polluting firms – this involvement is purely unofficial with the UN actively banning sponsorship from companies such as BP

and Shell, some businesses have a role as official sponsors. Their official role is set out as "lend[ing] their resources, commitment and expertise to make COP26 a success" which would seemingly broadly translate to the exchange of money and a business perspective on the climate for a degree of publicity and influence within the conference.

To some, whilst only companies with 'green' credentials have been selected, this is an outrageous adulteration of so-called 'climate justice'. Critics, including a Whitehall source to The Guardian, have declared that "COP isn't about branding" but corporate sponsorships have caused the conference to be dominated by it. Indeed, many will have observed advertisements by sponsors like Sainsbury's have sought to capitalise upon and incorporate COP26 involvement. Sponsors will claim this is an act of raising general awareness, but, conversely, critics will say it is part of a pattern of commercial publicity stunts overriding the core climate issues at the heart of the matter. Therefore, corporate involvement is controversial for its ability to divert attention from the climate.

An investigative report by The Independent also throws into question the environmental credentials of many of the sponsors and, thus, their validity to be sponsors: Microsoft, for example, still emits 15.6 million tonnes of Carbon and will be 36% reliant on carbon offsets to reach its 2030 carbon-negative goals. Carbon offsets remain controversial with climate pressure groups such as Greenpeace who argue there is "no case for relying on offsets" as initial emissions can be avoided by using and investing in greener technology. Whilst avoiding blatant polluters, COP26 is nevertheless, still sponsored by polluters and, therefore, businesses with vested interests in the results of the talks. Their official involvement gives them capacity to seek potential dilution to climate resolutions to more comfortably suit their financial desires.

However, climate change is very much a widespread issue that relies upon co-operation and collaboration to solve. To ignore and side line business would be counter-productive as it would alienate key groups with the potential both to further pollute, but also to utilise its extensive capital for positive change. Perhaps sponsorship is nothing more controversial than friendly co-operation, gently incentivised by advertising opportunities. Without the involvement of producers, the consumer can do very little to combat climate change: high polluting and unsustainable goods are rarely the object desires of individual consumers. Instead, they are bought as they are affordable and available in contrast to expensive and rare

environmentally-friendly goods. Liberal theorists of Global Politics would, therefore, argue collaboration with businesses is essential to resolve these issues as no man is an island capable of it all.

Sponsorships, ultimately, are a form of lobbying – lobbying which could be productive or quite conversely, undue influence diluting and diverting real action. The inherent opaqueness, whereby the public has little real comprehension of sponsors' true involvement, leaves such a judgement to the whims of individuals and their inherent optimism or cynicism. It is, arguably, this lack of transparency that is most controversial about lobbying altogether and, by extension, within COP. The more unheard, but maybe more important, group involved at COP26 is that of individuals – individuals who will personally experience the effects of climate change be that hotter summers or absolute devastation of lands and homes through natural disasters. They are less heard because their official involvement is diminished. Official representations have been made by indigenous communities which is highly commendable as, in global politics, it is all too easy to forget that

our own way of life is not the sole way of life. There are, in fact, many individuals who quite legitimately live outside the consumerist capitalism that so dominates our lives and it is important that their needs are addressed and met, too.

Why COP26 is Controversial

By Jordan (Y13)

The COP26 discussion has got the whole world excited about climate change and the steps we can take forward in order to slow down or maybe even reverse the effects that the human population has had on our precious planet. But despite this, many have the viewpoint that this whole endeavour does enable progress, and is in fact a waste of time. In this essay I will be arguing the points to deeper investigate the claim: 'Is COP26 futile'?

Around one hundred fifty countries have signed up for this initiative out of one hundred and ninety five, so many believe that this is good and that this large proportion of participating countries can lead to radical change. However, it remains to be seen with the lack of presence at the conference of Russian leader Vladimir Putin and Chinese President Xi Jinping. The influence that these two large contributors to greenhouse gas emissions have over decisions on reducing global emissions.

Another view is that it is good that people are co-operating and the only way to make a change for the climate is to ensure that as a global community, we work together to make a change. However, some climate activists (such as Greta Thunberg) state that COP26 is yet another failure, expressing how "it is not a secret that COP26 is a failure. It should be obvious that we cannot solve the crisis with the same methods that got us into it in the first place". She had mentioned that governments have their representatives to state different things about climate change but most of them will never take the critical steps to actually make the change. One could argue she may be right , as this is still the 26th annual meet for this issue and the change to the world's climate has only got worse in that time.

Watch: Greta Thunberg address COP26

Greta Thunberg (climate activist) is often known for making controversial speeches at climate conferences, and COP26 was no different. She branded the summit as a failure, advocating for *drastic annual emission cuts like anything the world has ever seen.* In this conference, she elaborates how the conference is fantastical and ignorant of the planet—certainly causing a few to be uncomfortable in their seats. It will be interesting to note the role climate activists play in shaping public policy.

COP26: Everyone's Feeling the Heat

By Krishna (Y12)

The Paris Agreement of 2015 marked a historic moment for the future of our planet. For the first time, all of the world's nations were united to discuss how to reduce greenhouse gas emissions and tackle the root cause of global warming. All of the commitments made, and agendas laid out served the core purpose of keeping global temperatures at around 1.5 degrees Celsius, and never above two degrees Celsius. We are currently not on the trajectory to meet this target. Six years on, the world leaders have reunited to address the issue once more.

During the Paris Agreement, there was a particular focus on the assistance provided to poorer nations. For poorer nations, who are often involved in the primary sector, their main source of finance comes through extraction. They are unable to capitalize on the manufacturing power that more developed nations have been able to exploit. Refining raw materials requires a skill set and education that is unavailable to the poorest countries, but allows other nations, to provide more added value.

A prime example is China, who have been able to manufacture goods and export them at a rapid rate. They add a percentage mark-up to the cost of production, but due to the size of the country benefit from massive economies of scale. China boasts one of the largest and most successful economies – but at a cost to the environment. China has the largest share of CO_2 emissions by country in the world, making up twenty eight percent.

Thus, it was expected that China would play a large role in setting out an agenda to reduce greenhouse gas emissions. Over forty countries pledged to move away from coal use – identified as the biggest contributor to climate change. China did not sign up, despite being one of the largest coal-dependent countries. More than a hundred countries applied to a scheme to cut methane emissions, by thirty percent by 2030. China did not join. Furthermore, criticism was piled on due to the absence of China's world leader, Xi Jinping. One of these critics was Joe Biden, the President of the United States of America – the second largest contributor to carbon dioxide emissions. The US also did not sign up to the coal initiative.

This has already exposed one of the fears many people had going into COP26. World leaders and businesses would make bold statements but may be unable to carry them through. Idris Elba, who also made an appearance at COP26,

remarked, 'When you see a celebrity in a forum like this, you sort of wonder why they're there.' He reflects the sentiment that while it is reassuring to hear hopeful and powerful messages from some for the most influential people in the world, it can be disappointing when the actions are not followed through on.

Elba also spoke on the far-reaching effects of climate chain on food supplies, especially in poorer countries. Rising temperatures cause famine and drought which have destroyed the livelihoods of many farmers. Xi Jinping also agreed that developed nations must, 'provide support to help developing countries do better.' Thus, it is clear that one of they key agendas is assisting poorer countries, who pollute less per capita, but do not have the financial capacity to protect themselves from the worst effects of climate change.

Brazil: A case study

One of the main causes of global warming is deforestation. When trees are cut down, carbon dioxide absorbing capabilities are lost. Thus, there are more greenhouse gases in the atmosphere and more heat is trapped, making the Earth warmer.

In the last year alone, over were ten thousand sq. km of the Amazon rainforest was lost. That's equivalent to almost thirteen times the size of New York. In the Amazon, land is being lost to logging, mining, cattle grazing and poaching. This has caused great tension in Brazil between those on either side of the fence. Environmentalists and indigenous tribes are fighting against politically backed

organisations and Brazilian locals trying to earn a living. Despite being the seventh largest economy in the world, Brazil has extreme levels of economic inequality. This is in part due to the corruption and violence that is prevalent in the country. Criminal activity, including the illegal mining and logging of resources, threatens the work of environmentalists, who believe that these illegal groups are not threatened by persecution. This year, following a court order to seize an illegal gold mine, a terrifying battle ensued between the federal police and the miners of the municipality of Jacareacanga. After the police set fire to their equipment, the miners collaborated and retaliated by burning down police helicopters. They then burnt the home of a local activist. The vice mayor of Jacareacanga was later arrested for his involvement with the miners.

The miners, ('garimpeiros,' as they are called)do not believe that their actions are wrong. They believe that they are providing an economic output that not only sustains themselves, but also the wider community. However, these miners and various other workers are supported by large and powerful industrialists who fund the capital

for machinery and transportation. But, as with the case with the vice mayor, federal agencies and environmentalists are facing an uphill battle against not only individuals but also vast, well-funded and well-co-ordinated networks who hold political influences everywhere.

Furthermore, Brazil is also being faced with the threat of Trans-National Companies (TNCs). TNCs often operating in developed nations, move their production to less developed nations to take advantage of lower costs. In return, the country is offered with improvements to local infrastructure, the creation of jobs, and a higher economic output. Given their own financial situation, poorer countries appease the requirements of large organisations. However, this can be detrimental to the livelihood of some locals. The trees are cleared to make space for soy plantations. The local farmers are also coerced into giving up their land to the plantations and when they report these to local authorities, they are met with death threats, according to the leader of the region's indigenous community.

To both countries and businesses, the key motivating factor is wealth. If there is no wealth in climate change strategies, there isn't a strong enough motive to change it. These deep lying political and financial issues make it difficult, not only for Brazil, but also other poorer nations to address the demands set out by developed nations during COP26.

It was promised that the developed world would pay one hundred billion dollars by 2020 to help the poorest member states. This target has not been met, and it seems doubtful that it will be met this year too. Now, a UN report suggests that even more ambitious targets are to be put in place.

In addition, the majority of this loan is put towards mitigation strategies. While this helps countries move away from the causes of climate change, it does not respond to the immediate effects that they will face. Lastly, the majority of funding for the poorest countries has come in the form of loans as opposed to grants. The distinction being that loans must be repaid. This makes countries already in large amounts of debt more financially vulnerable.

In conclusion COP26 provides an important opportunity to address key concerns regarding climate change. However, this relies on the richest nations doing their part in reducing their own carbon footprint as well as helping the poorest countries in doing the same. Thus, not only does the quantity of funding need to increase, but careful thought must go into how it will be used. Addressing climate change is by no means an easy task, but carefully thought-out agendas and execution upon these would be a large step in the right direction. As of now, however, the current funding and actions are nothing more than a drop in a rising ocean.

Just Add Water: A Recipe for Disaster in Kiribati

By Divy (Y13)

To imagine that within the next few years your house and your neighbourhood will cease to exist is an uncomfortable thought for anyone. This very dystopia occupies the mind of the Gilbertese people (residents of the remote idyllic Pacific paradise of Kiribati) every single day.

With an average elevation of 1.8 metres above sea level, the sea is never more than a literal stones through away. This has provided the nation with a rich fishing legacy and a maritime culture, whilst endangering the residents from the most devastating contemporary anthropogenic disaster: climate change.

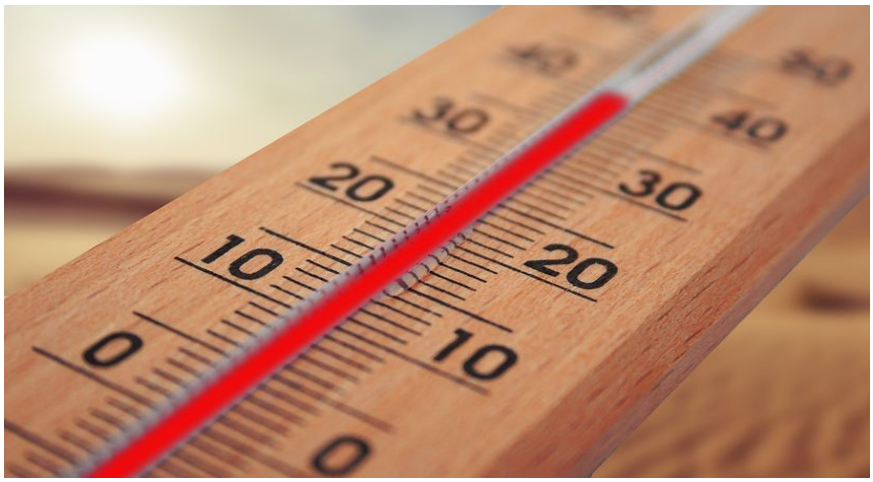
Many explain rising sea levels with the melting of ice sheets far away in Greenland - it provides a satisfactory narrative. However, the largest contributor to actual year on year rise in the level of the sea is thermal expansion, where water in the oceans takes up a greater volume at higher temperatures due to principles of particle kinetics. This is exaggerated at the equator with its intense sun and in a nation that straddles all four hemispheres, the ocean is getting dangerously close to property, houses, schools and livelihoods.

Storm surges and even the spring tides have presented devastating consequences to the islanders, with sea water contaminating the scarce fresh water supplies and disrupting the ferry system which brings food and equipment into the island from Australia. As well as this there has been the usual flooding in houses, destruction of property and outbreak of disease from the poor hygiene in crisis situations. This has immense implications for the people who struggle to develop economically, as any capital investment is always under threat of damage due to flooding, and socially with mass emigration of anyone fit and able who wants to find their feet in more than just sand and to advance within an industry absent on the island.

The sinking nation of Kiribati will rise tall on the global stage during COP26 to advocate for revolutionary techniques to combat climate change, furthering its already innovative record from environmental refugees to dredging of lagoons. The inevitable drowning of Kiribati will also serve worldwide implications, from understanding the legislation of a country "dying", the mechanism of relocating people, the transition from EEZ (Exclusive Economic Zone) waters to international waters and the moral question of whether a sunk country is still a country and demands international representation.

How is Climate Change affecting the Economy and Society?

By Ayush (Y12)



As climate change surges across the globe, environmental economics is becoming increasingly important. Whether it's investment in new forms of renewable energy, or financing innovation to fix the planet, economics plays a crucial role in steering us towards a low carbon future. More importantly also, is the COP26 summit which is taking place. With more than twenty five thousand people, the world's efforts towards stabilising and bringing climate change under control continues. But, whilst climate change proves to be a threat to the planet and to the people, it also jeopardizes the global economy. Hence why, in this article, we discuss the pecuniary effects of climate change and how COP26 may be the last chance of survival.

Climate change has had an increasing effect on the economy, as temperatures, sea levels and extreme weather are all on the rise. As global warming increases the severity and impact of weather-related disasters, substantial economic and productivity losses could be expected. And as global warming increases, these losses seem to be getting increasingly higher too. According to a report by Morgan Stanley, climate disasters have cost North America four hundred and fifteen billion dollars in the last three years, mostly owing to the profusion of hurricanes and wildfires. But unfortunately, infrastructure is not the only sector taking a hit from such calamities.

Tourism is another victim. Deforestation and its destructive impact on biodiversity can massively affect tourism in many countries. With biodiversity destroyed, many countries become less attractive for tourists. Rises in sea levels poses a similar issue. As countries like Fiji, where forty percent of the GDP relies on tourism, face the threat of rising sea levels and increased risk of flooding and inundation, both the quality of people's lives and tourism plummet, crippling their economies.

But what's even more worrying is a hit in the agricultural industry. Droughts shrivel harvests, further contributing to the arduous task of feeding an already increasing population. And as this population rises, matters only seem to be getting worse for economies across the world.

But whilst an increasing population ties closely with the economic impact of climate change, it is also a big factor in increasing climate change itself. With the number of people increasing, aggregate demand only increases in the bargain. In addition to this, demand for actual goods rises too, meaning production and manufacturing must increase, and hence further contribution to climate change. The increased consumption of non-renewable resources, higher levels of pollution and increased output overall are all factors playing a part in climate change, and they all stem from the increasing population we are facing today.

But, whilst increasing population is progressively damaging to the environment, it is not the only factor responsible for environmental destruction. Overall economic growth also plays a part. As countries grow more and more, they seek quick, cheap, and reliable energy to satisfy the large demands of the population and to develop at a faster pace. This quick, cheap, and reliable energy is mostly found in non-renewable energy sources, which are detrimental to the environment. And, despite the introduction of renewable resources, not enough money is being poured into financing this form of energy, hence non-renewable energy is still the predominant source. And therefore, an improving economy also contributes greatly to environmental degradation. So, what can be done to turn things around?

Well, it is this aim to turn things around that is being discussed and planned in the COP26 summit. In this summit, pledges are being formed, and deals are being made. More than forty countries have agreed to phase out the use of coal by 2030 or 2040 and America and the European Union have promised to cut emissions of methane. In addition, more than one hundred world leaders have promised to end deforestation, by 2030, including President Joe Biden but also President Vladimir Putin, who pointed out that a fifth of the world's forests are in Russia. And while these promises seem to be steps to reducing climate change, seeing them through is much harder.

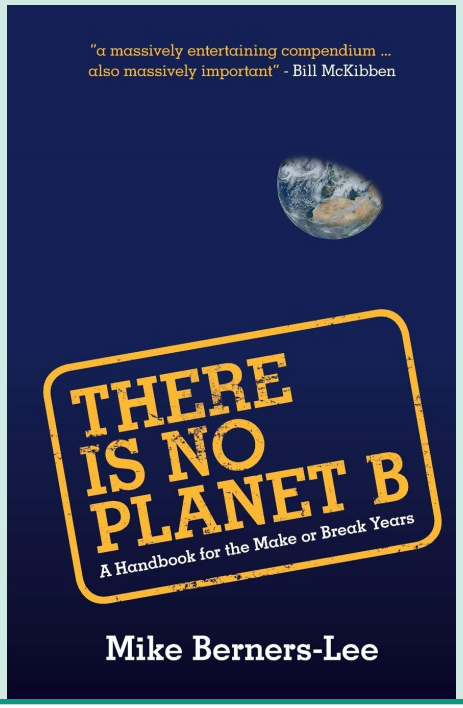
In fact, there have been similar declarations in the past which have not been achieved, for example, in 2014, the New York

Declaration, where countries committed to deforestation by 2020, whilst completely ending it in 2030. As the 2020 target was missed, the 2030 target seems increasingly difficult, hence why the declaration has been repeated in this new pact. However, whilst the promises from many countries allow climate activists to be hopeful, some countries keep their economic interests ahead of all other factors. For instance, some forty countries have agreed to phase out the use of coal by 2030 or 2040, however this does not include America, Australia, China, and India, who are all major contributors of coal usage. Nonetheless, these economies are playing a crucial role in reducing climate change in many other ways, and hence they have the ability to significantly impact climate change efforts.

Overall, climate change severely affects economies and societies. Whether it's the destruction of infrastructure or a downturn in agriculture, climate change certainly has the power to devastate entire communities. And the situation is not made any better with the threat to the environment that an increasing population provides. However, as awareness of the risk of climate change increases, countries are taking greater action to bring climate change under control. Summits like COP26 allow for countries to work together, ensuring the world does not take an environmental and economic nosedive. With a promising start to the summit the vehement hope of many against climate change, global warming and environmental damage remains strong. And, as the COP26 summit continues, even more pledges are to be made, in the hope that climate change will take a turn for the better.

Read: There is No Planet B by Mike Berners-Lee

This handbook approach to the climate crisis is a worthy read for anyone wishing to educate themselves upon the crises faced by the world today. One fascinating insight by Tim Berners-Lee is that the climate crises is not a question of technology (as Boserupian economists would suggest) but rather a question of moral values. "*Humanity has to raise its game*" and this book quickly acknowledges the 1% rule is insufficient to bring about the required change (the 1% rule being that if it is possible to get at least 1% better in every aspect of a process, you can be substantially more efficient at producing the overall product). The clear and concise run through of numerous climate crises faced by the world not only highlight the significance of human activity on the planet but demand for action.



What is the Relationship between Climate Change and the Transmission of Disease?

By Mohammed (Y12)

One of the most significant health-related issues caused by climate change is the increase in diseases. The rise in temperatures caused by climate change leads to better conditions for the growth and rise of many diseases.

The most recent example may be the COVID-19 virus, which has drastically altered all of our lives. The UNEP designated COVID-19 as a zoonotic disease, (meaning it comes from animals), and the WHO believe that sixty percent of emerging infectious diseases are most likely zoonotic.

In response to this, the UNEP stated that "The most fundamental way to protect ourselves from zoonotic diseases is to prevent destruction of nature. Where ecosystems are healthy and biodiverse, they are resilient, adaptable and help to regulate diseases". One of the biggest contributors to destruction of ecosystems is climate change, eliminating many species of plants and animals that are integral to the area around them through extreme weather, air and condition changes.

Of course, COVID-19 isn't the only disease affected, a much more widespread disease has been spreading faster as well due to climate change – malaria. The increased precipitation and floods in certain areas, such as India, have led to ideal conditions for a growth in mosquito populations, which means more vectors for the malaria parasite to be transported through. Malaria led to four hundred and nine thousand deaths in 2019, and a study performed in 2006 estimated that (in India), malaria risk will increase by up to fifteen percent due to climate change (given the current values, that would be thirty four million more cases!).

Diseases like malaria are also deadly due to their location. The majority of malaria cases occur in "under-developed" subcontinents, such as South Asia and Central Africa. The healthcare systems in most parts of these countries are typically less developed than (for example) what we have, and therefore a rise in cases for a disease as deadly as malaria could be catastrophic.

How can the Health of a Population be Protected in Times of Climate Change?

By Agustya (Y12)

Climate change is one of the most significant challenges that the earth faces. Although it may not be one of the effects that people may intuitively associate with climate change, the increase in temperature of our atmosphere can lead to new and severe diseases affecting people in equatorial countries, as well as the acceleration of previously prevalent diseases.

One example of an equatorial country where increased temperatures are causing an increase in the rate of disease is India. Between 1908 and 2018, the average temperature in India has increased from 33 to 34^{o}C. On the face of it, this may seem like an insignificant deviation; however, if this trend were to continue, the temperatures in India could quickly reach up to 40^{o}C within two hundred years. This temperature would have devastating impacts on the health of citizens. Direct impact would include illnesses due to heat such as heat strokes and heat cramps as well as the accelerated death of those with respiratory and cardiovascular diseases. The heat would also lead to indirect impact such as the increased pressure on the healthcare services and the increased rate of waterborne and airborne pathogen transmission.

Thus, it is becoming increasingly unavoidable that the government and individuals will have to change the way they approach climate change. One way that the Gujarat government has responded to the issue of climate is through a centralised air conditioning system. The main way that citizens in India keep themselves cool in the extreme heat is through air conditioning; however, this has many adverse effects on the environment. Furthermore, with a population of twenty nine percent in poverty, a large proportion of India is unable to access air conditioning at all.

To tackle these problems, governments in many regions of India have established a centralised air conditioning system where centrally chilled water is distributed to citizens through underground pipes. This not only allows access to air conditioning for poverty, but it also consumes thirty five—fifty percent less energy than individual air conditioning. As a result, the effects of heat and global warming has been greatly decreased and minimised throughout various parts of India.

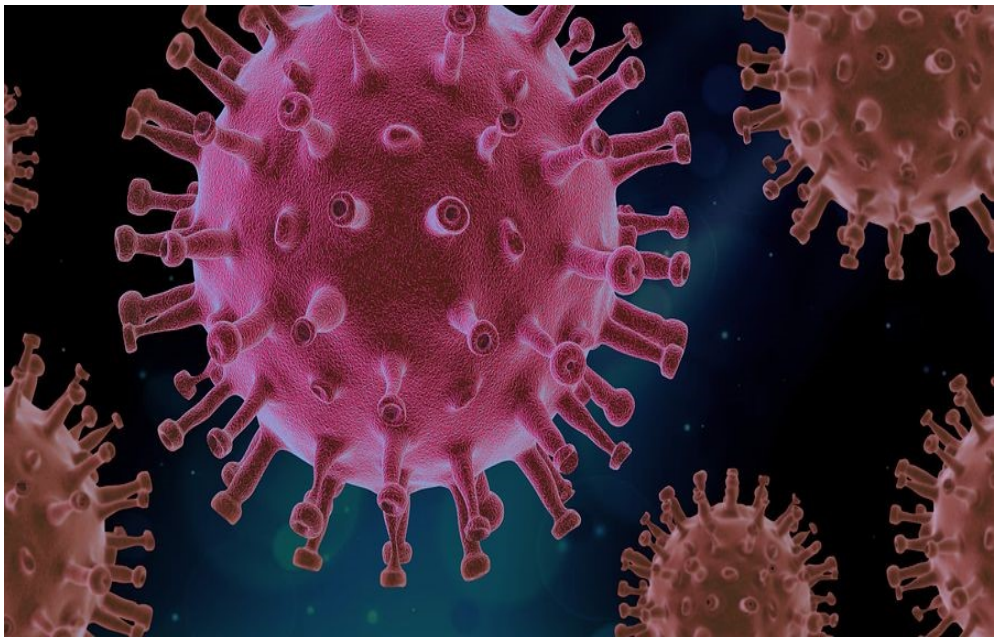
If Climate Change Kills Our Healthcare, It Will Kill Us All

By Monmoy (Y12)

With all the events that have taken place over the last year, the battle for climate change was arguably forced to take a backseat whilst people focused on keeping themselves safe and fighting for their rights. But as the pandemic begins to wind down (or so the governments believe), world leaders have taken their next initiative to fight climate change, with the ongoing COP26 summit which began last week. Leaders are determined to tackle big industries which heavily contribute to climate change, and the impact of climate change continue to be brought into the spotlight on a daily basis. Industries such as plastics, fashion and agriculture are eager to mitigate and minimise their impact on climate change, and to create a healthy relationship with carbon dioxide and other pollutants. However, one sector of society, whose relationship with climate change is often overlooked, is the healthcare industry.

The healthcare sector holds a significant level of responsibility for our changing climate, with 4.4% of the global CO2 emissions being as a result of various areas of healthcare, and in countries as large as the United States, it can amount to 8.5% of the nation's total carbon emission. The UK's own National Health Service (NHS) emits on average twenty million tonnes of CO2 annually, with sixty two percent of the NHS' emissions coming from pollution in the supply chain, and twenty four percent from the direct delivery of care, in 2019. The remaining fourteen percent of these emissions came mainly from staff commuting and private care sectors commissioned by the NHS.

The healthcare sector has been continuously drained as a result of the COVID-19 pandemic, and climate change will only make things worse. We are all well versed on the human contributions to climate change: especially in areas such as rainforests, humans are disrupting food chains, sending animals to extinction, eliminating trees which reduce CO_2 levels in atmospheres and so forth. But an overlooked risk is that species of plants and organisms that provide us with vital medicines and potential for new medicines are reducing everyday as humans continue to eliminate the biodiversity in these biomes.



Furthermore, climate change has been shown to correlate directly to an increase in extreme weather such as flooding, tsunamis, hurricanes, which are going to further cost the healthcare sector, and eventually the public themselves, as people are continually admitted to hospital.

Meanwhile, hospitals and practices continue to use chemicals specifically harmful to the environment, such as Desflurane, a hydrofluorocarbon gas used as an anaesthetic, which is exhaled into the atmosphere. One hour of exhaling Desflurane has the same effect on the greenhouse gas layer as driving two hundred twenty miles in an average car. Propofol is a similar liquid anaesthetic alternative, but has the same environmental effect per hour as driving one mile. There are so many similar cases within the healthcare industry, and life cycle assessments need to be in place and analysed thoroughly before medical resources and products are chosen for administrative use.

Carbon emissions from the healthcare sector have reduced from approximately thirty five million tonnes in 1990 to where they are today, but with time working against us, it is crucial that the global healthcare sector steps up to plate, because it is one vital industry that the public, especially the most vulnerable, cannot afford to lose. Healthcare and public health ministers need to place firm, explicit boundaries on products and give guidance to healthcare institutions about procedures that must be followed to reduce carbon emissions on the environment, otherwise this industry, an industry we so desperately need to stay afloat, simply will not be able to cope with the effects of climate change soon to come.

What Role does Food and Agriculture Play in Responding to the Challenges of Climate Change?

By Andro (Y13)

Food is an integral part of society, not only due to it being a necessity for human survival but also due to its power to unite different cultures. With world populations rising, it is no surprise to see demand for food rise alongside this. However, going to your local Tesco and buying a pack of avocados has a much larger effect on the environment than initially thought and we need to think of ways to mitigate the effects of our ever-increasing food consumption on the climate.

The beginning of the COVID-19 pandemic saw pandemonium ensue - with consumers rushing to buy essentials and supermarket chains rushing to fill shelves. It highlighted a key weakness in global supply chains, the fact "super-efficient, highly centralised food systems are fragile, because if they go 'wrong', they fail," (Terazono, 2020). Many countries in the world adopt a just-in-time system (Terazono, 2020), heavily reliant on delivery times. These complex supply chains often have different layers involved, and when one fails, so do the rest. The more complex the supply chain, the greater the number of food miles travelled.

As Covid-19 began to spread, workers fell ill and agricultural businesses were forced to close, albeit temporarily – there was great disruption to the supply of food in different countries. This led to the rise of more sustainable, local agricultural businesses who had shorter supply chains that were less fragile. For example, companies such as Farmdrop who have seen revenues triple compared to pre-pandemic levels (Terazono, 2020) and act as advocates of the importance of cutting carbon emissions, sourcing their produce from areas within one hundred and fifty miles of London wherever possible (Farmdrop, 2021).

The idea of shortening supply chains is a pivotal one in reducing the impact of the movement of food on the environment due to this decrease in food miles. A two hundred and fifty gram punnet of strawberries grown locally and in season emits four hundred and ninety grams CO_2e whereas a two hundred and fifty gram punnet flown in from South Africa releases over seven times more (Berners -Lee, 2020, p. 58). Hopefully, the rise of sustainable agri-businesses will encourage similar businesses to be set-up or encourage existing businesses, who aren't actively trying to increase their sustainability, to think more carefully about their impact on climate change. This needs to be something encouraged by governments of countries, perhaps by subsidising sustainable businesses like Farmdrop as well as taxing businesses who exceed a certain level of greenhouse gas emissions.

Should we be using Dams?

By Sang-Hyun (Y13)

As the 2021 COP26 is being held, the threat of climate change grows more every day. With inaction leading to the possible downfall of humanity, leaders globally are going to be busy devising plans for these next crucial years. However, some of these issues can seem deceptively simple. One of these issues being the essential resource, energy.

With superpowers such as China experiencing a 1000% rise in demand for electricity since 1990 (now being the most energy consuming country globally) sustainable methods must be implemented to prevent further pollution and greenhouse gas emissions from fossil fuels. One solution China has opted for is dams; large artificial structures built across rivers or streams to restrict the flow of water. By harnessing the power of rivers, China can generate energy for the rest of the country, but even this 'green' source has major drawbacks.

China is home to 1.398 billion people, with a range of communities in all regions of the country. Riverside communities are particularly strong with the Yangtze region alone holding 400 million people. However, dams can disrupt this way of living as drinking water is made scarce, fields aren't fertilized and fishing livelihoods come under threat. But it is also important to remember that rivers can flow through multiple countries.

The transboundary river Mekong also flows through countries such as Vietnam and Thailand, which can then be threatened with the construction of dams in China. As water flow gets restricted further down, transboundary conflicts can occur, resulting in political arguments and rising tensions within Asia. Moreover, dams aren't entirely 'green', with one billion tons of CO2 equivalent emissions being attributed to dams, due to the way they affect the environment bio-geochemically. Considering this, leaders must be wary of potential solutions and humanity's next steps towards the future.

Semiconductors are Running Out, and the World cannot Compute

By Joseph (Y13)

In this year's COP26 convention, the material ramifications of many products have been talked about at length, such as single use plastic products, or unsustainable deforestation of the rainforests. However a key material impact that has to be taken into account is perhaps the product that many of us in the developed world use the most - the semiconductor. This component, which acts as a base for many computing components that allow many of the devices that we use on a daily basis is not able to be produced at a fast enough rate.

Why is this happening?

Semiconductors are silicon based components that are used in computing products such as memory storage and computing processors. They help to operate even the simplest computers in products that seem to not be affected, such as the electronic timers on microwaves, or sensors and display screens inside of cars. These essential products are usually produced in Eastern Asia, but due to the increased demand for having a computational device on everything, from touch screens on fridges to heating systems to doorbells, the requirement for semiconductors has increased exponentially. Since silicone is a synthetic polymer and difficult, expensive and energy taxing to make, not only would an increase silicone production have adverse environmental consequences such as more crude oil needing to be extracted increasing the amount of energy being used to process the materials, but it is also extremely time consuming to produce the amount of silicone that the world requires.

So what can be done?

In today's society, it is very easy to forget the value of a computer, in any form. And yet, as a result of their abundance, they are becoming cheaper than ever to dispose of after minimal usage. Many major tech companies in recent years have reduced the reparability of their products (known as planned obsolescence), in an effort to increase how many devices, us as the consumer, will buy.

In response, we should attempt to maximise the life cycle of our devices. Maybe put off buying the next iPhone. Perhaps Windows 11 can wait for another year? Either way you will be doing our environment a small favour.

Love in the Time of Climate Change

I love you as one

Loves endangered species

A single tear shall mark my face

As I help drive your extinction

I love you as one

Loves the rainforest

Enamoured by your great beauty

As I cut you down

Burning what was once special

I love you as one

Loves the sound of climate

Protests: a performance to applaud

An act to adore, but is then heard of no more

I love you as one

Loves the use of plastic alternatives

Used in public to bolster my image

As I cheat behind your back

Perhaps one day I could come to love you

But as you take your last few breaths

I simply don't care

By Abbas (Y13)

How can Mathematical Modelling be used to Predict Future Climate?

By Ugas, Hishaam and Aarav (Y12)

The analogy of a shower can be applied to the study of the dynamics of the climate, despite how absurd it seems.

The shower equation, a first order differential, considers the idea of delay- a significant factor when evaluating the effectiveness of climate models. It is based on the idea that turning the dials on your shower have a delayed effect, because the water has to travel through the pipes, and people tend to further adjust the dials because they don't immediately feel the change in temperature, creating a never-ending cycle when you try to find the optimum temperature (theoretically).

The situation can be modelled mathematically.

Let **T(t)** represent the temperature of the water as we feel it at time t. If it takes a time of d seconds for the water to work its way through the pipes, then the shower equation is: **$dT(t)/dt = -kT(t-d)$.**

$dT(t)/dt$ represents the rate of change of the temperature of the water at time t. If this is positive then the temperature is increasing at time **t**, and if it is negative then the temperature is decreasing at time t. The higher the absolute value for **$dT(t)/dt$**, the larger the rate of change.

The right-hand side of the equation shows how this rate of change of temperature at time t is proportional to **T(t-d)**, the temperature you had d seconds before time **t**. The minus sign shows how changes in temperatures would cause you to turn the heat up/down in order to keep the temperature at an equilibrium. **k** is a positive constant of proportionality, assumed to be greater than zero.

Solving this equation means finding the function **T(t)** that satisfies it, which gives the temperature **T(t)** for any time **t**.

Shower Equation without Delay

If it took the water no time to get through the pipes, there is no delay so **$d = 0$**.

$dT(t)/dt = -kT(t-d)$.

The resulting equation would be:

$T(t) = e^{-kt}$

By basic calculus, the function **I** is a solution.

Shower Equation with Delay

When there is a delay, **$d \neq 0$**.

Let us assume the solution in the form of **$T(t) = e^{-at}$**

For some **a**. To find the parameter for **a**, we first differentiate with respect to **t** which gives:

$dT(t)/dt = ae^{at}$

Putting this into the original equation gives:

$ae^{at} = -ke^{a(t-d)} = -ke^{at}e^{-ad}$

This equation holds when the parameter a satisfies the transcendental equation:

$\mathbf{a=-ke^{at}\ e^{-ad}}$

Letting **x = -ad,** the equation becomes:

$\mathbf{-x/d = -ke^{x}}$

so **x = kdex.**

Such transcendental equations are difficult to solve, but we can plot the two functions y = **x** and **y** = **kdez** and see where they intersect. The **x**-coordinate of these intersection points will satisfy the equation.

This plot shows that the equation only has solutions if:

kd < 1/e ≈ 0.3679...

where **e** is the base of the natural logarithm.

The solutions **x** in this case will be positive numbers. Since **x = -ad** and **d** (the delay) is positive, **a = -x/d** is a negative number.

Therefore, if the product of the delay parameter **d** and the constant of proportionality **k** is less than or equal to **1/e**, the situation is controllable and the turning of taps will eventually reach the ideal temperature. However, if **b** and the real part of the complex solution of the equation **x=kdex** is greater than zero, then the temperature will be uncontrollable and will tend away from the optimum temperature.

Applications for the shower equation

One of the most important applications for this shower equation comes when studying how the climate varies, because some actions can have delayed effects. For example, if we rapidly increased the rate at which we burn fossil fuels, the level of carbon dioxide and other greenhouse gases would rise significantly, but it would take some time before we saw the effect that it has on the climate. If we then tried to decrease the level of carbon dioxide in the atmosphere by carbon capture, we won't see the effect this has for some more time.

Limitations of modelling future climate change

While we have demonstrated a few ways of modelling the data, there are several flaws in these methods. One issue is the concept of "chaos" when dealing with the non-linear equations for climate (a small initial uncertainty can have a knock-on effect on your prediction, rendering it useless). We can see chaos when predicting the weather over the next week: although meteorologists understand the laws that govern what the weather is like, the little variations over the distance between weather stations, can cause forecasts to differ significantly. Although the climate is looking at general trends over longer periods of time rather than the day-to-day, which negates some of the factors that cause weather predictions to be faulty, it still has multiple variables, which can lead to chaos.

Although these mathematical models provide strong links between human activity and climatic factors, change can only be brought about if we act on what they reveal to us.

THE WILSON'S INTRIGUE

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