The Water Cycle

"When the well is dry, we will know the worth of water."
-Benjamin Franklin

Water exists as rain, snow and sleet and makes up ponds, lakes, rivers, and streams. Masses of saltwater bulk up the oceans. Water exists in our bodies and in the bodies of all other living organisms. It is stored beneath the surface of the Earth, soaking into large, porous rocks. It flows through our taps into our sinks at home, and through our air conditioning units and heating systems. Incredible amounts of water are used in agriculture to grow vegetables and fruit, as well as in animal farming. Water is also an indispensable component of medical infrastructure and is utilized for sterilisation and pharmaceutical production.

Water in all forms is part of a continuous cycle traveling from one being to another. Did you know that the water you drink was once part of the ocean? In this chapter, we will learn about the value of this liquid gold- water- by following the journey of a single drop of water from the ocean to your lips, and back.

First Dimension : Analytical Thinking

SCIENTIFIC UNDERSTANDING OF WATER CYCLE

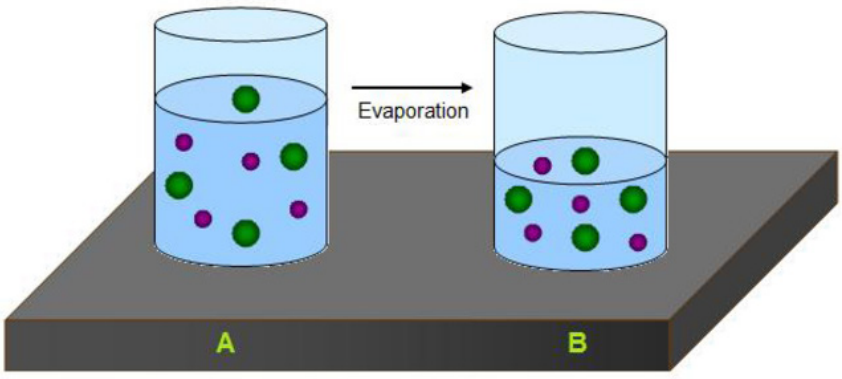
Did you know that the water found on Earth today is all the water that ever existed on the planet? The reason for this is that water is continuously being recycled from one form to another in a continuous process.

The Water Cycle is comprised of four interconnected stages. These are: evaporation, condensation, precipitation, and storage.

Evaporation

This is when water changes from a liquid to a gaseous state. This process occurs when energy from the Sun heats the water of the oceans, rivers and lakes. When liquid water is heated, it changes to water vapour and collects in the clouds.

One type of evaporation is utilised by plants to return water back to the atmosphere. This type of evaporation is known as **transpiration** and occurs when water is released as water vapour from the surface of leaves.



Condensation

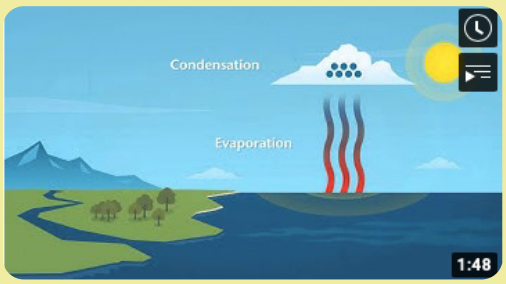
This is when water changes from a gaseous to a liquid form when it cools. To better understand this phenomenon, consider the droplets that form on the outside of a glass of chilled water. These droplets form when water vapour in the warm air condenses on the surface of the cool glass.

Clouds are formed when tiny water droplets or frozen crystals come together and are suspended in the air.

Precipitation

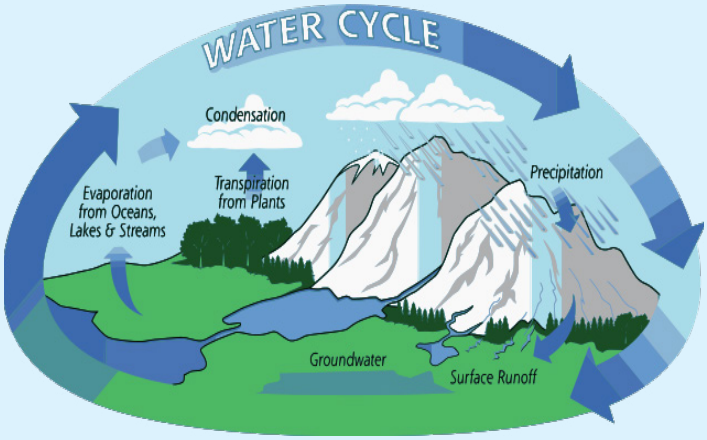
Precipitation is a word used to describe the water that falls from clouds as rain, snow, sleet or hail. Precipitation is a phenomenon designed to make it possible for water to return to the surface of the Earth.

How does rain form and what is the Water Cycle?



https://youtu.be/zBnKgwnn7i4

In animated video, the process by which rain forms is explained. You will understand how rainfall, evaporation and condensation all form part of the Water Cycle.



Storage

When water falls as precipitation, it is absorbed by the soil and stored in **aquifers** (porous rock) beneath the surface of the earth. Water that is stored in aquifers is known as groundwater. However, not all precipitation is absorbed by the soil. The water that is not absorbed by the Earth's surface collects in rivers and streams and eventually makes its way back to the ocean. This water is known as **runoff**.

Recall that water is also stored in the bodies of plants and animals. In plants, water is combined with carbon dioxide in the process of photosynthesis to make high energy molecules such as glucose. Glucose is then broken down by cellular respiration and the water is re-released into the atmosphere. Animals obtain most of their water through food and by drinking it from available sources of water. The water is then returned to the atmosphere by cellular respiration, evaporation and excretion. Did you know that our bodies are made of 70% water?

Amazing Scientific Facts

-The Water Cycle-

1.

Did you know that about 97% of water on Earth is salty? Indeed, only 3% of the Earth's water is freshwater. However, 2% of this freshwater is found in the form of glaciers and ice caps. This means that we, as human beings, along with other living beings, only have access to 1% of all the water on Earth.

2.

Did you know that the human brain is made up of 75% water- just like living trees? Interestingly, most of the vegetables that we enjoy are made up of more than 90% water which makes them an excellent source of hydration.

3.

Did you know that, unlike other elements, water expands while freezing? Indeed, water expands by 9% when it freezes, therefore, ice is less dense (and thus lighter) than liquid water. Without such an exceptional property, most -if not all- aquatic animals would die when water freezes.

4.

Did you know that you might not live beyond seven days without drinking water whereas you can go for about a month without food?

5.

Did you know that the sun is designed to evaporate a trillion tons of water every day?

6.

Did you know everything is a complex, integrated, and well-designed system and that water is so essential for the entire system and life as a whole?

7.

Did you know that most industries cannot run without the Water Cycle? Indeed, every loaf of bread you consume uses about 570 gallons of water from the Water Cycle. It takes at least 2.5 gallons of water to grow one tomato and 11 gallons of water to grow a single orange. It takes about 5,200 cubic feet of water to produce a new car and 8000 cubic feet of water to produce one ton of steel.

8.

Did you know that just like the water in our blood is designed to regulate our body temperature, the water on our planet is designed to regulate the temperature of the Earth?

Second Dimension : Analogical Thinking

MAN-MADE DRINKING WATER SYSTEMS VS. WATER CYCLE

As mentioned in the previous dimension, water is an indispensable component of living (biotic) and non-living (abiotic) matter.

Can we create water? What would creating water entail?

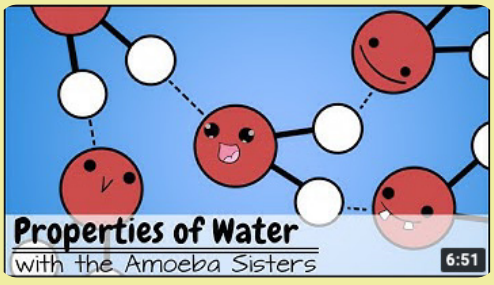
Let us take a closer look at the complex structure of water. A molecule of water is comprised of one atom of oxygen and two atoms of hydrogen.

The Water Cycle differs from other cycles, such as the Nitrogen and Carbon cycle, in that the chemical composition of its primary component- water- remains largely unchanged. The chemical formula of water is H_2O.

Properties of Water

To produce water from its components, you would have to join two atoms of hydrogen with one atom of oxygen. If you were to simply mix hydrogen and oxygen however, nothing would happen. The reason for this is that the orbits of hydrogen and oxygen atoms need to become linked, and to do this you would need a spark to initiate the reaction. However, since hydrogen is highly flammable, there would be an explosion. To produce water on an industrial scale, it would be very expensive as the facilities required to contain the repeated explosions would need to be enormous.

Properties of Water

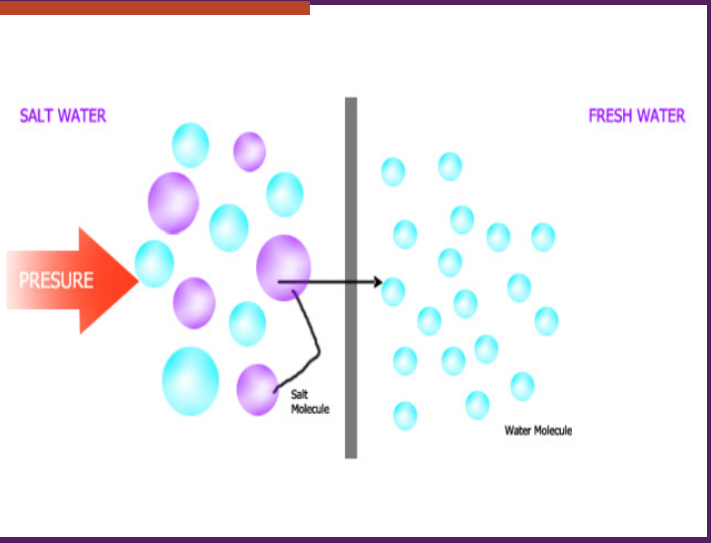


https://youtu.be/3jwAGWky98c

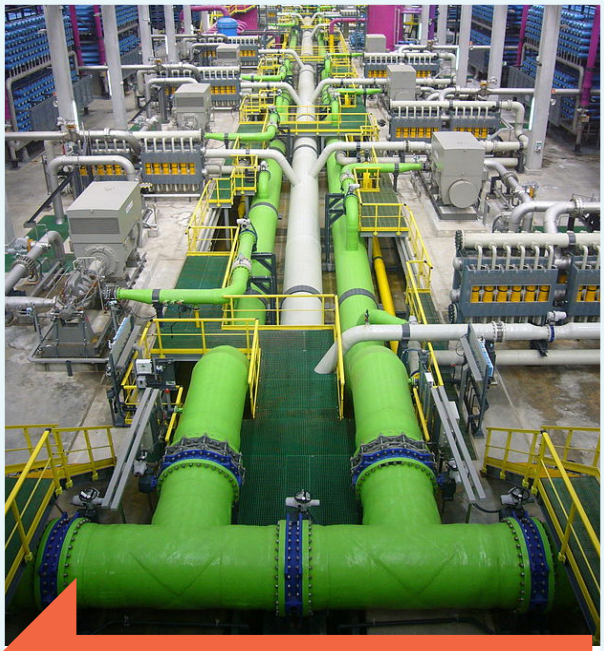
In this video, the properties of water are explored by taking a closer look at its hydrogen bonds.

Reverse Osmosis

Reverse osmosis, salt-water is let through a barrier that contains many small holes. A lot of pressure may be required to force the water through the barrier. This depends on how much salt there is in the water. If the amount is high, the pressure required will be higher. The holes allow the water molecules to pass through, but not the salt.



As mentioned before, only 1% of the water on the planet is accessible freshwater. Since it is not feasible to make water from its basic components, in countries where sources of freshwater are scarce, a process called desalination is used to remove salt from seawater or salt-laden groundwater to produce water that is safe for drinking, agricultural and industrial use. However, this process is expensive as it uses an enormous amount of energy, contributing to global warming by its high greenhouse gas emissions.



Desalination

The process of desalination involves removing high quantities of salt from saltwater. This is done in one of two ways: **distillation** and **reverse osmosis.**

In **distillation**, water is heated so that it forms a gas, leaving behind the salt. The water is collected as steam cools to a liquid once again (but now it is salt-free).

Using the second method, **reverse osmosis**, salt-water is let through a barrier that contains many small holes. A lot of pressure may be required to force the water through the barrier. This depends on how much salt there is in the water. If the amount is high, the pressure required will be higher. The holes allow the water molecules to pass through, but not the salt.

The salt that is left behind poses a problem. Desalination plants are often built close to the coast so that the by-product of desalination- brine- is pumped back out to the sea. This increases both the salinity and the temperature of the sea in the area which in turns harms aquatic life and reduces oxygen levels in the water. This process eventually leads to the formation of **dead zones.**

A better way of removing dissolved salts is to use bacteria. Some treatment plants use anaerobic and aerobic bacteria to remove salts such as nitrates and phosphates from desalinated water.

Reverse osmosis alone is not enough to make water safe enough to drink (**potable**). Other technologies such as Ultraviolet Disinfection treatment and Activated Charcoal treatment are used to remove carbon-containing contaminants in the water such as medicines, pesticides, and disinfectants.

"The increase in both the salinity and temperatur of the sea, harms aquatic life and reduces oxygen levels in the water, forming dead zones."

As you can see, the process of making water suitable for human use is a long, complicated, expensive and environmentally harmful process. Many countries are turning to alternative ways of supplying water to homes such as harvesting rainwater and stormwater.

Microfiltration system at Bedok NEWater Factory, Singapore

A human-made technology comparable to the Earth's Water Cycle is also being used by some countries to treat sewage water and reuse it as drinking water. Singapore, for example, derives nearly half of its drinking water from treated sewage. It is known as **reclaimed water** or NEWater. After many years of collaboration, scientists came up with the following multi-step process to recycle sewage water that involves:

1. Microfiltration: Microscopic particles including some bacteria are filtered out at this stage.

2. Reverse Osmosis: Undesirable contaminants are removed here. The water at this stage is high-grade water.

3. Ultraviolet Disinfection: The water passes through ultraviolet light to ensure any remaining organisms are eradicated. Chemicals are added to restore the pH balance. NEWater is now ready for use.

Can you see a faint resemblance between the man-made desalination system- the reclaimed water system- and the Water Cycle? Which process is more sophisticated, efficient and elegant? Is it possible to establish an artificial Water Cycle system at your house?

NEWater: A Singapore Success Story

https://youtu.be/DWWU-8_4wu0

Watch this video learn about the success story of NEWater, a high-grade reclaimed water system in Singapore.

Third Dimension : Critical Thinking

EXPLORING THE MAKER OF THE WATER CYCLE

In the last section, we established that the artificial process of desalination to obtain fresh water attempts to mimic the Earth's Water Cycle. Remember, to get pure water, salt-water is simply boiled to separate the salt it contains. Through boiling, liquid water transforms to steam while the salt is left behind. Then, the purified water is transported to those who need it through water pipe systems and or/ water tanks.

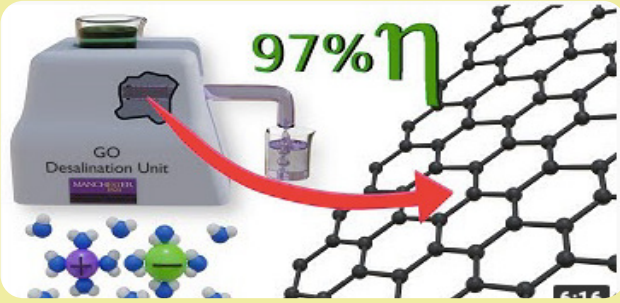
In nature, the oceans, sun and atmosphere work in perfect collaboration to do the same thing- although at a much larger and more efficient scale. The Water Cycle thus works better than any man-made desalination system. First, it utilizes solar energy, which is the most abundant and clean form of energy. Second, it works efficiently by not wasting a single drop of water during the process. Third, it works very effectively, and on a much larger scale. Fourth, the transportation process is achieved without any interruption or disruption to anyone's daily commute. Fifth, an enormous scale of air transportation is achieved without producing any pollution. In conclusion, water is delivered in a kind, efficient, cost-effective and harmless manner to all the inhabitants of our planet.

The Invention of the Modern Desalination System

One of the earliest references to desalination was given by Greek philosopher Aristotle (384–322 BC) who said:

"Saltwater when it turns into vapour becomes sweet and the vapour does not form saltwater again when it condenses"

Graphene Filtration | A Revolution in Desalination technology!



https://youtu.be/tAN0QNQFDbg

Watch how a group of Manchester Institute of Science and Technology researchers recently made a major breakthrough in the graphene-based desalination process.

"Did you know that desalination was used on ships to produce fresh water to drink?"

In its earliest stages, desalination was used on ships to produce fresh water for drinking in cases of emergency. Much later, in the 1950s, the first modern process of desalination was introduced in the United States. However, it took some time for the process to become streamlined for use industrially. The first industrial desalination plant was built in the Caribbean island of Aruba in 1959.

The development of modern technologies such as desalination plants was only possible through the combined efforts of researchers and the availability of resources over a long period of time.

It took even more time and effort to come up with a system that recycles sewage water into drinking water. Indeed, the very first plant was established in the year 2000 in Singapore.

There are three factors that must come together in perfect unison to result in human inventions such as desalination or reclaimed water. These are **knowledge, resources,** and **time.**

Knowledge: What is knowledge? How do we know what we know? What makes it possible to know what we know? Human beings have been equipped with senses, reason, and other faculties that make it possible to communicate with the world around them. Only by observing, understanding, analysing, and retaining information using their senses, can they begin to acquire knowledge.

Resources: Resources are provided in a variety of forms. Some of these resources are physical (elements from the rocky surfaces and water sources of the planet) and some are nontangible (like wisdom, intelligence, health, love, human connection and the appreciation of beauty).

Time: The availability of time is too often taken for granted. We are mostly unconscious and have no control over its subtle passing as we perform our daily tasks. Time is valuable.

When the acquisition of knowledge is combined with the availability of resources and accumulation of time, modern human inventions are made possible. The human-made inventions of desalination and reclaimed water are simply the results of a combination of cumulative knowledge, resources and time, and based on an imitation of an observable phenomenon- the Water Cycle. In fact, it would be more accurate to say that the desalination process is only a partial imitation of the Water Cycle.

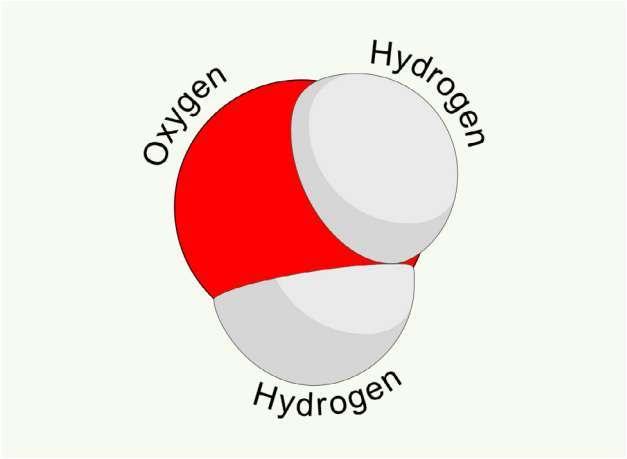
"Did you know that the Desalination process is only a partial imitation of the water cycle? "

In short, it is an undeniable fact that the development of the modern desalination system and reclaimed water system would not have been possible without the will, effort, and knowledge of many people over many years. Since the Earth's Water Cycle system is much more complicated and elegant than any comparable man-made system, it must require an even higher level of knowledge and power along with persistent will. Just as we are aware that any modern house equipped with utility services has a payable utility provider, we must be aware of the Utility Provider of the Earth to pay our due bill.

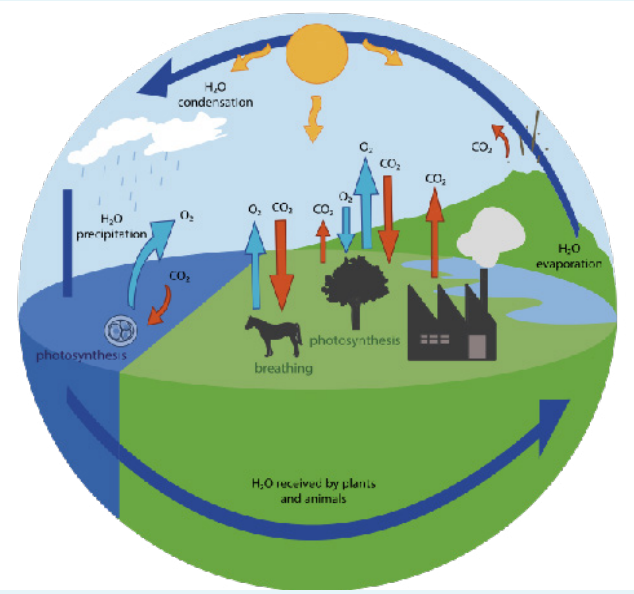
Fourth Dimension : Meditative Thinking

REFLECTING ON THE ATTRIBUTES OF THE MAKER

In the previous section, we concluded that that it takes will, knowledge, and power to create the Water Cycle. Who is the Creator of this miraculous cycle? We believe the Water Cycle is quite transparent in revealing the presence of its Creator through unique 'marks'. We can find evidence for these 'marks' through two main observations. First, the Water Cycle is the outcome of a series of delicate, interconnected events at both the macro and micro level. Second, plants, animals, and human beings all rely on the delicate system of the Water Cycle.

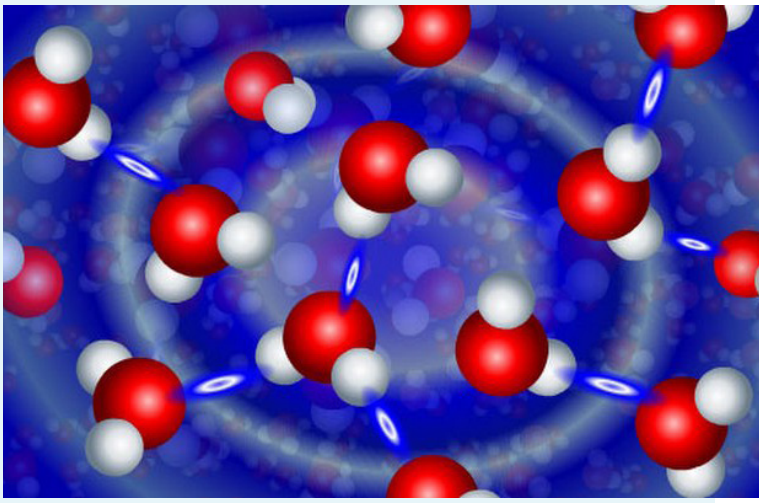


At the micro level, for the Water Cycle to exist, water molecules need to possess certain physical and chemical properties to allow the water to move from one stage to another. First, a stable subatomic universe made out of electrons, up quarks, and down quarks needs to be created (perhaps they need to be created constantly from the quantum field as science has revealed). Next, hydrogen and oxygen need to come together to make a water molecule without causing an explosion. Indeed, since hydrogen gas is highly flammable, it ignites when mixed



and micro levels. We can thus conclude that the Water Cycle can only be the work of the One who creates and maintains the entire universe.

Let us explore that would happen if different stages of our Water Cycle suddenly stopped functioning, what would happen if there was a fault in:



with oxygen in the air. Strangely, if it were up to their individual properties, the elements that make up water – oxygen and hydrogen- would produce a fire rather than extinguishing one. Furthermore, the mass of a water molecule needs to be light enough to be carried by the air molecules. The force of gravity is also needed to bring water molecules down to the Earth.

At the macro level, we can see that the Water Cycle functions through the collaborative work of the Sun, the atmosphere, the oceans, the force of gravity and the solar and galactical systems in which they all exist.

Perhaps, as we enhance our knowledge of the various elements of the Water Cycle, we will understand that the Water Cycle is connected to the entire universe at the macro

" Did you know that the elements that make up water-oxygen and hydrogen- would produce a fire rather than extinguish one? "

01

1. Condensation:

Remember, condensation is the process in which clouds are formed. If water vapour suddenly lost the ability to change its state from water vapour to liquid, or if droplets of liquid water were not able to collide with and stick to particles in the air, clouds would not form. Without clouds, there would be no rain. Without rain, temperatures around the world would rise exponentially, droughts would be widespread and mass extinction of life would soon occur.

02

2. Precipitation :

As we learned in the first dimension, precipitation is the water that falls from the sky as rain, snow, sleet or hail. Precipitation occurs when water droplets or ice crystals in clouds become too heavy to remain suspended in the air and fall. If there was a fault in the precipitation stage of the Water Cycle, the water droplets would become heavier and heavier and all the water sources on Earth would soon dry out.

03

3. Evaporation:

Let us imagine water lost its ability to change its state from liquid to water vapour. Without the ability to transform to a gas, water levels on the planet would quickly rise, leading to mass flooding. As the sun continued to warm the Earth without evaporation occurring, temperatures would rise very rapidly. To better understand this scenario, imagine placing a pressurised can of liquid in a sweltering oven. As the liquid in the can boils, the increasing heat and pressure would cause the can to explode.

“Similarly, the true source of water is not hydrogen and oxygen. Rather, it is the Mercy, Power, and Knowledge of the Creator. ”

Are we running out of clean water? - Balsher Singh Sidhu

https://youtu.be/OCzYdNSJF-k?t=1

Watch how Balsher Singh Sidhu takes a closer look at water consumption in this TEDx talk.

Just as the Water Cycle is connected to many factors for its existence, all living creatures are connected to the Water Cycle to survive. Indeed, one might argue that the ultimate product of the Water Cycle- fresh-water- is the source of life for all living beings. Thus, it is clear that the One who creates the living cells of plants, animals and humans, creates certain properties of water to sustain life. As we discussed before, the properties of water are very different from that of its elements. This fact is a clear sign that water does not come from hydrogen and oxygen. Rather, it is directly created by the Most Merciful using hydrogen and oxygen.

Just as light is produced through a combination of electrical wires, light switches and bulbs, but not from them; drinking water also comes through pipelines and faucet systems, but not from them. Similarly, the true source of water is not hydrogen and oxygen. Rather, it is the Mercy, Power, and Knowledge of their Creator. Water is created as a result of the manifestation of the attributes of its Maker who creates life along with the water and food that sustain it.

Indeed, it is evident that the Wise Maker of water is the maker of the Earth and all that lives on it. This is because our Maker knows the need of the inhabitants of this Earth for water. He must know the need of every single biotic and abiotic process for water as a universal solvent which dissolves more substances than any other liquid. The Maker of water is also the Maker of the Solar System that houses our planet within the universe. In short, The Maker of water can only be the giver of life and of sustenance.

The Creator of the Water Cycle must have the wisdom, ability and power to maintain the intricate balance of water molecules moving from one form, or state, to another. Indeed, He must have bestowed the Water Cycle with the associated ability to suspend billions of water vapour molecules in the air into the masses that we call clouds. He must know our needs for liquid water to be released from the clouds as precipitation at a specific point of time, or for water to be released by melting glaciers of ice when required.

The Maker of the Water Cycle must be very generous and compassionate in providing us with this system through which water passes through various stages to sustain life on Earth. Without the presence of this liquid gold, which makes up the main composition of our physical bodies, we would not be alive. Should there be a shift in the balance of the Water Cycle, humanity would be at risk of survival. In the past few years, we have already witnessed and experienced extremes of temperature, severe drought and flooding in many parts of the world. This climate change is a result of human beings' lack of appreciation for the Creator's gifts. The planet seems to be protesting about its inhabitants' carelessness by heaving up in the form of frequent earthquakes, mudslides, mass flooding, and drought.

Just as we know that the utility services we enjoy in our homes must come from a utility provider, we must know and be aware of The Provider of the Earth to pay our due bills. Every month, we willingly settle our utility bills with a sense of appreciation, knowing we will receive the services we pay for. Likewise, at the very least, we should offer our sincere gratitude and appreciation to The Provider of the Earth for His constant provision of elegant and efficient utility services to all living beings.

Fifth Dimension : Moral Thinking

RESPONDING WITH BETTER CHARACTER

If the Water Cycle stopped in its tracks, could we fix it? Could we press a 'restart' button to get it to reboot itself? Would we be able to purchase a quick fix, or a substitute, for its role? The answers to these questions should be evident. We did not create the Water Cycle, nor did we purchase it. Even if we were to bring the world's best experts on hydrology and thermodynamics together, we would simply not be able to re-create this flawless system.

The provision of the Water Cycle allows us to survive here on Earth. The unrelenting, mass production of water is beyond what the human brain can comprehend. **Appreciation** is understanding the value of our flawless Water Cycle. It is to realize the importance of having water on the planet. It is to understand that freshwater is a true blessing.

Indeed, water is the most important element of life. Water is the necessary ingredient for the creation and continuation of life. It is an extremely valuable gift.

Would you be willing to give away this gift, at any cost? The True Bestower of Bounties wants in return for the precious gift of the Water Cycle three things: one is remembrance, another is reflection, and the third is gratitude.

1

Remembrance is realizing that there is a Creator of the Water Cycle.

2

Reflection is thinking of the priceless, miraculous Water Cycle as a gift of our Creator's mercy.

3

Gratitude is being thankful to the Creator for granting us a Water Cycle that supplies water for drinking, bathing, growing food and maintaining our environment.

STORY TIME ...

Drinking Seawater Can Kill You

Have you ever watched the Discovery channel movie Capsized: Blood in the Water? It is based on the horrifying true story of five people who went on a routine sailing trip from Maine to Florida in October 1982. Two days into the journey, their yacht capsized, throwing them into the ocean. All five crew members managed to clamber into a life raft. However, within hours, they were surrounded by hundreds of killer sharks. By the third day on the raft, the crew members began to get delirious as their brains were slowly starved of water.

Desperate for hydration, two of the crew members began to drink seawater, known to accelerate dehydration and cause kidneys to shut down. The two men soon became delusional, with one claiming to have seen land and the other wanting to swim over to buy supplies. Both men subsequently jumped off the raft and were quickly eaten by sharks. A third crew member suffered an agonizing death from infected wounds inflicted during the cap size of the yacht. Five days after the sinking of their yacht, two of the crew members were still alive, most likely due to the fact that they refused to drink seawater. They were rescued by a passing Soviet cargo ship and presented to US authorities.

How can we express our gratitude and appreciation for the Water Cycle?

Let us consider what steps you can take to remember, be grateful, and reflect:

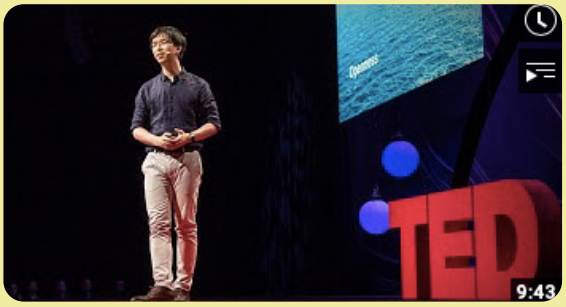
Remember the value of water. When washing your hands or bathing, remember the journey of the water you are effortlessly using from the ocean to your tap. Do not get into the habit of wasting water. Treasure water!

Be grateful for water. Being **grateful** for the presence of water tends to be easier when you experience a lack of it. If water is abundant where you live, recall that more than half the world's population do not have the luxury of access to running water! Give back to others by sharing the sustenance provided to you by the Most Generous. Practice gratitude by thanking the Creator and Sustainer of our Water Cycle every day.

Reflect on how water is created to nourish your body and keep it clean. Reflect on how access to clean, running water means that you are less susceptible to illness. Reflect on the value of having easy access to fresh drinking water. Reflect on how every sip of water is designed to reach your cells to keep them alive. Reflect on how every created organism needs to be sustained by the continuous provision of water.

The Water Cycle not only delivers sustenance for our bodies, it presents lessons for the heart and mind. For instance, a water droplet descends very gently- teaching us to be gentle with others. It reaches all living beings regardless of race, ethnicity, economic background or gender- teaching us to help anyone in need without being discriminative. Water always finds its way around obstacles- telling us not to give up in the face of life's challenges. It takes various forms in the bodies of various living beings, but never loses its essence- showing us how to preserve our identity while getting along with others. It mirrors the Sun's colors rather than revealing its own- showing us how to be a mirror to the Divine Names rather than revealing our ego. When exposed to heat, it changes form, moving upwards towards the sky- teaching us to give up our ego and understand our true nature of being impotent and needy. Only by giving up our egoic selves can we reach the highest level of humanity through the good character traits of kindness, perseverance, piousness, and compassion.

Be humble -- and other lessons from the philosophy of water



https://youtu.be/OIlSXRC-B-I?t=1

In this TED talk, we learn how water teaches us to be humble, live in harmony with others, and be open to change.

Remember the value of water, practice gratitude for its presence and reflect on its countless uses on the Planet earth.

Being **good residents** of this planet means having **respect** for the resources provided to us by our Creator. It means no waste or overconsumption. It means the efficient and effective use of all resources for beneficent outcomes in the spirit of sustainability. Remember: not a single drop of water has been wasted since the establishment of the Water Cycle. Water molecules are being used again and again to support the countless creatures on our planet in a most generous and kind manner.

To be good humans, we need to strengthen our **love of learning, self-regulation and leadership.**

Our **love of learning** is strengthened as we inquire, read, analyse, and critically evaluate all the reasons we are provided with a system like the Water Cycle.

Developing **self-regulation** means that we make better choices in our daily lives by being careful about our water usage and impact on our environment. A self-regulated person is conscious of his or her actions and reactions. It is time to think about the rights of future generations to access fresh, clean and affordable water resources.

Finally, **leadership** means taking action when necessary and urging others to do the same. A good leader is someone who enlightens others and organises positive change. We cannot solve the issue of water scarcity on our planet by waiting for others to act. We must each do our part.

"We cannot solve the issue of water scarcity on our planet by waiting for others to act. We must each do our part."

TEST YOUR KNOWLEDGE

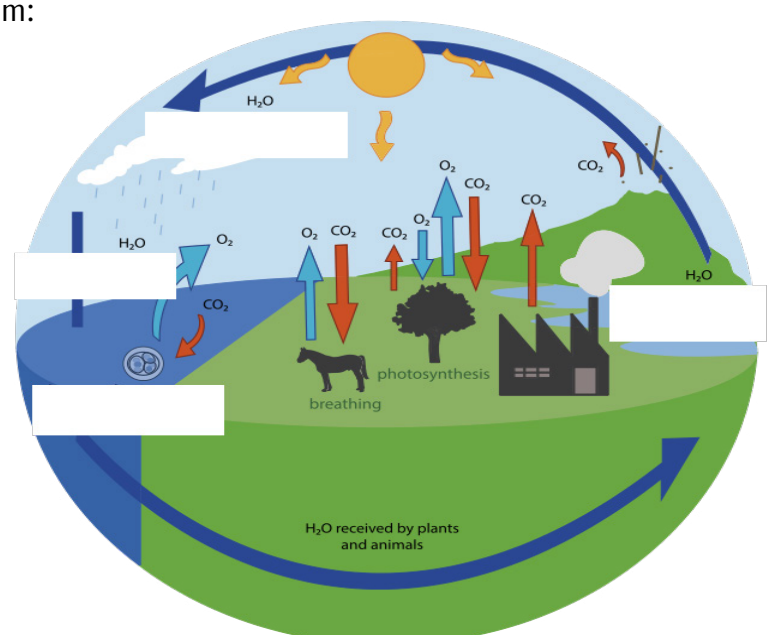
I.UNDERSTANDING SCIENCE TERMS

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

Condensation ***Evaporation*** ***Runoff*** ***Transpiration*** ***Aquifer*** ***Precipitation***

1. _____ is when water changes from a liquid state to a gaseous state.
2. The process where water is released as water vapor from the surface of leaves is known as _____.
3. _____ is when water changes from a gaseous state to a liquid form when it cools.
4. _____ is a word used to describe the water that falls from clouds as rain, snow, sleet or hail.
5. A(n) _____ is a type of porous rock that stores water beneath the Earth's surface.
6. The water that is not absorbed by the Earth's surface and makes its way to the ocean via streams and rivers is known as _____.

Label the following diagram:



II.CHECKING FACTS

Determine whether each of the following is true or false.

1. You can live for a maximum of three days without water._____
2. 75% of the brain is made of water._____
3. In reverse osmosis, water is heated until it evaporates, leaving behind a salt. _____
4. Drinking water comes from pipelines and faucet systems, not through them. _____
5. Gray water is not potable. _____
6. Only one percent of all water in the planet is accessible to drink. _____

III. UNDERSTANDING CONCEPTS

Write a short answer for each question or statement.

1. Where is water found on the planet?

2. Name the four stages of the Water Cycle.

3. What is water made of?

4. How do you know that there is a Hidden Hand behind the control and maintenance of the Water Cycle (connect with water to Creator)?

5. List two hidden messages in the Earth's Water Cycle from its Maker (consider water as a form of communication).

6. Discuss two moral lessons from the Maker of the Water Cycle.

V.APPLYING CONCEPTS

Write a paragraph to answer each question.

1.How is the design of the Earth's Water Cycle different from Singapore's NEWater (or reclaimed water) System?

2. Describe how your life would be different if you lived in a remote area with limited access to water.

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

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

5. Why do you think water 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 Water Cycle?

_____

_____

_____

__ _____

V. THINK-THANK GAME

In this "think-thank" game, we want you to think about the water cycle 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 water cycle 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 the Water Cycle 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 the Water Cycle!"

2. Player 2 responds, without pausing, with something about the Water Cycle to be thankful for. For example: "creating an efficient system to cycle water without wasting a single drop"

3. Player 1 repeats the appreciation phrase again loudly and quickly. For example: "Thanks to the Maker of the Water Cycle!"

4. Player 2 responds, without pausing, with another thing about the Water Cycle to be thankful for. For example: "For transporting water through clouds without causing noise pollution!"

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