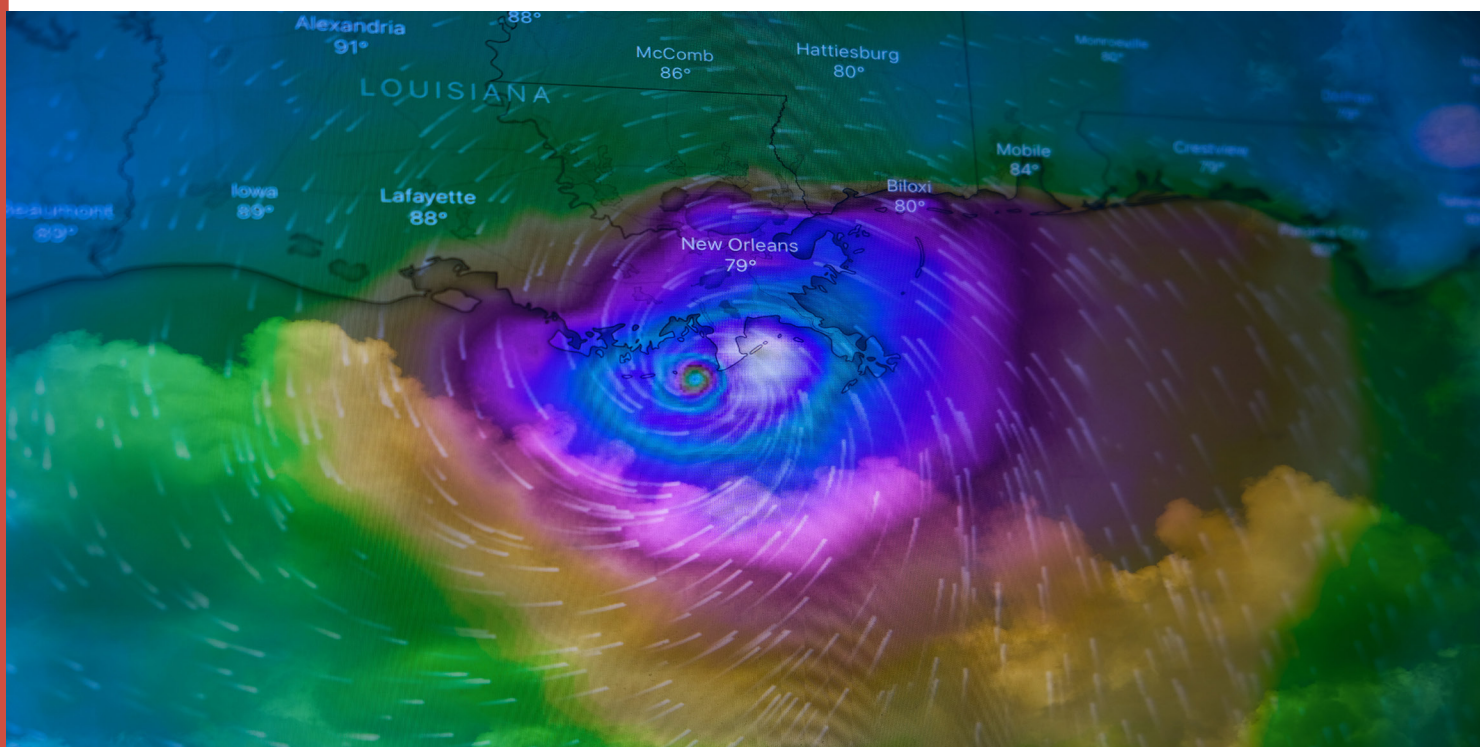


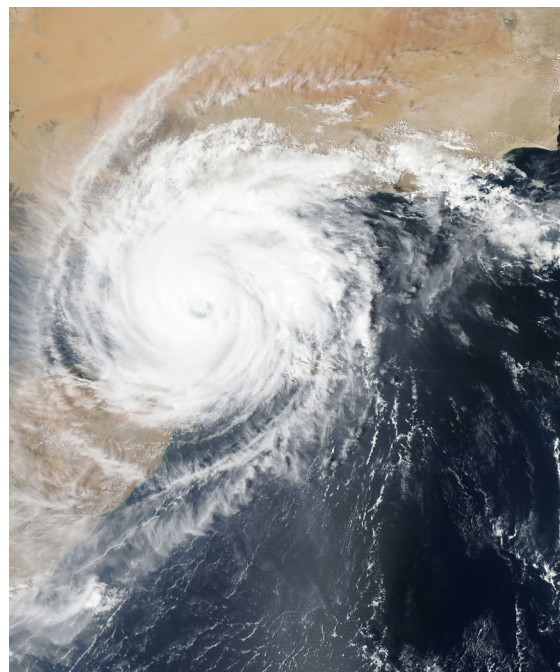
Weather and Climate



'Rain before seven, stops by eleven.'
'Clear nights mean cold days.'

Sayings such as these are commonly used by people all over the world to try to predict the weather. However, even expert meteorologists admit that technology-dependent weather forecasts are not always accurate. Hurricanes predicted to 'go' somewhere often appear somewhere else, leading to unforeseen, catastrophic disasters.

In the last chapter, we learned that the atmosphere is the blanket of air surrounding the Earth. In this chapter, we will learn more about how the state of the air in the atmosphere is designed to influence both weather and climate.



First Dimension : Analytical Thinking

SCIENTIFIC UNDERSTANDING OF WEATHER AND CLIMATE

What is Weather?

How will you decide what to wear to school today? You will probably take a look outside the window or check the weather forecast on your phone. The weather is determined by the changes in the air around us. The weather can be warm and sunny today, and cool and rainy tomorrow. It all depends on the state of the air and very complex systems interacting with each other.

The Elements of Weather

Wind

Wind is produced when air moves from one place to another. It is caused by uneven changes in temperature and pressure. It might reduce the visibility of entire cities by dust and can even uproot giant trees from the ground. It can carry the scent of the ocean, or the warning of a forest fire.

The link between wind and air pressure

The pressing down of the layer of air around the planet is called air pressure. The higher up you go, the less air is above you and the less air pressure there is. Have you ever noticed how your ears get blocked as you ascend in an airplane, or how they pop when you come back down? This is due to changes in air pressure.

Air pressure near the surface of the Earth also changes due to changes in temperature. As the Sun heats the Earth's surface, the Earth's surface warms the air right above it. The warm air then rises. Wind moves from areas of higher pressure to areas of lower pressure. When there is a large difference in pressure between two areas, wind moves rapidly.





Precipitation

Precipitation is a word used to describe the moisture returning to the planet from the atmosphere where water droplets condense to form clouds. There are four forms of precipitation: rain, snow, hail or sleet.

Whereas weather is how the air feels from day to day, climate is the overall weather of a particular place. A desert climate is dry and hot for example, whereas a tropical climate is warm and humid. How would you describe the climate near the Arctic pole?

Climate can be different from season to season. The climate changes from season to season because the planet is tilted on its axis. As our planet revolves around the Sun, the part that is exposed to the Sun receives more warmth, making it summertime. The part that is tilted away from the Sun receives less war-

th, making it wintertime. The countries that fall near the equator are exposed to sunlight all year round, which is why their climates are fairly stable.

Keeping Track of Climate Change

How do we keep track of changes in weather and climate? We do this by measuring changes in temperature, sea level and clouds, using satellites. However, we must remember that the use of science and technology to keep track of changes in cloud cover, barometric pressure and temperature is still largely connected to human input to make sense of the data collected.

Question:

Why is weather forecasting important?

Answer:

To take right measures against extreme weather.



Amazing Scientific Facts

-Weather and Climate-

1.

Did/do you know that the average temperature on the Earth's surface is around 14 degrees Celsius? A mere one degree change in the last century has resulted in global warming and significant climate changes.

2.

Have you ever heard of a Frognado? In 2005, it 'rained' frogs on a small town in Serbia! Strong winds hit a town called Odzaci carrying with them countless frogs. (news.yahoo.com)

3.

Did/do you know that hail stones could weigh up to 1 kg? In 1986, enormous hailstones rained down on Bangladesh. The huge hailstones killed 92 people. Even a softball-sized hail stone falls from the sky at around 100 mph. (atlasobscura.com)

4.

Have you heard of blood rain? This is a phenomenon caused by the carrying of Saharan desert dust up into the clouds, shading them red, and even staining the rain a red color.

5.

Contrary to popular opinion, only 1 in 10 people who gets struck by lightning actually gets killed. What is even more surprising is that a lightning bolt can produce heat that is five times as hot as the surface of the sun! (About 50,000 degrees Fahrenheit)

6.

Did/do you know the Earth is the only planet we know of that can support life with its suitable temperatures? Other planets are either too hot or too cold due to their distance from the Sun. For instance, the next planet, Venus is the hottest planet in the solar system with temperature exceeding 750 degrees Fahrenheit (400 degrees Celsius). Mars, which is a little further from the Earth, has an average temperature of 80F (minus 60 C)

Natural Disasters

Occurrences such as volcanic eruptions and earthquakes are not directly related to human activity. These are commonly known as natural disasters.



Extreme Weather

Some parts of the planet experience bouts of extreme weather such as drought and flooding, hurricanes and wildfires. Human beings have contributed to the frequency of these periods of environmental stress by mindless consumption and abuse of the planet's resources. However, sometimes occurrences such as volcanic eruptions and earthquakes are not directly related to human activity. These are commonly known as natural disasters.

In meteorology, the scientific study of weather, 'light' rain is classified as rain that is less than 0.5 mm (1/48th of an inch) whereas 'heavy' rain is more than 4 mm (1/6th of an inch). The rainiest day on record was observed on a French island in the Indian Ocean in 1966. 1,825 mm (72") of rainfall was recorded.

Climatology, on the other hand is the study of climates. Climates are classified into five types: Tropical, Cold, Dry, Temperate and Polar. A sixth category has been added for places on Earth where high altitudes dominate other climate factors.

In short, weather is an integral component of all the physical processes that occur on our planet. And when changes in weather are extreme, as in the case of heat waves or drought, our health, wellbeing, and survival as well as that of other species on the planet, are all threatened.

In the past several years, heat waves have become more frequent. Heat waves around the world have resulted in the loss of countless human lives and livestock, damage to agriculture and infrastructure and increased incidences of drought and wildfires. Then, we had climate caused migrations of people to other countries.

Global Warming- The End Game



<https://youtu.be/Y3gqoDUtmt4>

Second Dimension : Analogical Thinking

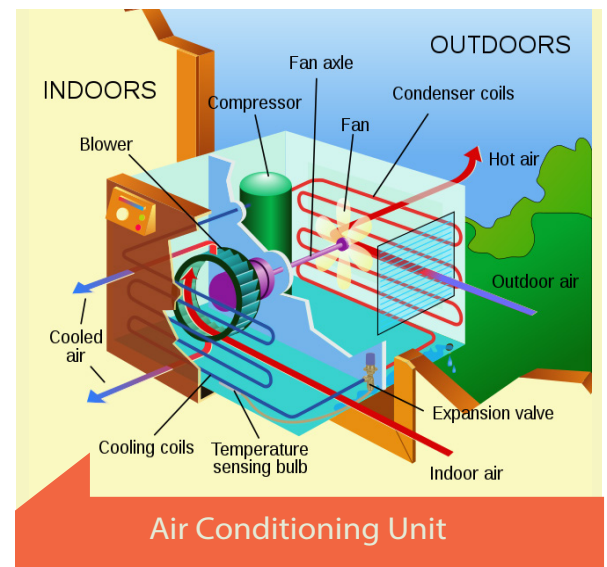
CLIMATE VS. HEATING AND COOLING SYSTEM

As we have learned, weather is an integral component of all the physical processes that occur on our planet. And when changes in weather are extreme, as in the case of heat waves or drought, our health, wellbeing, and survival as well as that of our species on the planet, are all threatened.

To better appreciate the weather system on the Earth, let us reflect cooling and climate monitoring devices developed by human beings. In the past several years, heat waves have become more frequent. Heat waves around the world have resulted in the loss of countless human lives and livestock, damaged agriculture and infrastructure, and increased incidences of drought and wildfires. Then we had climate caused migrations of people to other countries.

Cooling Devices

On a hot summer's day, you would probably rely heavily on your air conditioning unit. But have you ever thought about how an air conditioning device is designed to cool down a room?



Air conditioners are equipped with chemicals called coolants. A coolant is made of a substance that can change rapidly between a liquid and a gaseous form. The air conditioning (AC) unit has a coolant-filled tube that allows air to pass through. As the coolant is transformed from one state to another (liquid to gas), energy is released that brings the temperature of the room down. The AC tube extends from inside the room to outside the room. The section of the tube containing the condenser is found outside the room. The evaporator and the vents for cool air are inside the room. The coolant in the tube acts as a heat absorber.



Monitoring Climate Change

To monitor changes in climate, NASA's satellite- Ice, Cloud and land Elevation Satellite (ICESat)- is being used by scientists to keep track of the levels of ice sheets, glaciers, forests, rivers and clouds as well as atmospheric pollutants. Although you are mostly unaware of these variables, they are designed to affect you on a daily basis. The thickness of ice sheets and glaciers is linked to whether sea levels rise or fall, which can influence the incidence of flooding and drought. A small change in the thickness of Arctic ice can have disastrous consequences on coastal cities and towns, for example. The impact of deforestation and wildfires also affects many interrelated factors such as oxygen levels and carbon dioxide levels, soil stability and ultimately biodiversity. All these changes have results for humans and other creatures as the whole system interconnected and depends on each other.

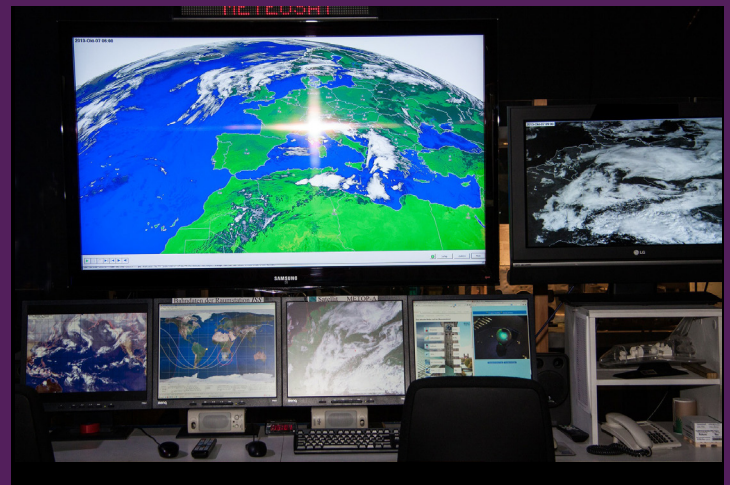
What happens when you switch on an AC unit?

1. When the air conditioning unit is switched on, the liquid coolant absorbs the heat in the air around it and changes into a gas.
2. The coolant, now a gas, travels through the tube to the compressor (outside the room).
3. The compressor pressurizes (or compresses) the gas turning it back into a liquid.
4. The hot air that is released when the gas turns into a liquid is then expelled outside the AC unit into the external environment while the cool liquid coolant returns to the evaporator.
5. In the evaporator, the coolant (now a liquid) absorbs the heat from the room's hot air, transforming into a gas once again.
6. The whole process is repeated and the air in the room is continuously cooled down by the air conditioning unit.

Can you think of another electrical device that works in a similar way? (Hint: It's in the kitchen).

The monitoring of river and sea levels makes it possible to elicit flood warnings and evacuation measures to be taken when needed. ICESat is equipped with special lasers that make it possible to take very accurate readings.

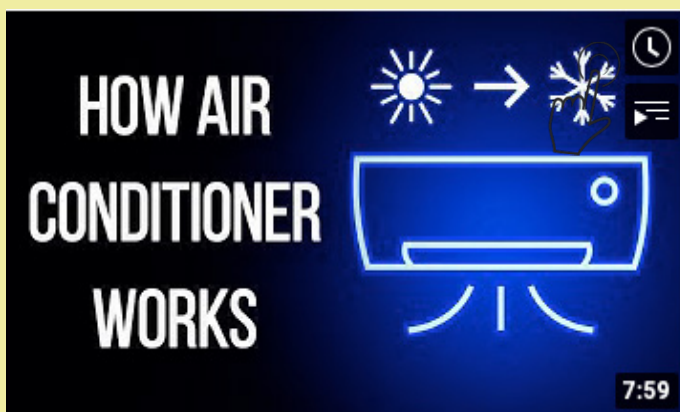
Can you imagine if scientists come up with a climate monitoring and control system for a large city that included cooling and heating devices? That would be very cool! We would not need to install heaters or coolers in our homes and offices. Now, imagine if scientists designed a climate monitoring and control system for a country or even the entire world. That would be incredible. In all likelihood, we would probably be amazed at first. Then, we would begin



taking this amazing system for granted (as long as it functioned without any problems, that is).

Ironically, we already have a climate monitoring and control system on our planet. We call it "The Atmosphere". The atmosphere comes together with other vital equipment such as the Sun, the moon, and the seas. Obviously, heating and cooling systems in our large Palace- the Earth- are far more elegant than any comparable man-made systems. It can thus be said that our man-made heating and cooling systems are primitive toys when compared to the superior technology used in the Palace.

AC was invented because of Mosquitoes



<https://youtu.be/EGX3P7P5AOE?t=1>

"Imagine if scientists designed a climate monitoring and control system for a country or even the entire world."

Third Dimension : Critical Thinking

EXPLORING THE MAKER OF WEATHER AND CLIMATE



In order to appreciate the amount of knowledge and effort used to design an AC unit, it's a good idea to go back in time to learn about how this invention came to be.

About 5000 years ago, ancient Egyptians cooled themselves down by fanning themselves using lotus leaves. They also kept buckets of water in their hallways. The evaporation of water from the buckets cooled down the air.

Consider the modern heating and cooling technology used to control the temperature in a room. Do you believe that you could recreate this technology without years of scientific research and resources? Why not? Indeed, the invention of air conditioning technology was built upon years of accumulated and creative research by a long chain of scientists.





Do you believe that you could recreate this technology without years of scientific research and resources?

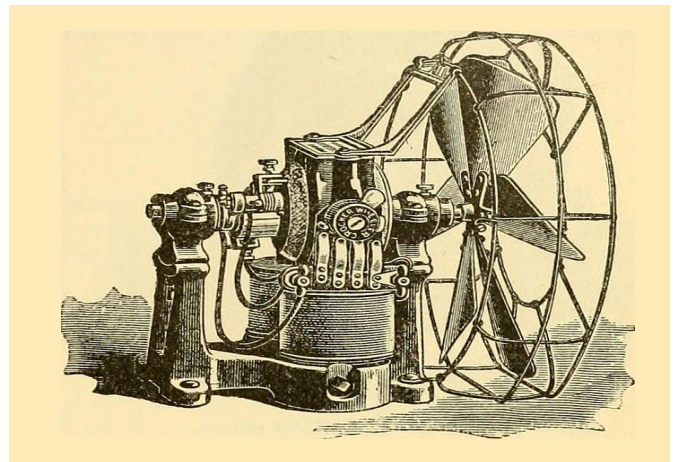
Termites inspired a building that can cool itself



<https://youtu.be/Y3gqoDUtmt4>



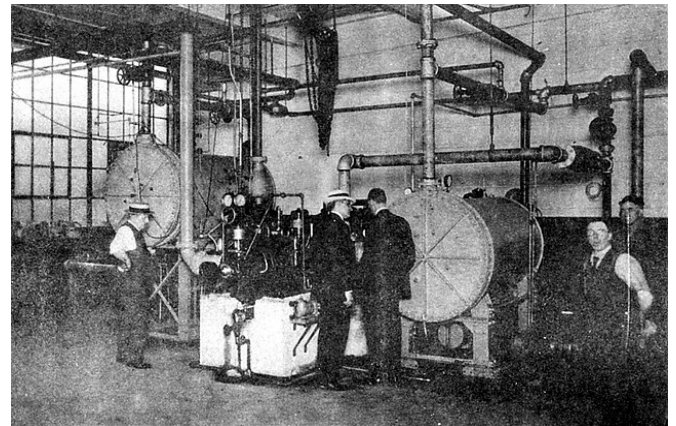
Over 1800 years ago, a Roman emperor had mountain snow delivered by donkey trains to keep cool.



In the late 1800s, an American electric engineer called Skats Wheeler invented an electric fan.



Between 1040 and 1787, Persians designed special wind towers with small windows to catch the wind and transfer it downwards.



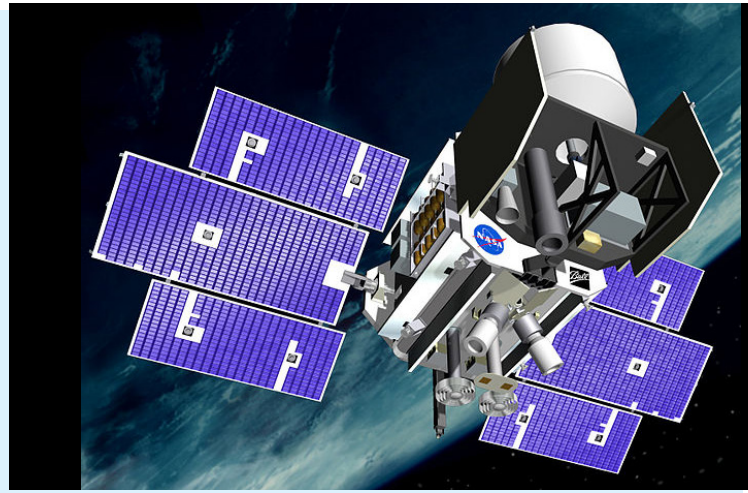
Finally, in 1902, another American engineer, Willis Carrier invented the air conditioner at 25 years old. Since then, the technology used to make air conditioners has been continuously upgraded and refined.

Let us also reflect on the technology used to measure the climate that we have today, like NASA's ICESat-2 (Ice, Cloud and Elevation monitoring) satellite-2, launched in 2018. Today, ICESat-2 is used to monitor changes in the thickness of the ice sheets across regions in the North pole and Antarctica. Collected data is used by scientists to monitor the effects of climate change. ICESat-2, which is 500 kilograms in weight, is one of the largest Earth observation devices ever built. It orbits about 500 km above the surface of the Earth and is equipped with laser beams that measure the depth of the ice on our planet's surface.

Its predecessor, ICESat, launched in 2003, orbited the Earth for 7 years before technical issues brought its functions to a halt. Scientists were unfortunately unable to restart it.



NASA engineers conduct a fit test on the ATLAS instrument of the ICESat-2 mission



To understand the magnitude of the research and hard work exerted by scientists to achieve these incredible inventions, we must remember that this technology was built upon the work of hundreds of other scientists across many centuries.

Can we control the global climate? What about the climate of the city we live in? Or the weather on any given day? Even if advanced technology was able to monitor changes in global temperatures, cloud cover, sea level or polar ice thickness, the ability to single-handedly control any of these changes is impossible. Sure, it may be possible to make small changes to slow down the rate at which we damage the Earth, but the administrative task of constant global climate control is beyond human ability.

Can we attribute global climate control to the individual elements that comprise the climate? To answer this question, we must break down the climate to its smallest components- the molecules that act

within it. Since water plays a starring role in determining the state of the weather and climate, let us look closer at the individual water molecule.

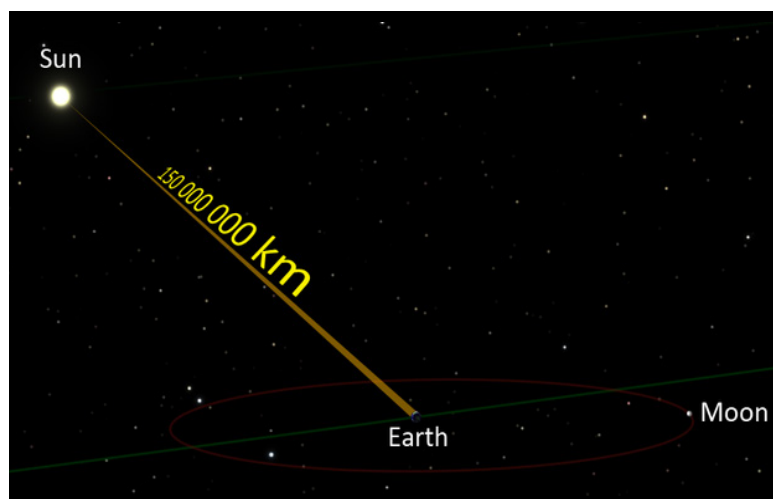
Each water molecule is made of one oxygen atom and two hydrogen atoms. Thus, since the water droplets that are miraculously suspended in the clouds are made of hydrogen and oxygen, could they be, responsible for the weather on any given day? Is it possible that the trillions of miniscule atoms have a state of consciousness that allows them to decide whether to be released over a particular area of land, or remain bound to the clouds that suspend them in it? Do the hydrogen and water atoms in the air communicate?

What about the wind? We learned that the speed of the wind is linked to changes in air pressure. If air pressure is also linked to changes in temperature, and changes in temperature attributed to the position of the Earth in relation to the Sun, and the position of the Earth linked to the ability of the Earth to rotate and revolve around the Sun, then

ultimately we would come to the conclusion that the weather and the climate are determined by the interactions between the Earth and the Sun in the Solar System. Who controls the position of the Earth with respect to the Sun at any given point in time? What would happen if the Earth tilts a few more degrees than necessary in another direction? Or if the Earth moved a little closer to the sun? Who controls the consistency and accuracy with which the Earth is placed at any given moment?

In short, it is very clear that we could not have cooling, heating, and climate monitoring technologies without consciousness, knowledge, will, and power. It is also obvious that the heating and cooling systems in the Earth is a billion times more elegant and complex than any comparable technology. Thus, it makes perfect sense to assume that the Maker of the Earth's heating and cooling systems must have billions of times higher levels of consciousness, knowledge, and power. How can we be sure who is the Maker of the weather and climate?

**“
What would happen if
the Earth moved a little
closer to the sun?”**





Fourth Dimension : Meditative Thinking

CONNECTING TO AND COMMUNICATING WITH THE MAKER OF THE CLIMATE

Let us now reflect on the things that make our planet hospitable. To our best knowledge so far, there are many signs that point to the fact that our planet was designed to be unique from all the other planets in the universe.

Some of these signs were uncovered by a scientist called Dr. John Chambers, at a University of Washington in 2002. Dr. Chambers released the findings of a computer model used to predict the likelihood of Earth-like planets forming in the planetary systems of the universe. For a planet similar to Earth to form, the planet needs to be just the right distance from the central star (in a habitable zone) to support the existence of a certain amount of liquid water for hundreds of millions of years. The audience at the seminar was astounded to learn that

while the likelihood of the formation of a similar planet was likely- Earth was unique from other planets in that it supported complex life.

The model showed that other similar planets had the possibility of forming but with too little or too much water. While there may be planets that support primitive life, the ability to support complex life forms anywhere in the universe is highly unlikely.

What makes our planet special?

It is the only planet with a sizeable moon in the solar system (when compared to its own size). It is also the only planet with plate tectonics (and continental drift) that act like its own personal thermostat- keeping the temperature suitable for life for billions of years.



Additionally, there are other conditions in our solar system that support life on Earth. The largest planet in our Solar System, Jupiter, acts like a comet/ asteroid magnet (because of its large size and pull of gravity) preventing the impact of 'cosmic garbage' on Earth and potential mass extinctions. For the possibility of supporting complex life, other planets would have to have similar-sized planets in their solar systems to reduce the impact of cosmic garbage.

Thus, the Maker of our Earth must also be the Maker of Jupiter and all the other planets within our Solar System that are designed to maintain the Earth's unique existence.

It is clear that the Sustainer of our planet and its unique climate, is the Sustainer of our bodies that are housed within it.

Let us visit some of the elements of our miraculous climate once again. Think about the wind. Consider how it is employed wisely to provide heat, electricity, and the passage of sound to the surface of the Earth. Think about how it is designed to give wings to the seeds of the Earth for efficient dispersal. Consider how the clouds are designed to dispatch billions of water molecules in perfect order in order to continuously sustain the animate beings of the Earth.

What would an inhabitable climate look like? What would happen if the temperature of the global climate rose as a result of global warming? It is very likely that chaos would ensue. Scientists predict that even a 1.5 degree rise in global temperature would spell disaster for the planet, giving rise to rising sea levels, flooding, the eventual loss of coastal cities and towns, frequent forest fires and horrific hurricanes. It is a frightening thought indeed.

It is obvious that it takes the collaboration of many things to get our planet to be habitable- just like a palace our home. At the macro level, the galaxies and stars need to support the Sun to stay where it is. Additionally, the Sun needs to collaborate with the moon, the planets, the atmosphere, and the seas to establish and maintain the right temperature. Indeed, the butterfly effect is a well-known concept referring to the impact of various small

What Makes Earth Suitable for Life?



<https://youtu.be/6Ihbuy5g84g>



events on the weather and climate. The term is related to the work of Edward Lorenz who discovered that minor change such as the flapping of the wings of a distance butterfly affect the formation and path of tornado.

At the micro level, molecules, atoms, electrons, protons, neutrons, and quarks need to come together in a precise manner to produce the perfect weather to sustain life. Furthermore, it is clear that the One who makes the Earth habitable must be the One who creates living beings and knows the right climate to keep them alive. Obviously, the entire universe at both the macro level and the micro level plays a major role in the habitable conditions on Earth. Thus, whoever creates, the universe with all of its micro and macro components must be the One creates and sustains a habitable climate for the living beings in this palace.

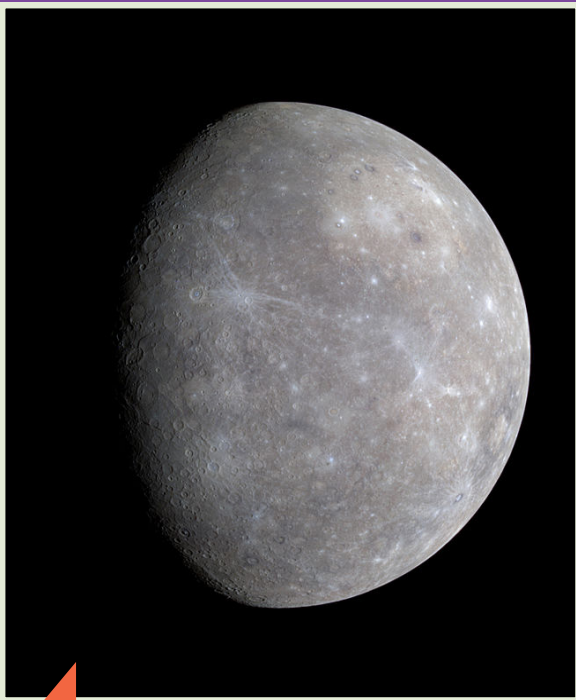
In short, the extreme complexity and inter-connectivity used in the creation of weather and climate clearly point to the One who has infinite knowledge, power, and wisdom. Indeed, the Maker of the Earth must be the Creator of the inhabitants that live within its hospitable environment and receive sustenance from it. He must have knowledge and power of how to harmonize thousand factors to sustain life. He must be caring and loving Maker in establishing giant heating and cooling systems for all living beings for free. In fact, in making the Earth to be a pleasant palace/home for its guests, He reveals that He is :

- **Most-Compassionate**
- **Most-Caring**
- **Most-Kind,**
- **All-Wise,**
- **All-Knowing,**
- **All-Powerful.**

Fifth Dimension : Moral Thinking

RESPONDING WITH BETTER CHARACTER

“Have you ever wondered what the climate is like on other planets?”



The Solar System's smallest planet- Mercury.

The gift of a stable global climate is one we all too often take for granted. Have you ever wondered what the climate is like on other planets?

Let us imagine that the human race developed the technology needed to travel to the Solar System's smallest planet- **Mercury**. As you approached this planet, which happens to be the planet closest to the Sun, you would be surprised by its dark black sky. The reason for this is that Mercury does not have an atmosphere, so there are no molecules in the air to scatter the light from the sun. Additionally, at night, it would not be possible to see any shining stars. There are no oceans either. If you were wearing a special suit to protect you from Mercury's extreme weather, you may survive. But the suit would have to be made of materials that are stable between 430 degrees Celsius and -180 degrees Celsius. Mercury is also subjected to multiple earthquakes.



Earth's twin sister, Planet Venus

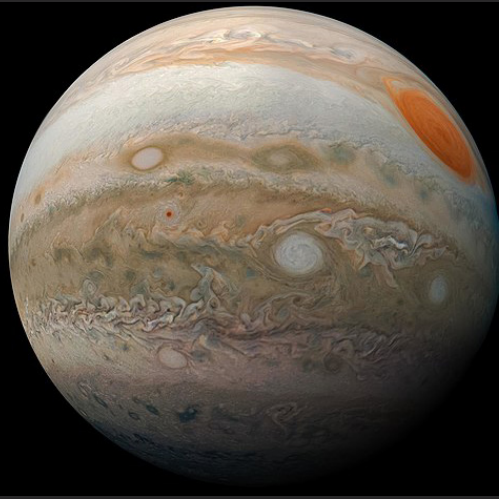
Have we discovered signs of life on Venus?



<https://youtu.be/mLH6QC-RXo8?t=3>

What about **Venus**? Temperatures on this planet, that is often called Earth's twin sister because of their similarity in mass and weight, are hot enough to melt lead! While its gravity is about 91% of Earth's gravity, its dense atmosphere is filled with Carbon Dioxide. The presence of Carbon Dioxide in the atmosphere means that the sky appears reddish-orange rather than blue. On Venus, there are multiple volcanic eruptions and winds stronger than those of a tornado or a hurricane.

Interestingly, scientists claim to have recently discovered potential evidence of life on Venus in the form of phosphine, a chemical previously only associated with the presence of living organisms. Since Venus has been described as 'hellish', the only place that could sustain a form of life on this planet would be 30 miles in a temperate band of the atmosphere above its surface. Scientists speculate that this could be in the form of single-celled microscopic organisms that would be able to survive in an acidic environment. However, they have yet to eliminate the possibility that the presence of phosphine is a result of physical or chemical processes.



"Jupiter is the solar systems largest planet!"

Let us consider **Jupiter**- the Solar System's largest planet. If you were to miraculously land on Jupiter's solid inner core (whose mass is actually ten times smaller than Earth's), you would instantly be flattened by its dense outer layer made of liquid hydrogen. Your prognosis? Not very likely to survive, to say the least!

Climate change exposes people, societies, economic sectors and ecosystems to risk. Intergovernmental Panel on Climate Change (IPCC), which was established by the United Nations Environment Program and the World Meteorological Organization (WMO) in 1988, found out that human influence on the climate system is a fact, and recent anthropogenic emissions of greenhouse gases are the highest in history. What is eye opening is the fact that 100 percent of the global warming over the past 60 years is human-caused, according to the IPCC's latest report

As we see, human beings have been increasingly abusing our atmosphere. Now, it is time to think about our future as well as

the future of the planet earth. Are we owed a stable global climate? Is it our right? Did we pay for it, or was it given to us? If we did not purchase access to our stable atmosphere, then we need to reflect on why it was given to us.

If we damage our climate, all living creatures will be affected and it would be very difficult to restore it. Climate activists like Swedish student Greta Thunberg have been campaigning for people to wake up to the reality of unravelling ecosystems and destroyed oceans. 'I don't want your hope. I want you to panic... and act', Greta said in a speech at the World Economic Forum Annual Meeting to a room full of financial, political and media leaders. Greta is a sixteen-year old Swedish student activist who has been nominated for the Nobel Peace Prize for her commendable role in addressing climate change. She has warned that if global action is not taken to address the impending catastrophe of a destroyed climate, the end of civilization as we know it is imminent.

What can we do to show our gratitude to the Sustainer and Maintainer of our climate? How can we give thanks to another day of being able to walk outside our door and breathe, unassisted and unperturbed by toxic pollutant levels, burning heat or extreme cold?

The True Bestower of Bounties wants in return for his precious gift of a habitable climate three things: one is remembrance, another is reflection and the third is gratitude.

1

Remembrance is realizing that there is a Creator of the global climate and its very complex systems as a whole.

2

Reflection is thinking of our balanced climate as a gift of the Creator's mercy.

3

Gratitude is being thankful to the Creator for bestowing upon us a habitable climate.

In order to reflect on the magnificent gift of a habitable climate, we need to strengthen our senses of **curiosity, purpose, zest, and gratitude**.

Being **curious** about the climate means that we try our best to understand how it has been created and sustained to help us and other living beings. We reflect on extreme balance and harmony in the climate system.

Feeling a sense of **purpose** means we understand our role in, and apply our understanding of, what it means to care for our planet's climate. We avoid harming such harmony through poisoning the air and destroying the delicate climate system. Change of mind must be followed by change of our daily consumption patterns and habits in the spirit of sustainability.



Feeling a sense of **zest** for life is only possible if we give back to our planet and its inhabitants by embracing environmentally friendly and sustainable lifestyle. If we understand the true value of climate system, we will contribute to the health of the planet and its inhabitants in our own individual ways and we will feel more **gratitude** and **appreciation** for the gifts we have been given by the All-Wise, the Most-Kind and the Most-Generous.

In giving, there is a joy that is unmatched by any other experience. Giving gives us **zest** for our existence.

The pursuit of selfish pleasure at the expense of others will always result in loss for all. What power and profit-hungry corporations do not comprehend, is that in their quest for maximum capital gain, they are neglecting the health of the future generations and the planet that is designed to sustain them. If they have any hope of preserving the planet they have been given for their descendants, then they must revisit their priorities. Remembrance, gratitude, and reflection for the gifts they have been given by the Creator are the agents which will help them along the way.

All-Powerful

All-Wise

All-Seeing

Most Kind

Most Merciful

All-Knowing

TEST YOUR KNOWLEDGE

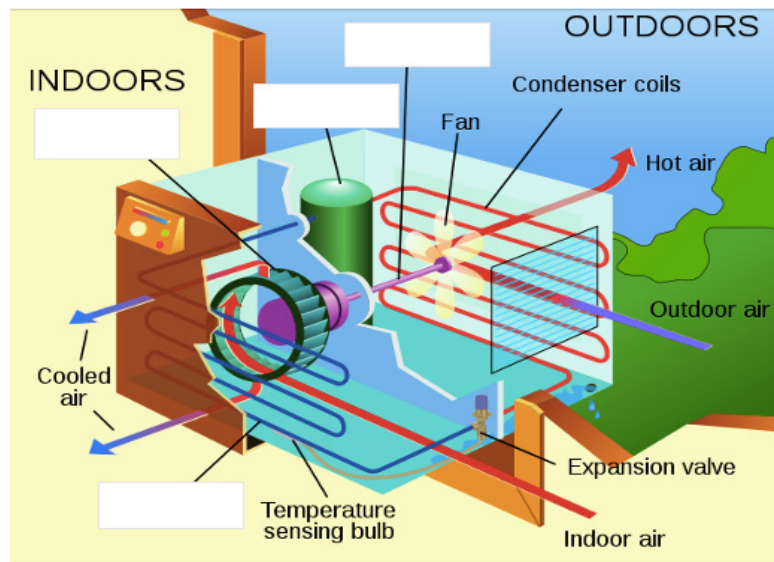
I. UNDERSTANDING SCIENCE TERMS

Complete the following sentences with a word or words from the Science Terms that will make the sentence correct.

Climatology Meteorology Mercury Venus Weather Precipitation Climate

1. _____ is a word used to describe moisture returning to the planet from the atmosphere where water droplets condense to form clouds.
2. The scientific study of the weather is known as _____.
3. The hottest planet in our solar system is _____.
4. The smallest planet in our solar system is _____.
5. The _____ is determined by the changes of the air around us.
6. The _____ changes from season to season.
7. The study of the climate is known as _____.

Label the following diagram:



II. CHECKING FACTS

Determine whether each of the following is true or false.

1. Only one in ten people who get struck by lightning survive. _____
2. A lightning bolt can be five times as hot as the surface of the sun. _____
3. The climate changes from season to season because of the moon. _____
4. The countries near the North Pole receive less light in winter. _____
5. Venus is habitable to human life. _____
6. Weather would not be perfect if the Earth followed perfect circle rather than tilted one while circling around the Sun. _____



III. UNDERSTANDING CONCEPTS

Write a short answer for each question or statement.

1. What are the five main types of climate on Earth?

2. Name four types of extreme weather.

3. How do we keep track of changes in weather?

4. How do you know that there is a Hidden Hand behind the control and maintenance of the weather and climate?

5. List two hidden messages in the Earth's climate from its Maker.

6. Discuss two moral lessons from studying the weather and climate.



IV. APPLYING CONCEPTS

Write a paragraph to answer each question.

1. How is the design of the Earth's climate control system different from that of an air conditioning unit?

2. Describe how your life would be different if the Earth's temperature rose by 2 degrees Celsius.

3. Why do you think material causes such hydrogen and oxygen atoms could not have created the Earth's climate?

4. The One who creates the Earth's climate has to be the Creator of the Earth. Why?

5. Why do you think our climate is an extremely valuable gift? Describe two things that make you appreciate the value of this gift.



6. How can you show your gratitude to the One who granted you the gift of the climate?

V. THINK-THANK GAME

In this “think-thank” game, we want you to think about the nose and give thanks to their Maker. We also call it the “play to praise” game. The goal of this game is to think of at least five things about the nose that you are thankful for.

Number of players:

At least two.

Directions:

Player 1 repeats an appreciation phrase loudly and quickly. Player 2 responds, without pausing, with something to be thankful for. This is repeated five times.

To win:

Player 2 needs to respond five times (without pausing) with different things about weather and climate to be thankful for in order to win the game.

Here is an example of two rounds of this game:

1. Player 1 repeats the appreciation phrase loudly and quickly. For example: “Thanks to the Maker of climate!”
2. Player 2 responds, without pausing, with something about climate to be thankful for. For example: “For making the Earth axis to be tilted to create seasons!”
3. Player 1 repeats the appreciation phrase again loudly and quickly. For example: “Thanks to the Maker of the climate!”
4. Player 2 responds, without pausing, with another thing about the climate to be thankful for. For example: “For keeping the earth temperature livable and pleasant!”

This should be continued for another three rounds until Player 2 wins or loses.