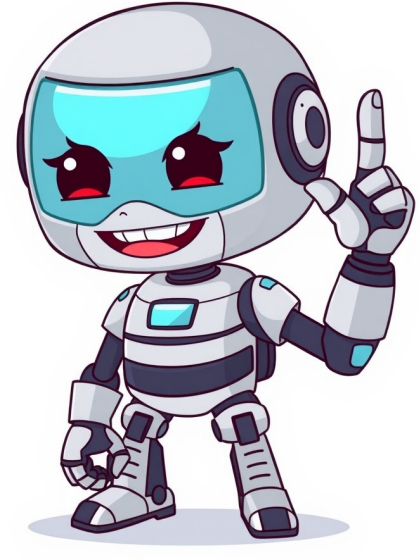


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The origin of coal, oil, and hydrocarbons dates back to intense heat and pressure that transformed marine organisms into fossil fuels over millions of years. During the Carboniferous Era, lush rainforests created ideal conditions for coal formation, producing gigatons of hydrocarbons. Trees dominated the continents, leaving behind a layer of dead plant material that eventually became coal.The hierarchy of taxonomy classification organizes living organisms into six main domains, with phyla, classes, orders, families, genera, and species being the most specific categories. The Chordata phylum contains animals such as mammals, reptiles, and amphibians, while humans fall under the Mammalia class, primates order, and Homidae family. Each genus has a specific classification, with our own being Homo, and gorillas belonging to the same genus but having two species: western and eastern. The taxonomic hierarchy continues from there, with each level becoming more specific. Biologists estimate that around 1.3 million species exist on Earth, although some 8.7 million may be possible. The animal kingdom is the largest, comprising about 1 million species, followed by plants at approximately 250,000 different species.The taxonomic system serves as a foundation for scientific inquiry and continues to inform our understanding of life forms today. Cellular respiration, the process humans require for energy, involves glucose and oxygen and generates ATP through glycolysis, Krebs' cycle, and the electron transport chain. This biochemical reaction is essential for life and powers biological systems.The carbon cycle, on the other hand, pertains to the movement of carbon through Earth's various systems, influenced by factors like atmospheric changes, ocean chemistry, and geologic activity. Carbon plays a vital role in life due to its ability to form stable bonds with other molecules, making it an essential element for all known forms of life.Carbon cycle is a natural process where carbon atoms start in gaseous form as CO2 gas, often produced by volcanic activity and meteor impacts on Earth before life existed. Today, humans release large amounts of CO2 through burning fossil fuels and cutting down forests. This leads to more CO2 in the atmosphere, which traps heat and affects climate.the ability to both absorb and release carbon dioxide. When carbon dioxide from the atmosphere comes into contact with ocean water, it can react with the water molecules to form carbonic acid a dissolved liquid form of carbon. When there is more carbonic acid in the ocean compared to carbon dioxide in the atmosphere, some carbonic acid may be released into the atmosphere as carbon dioxide. On th other hand, when there is more carbon dioxide in the atmosphere, more carbon dioxide will be converted to carbonic acid, and ocean acidity levels will rise. Some scientists have raised concerns that acidity is rising in some parts of the ocean, possibly as a result of increased carbon dioxide in the atmosphere due to human activity. Although these changes in ocean acidity may sound small by human standards, many types of sea life depend on chemical reactions that need a highly specific acidity level to survive. In fact, ocean acidification is currently killing many coral reef communities. The carbon cycle, under normal circumstances, works to ensure the stability of variables such as the Earth's atmosphere, the acidity of the ocean, and the availability of carbon for use by living things. Each of its components is of crucial importance to the health of all living things especially humans, who rely on many food crops and animals to feed our large population. Carbon dioxide in the atmosphere prevents the sun's heat from escaping into space, very much like the glass walls of a greenhouse. This isn't always a bad thing; some carbon dioxide in the atmosphere is good for keeping the Earth warm and its temperature stable. But Earth has experienced catastrophic warming cycles in the past, such as the Permian extinction, which is thought to have been caused by a drastic increase in the atmospheres level of greenhouse gases. No one is sure about what caused the change that brought about the Permian extinction. But, greenhouse gases may have been added to an atmosphere by an asteroid impact, volcanic activity, or even massive forest fires. Whatever the cause, during this warming episode temperatures rose drastically. Much of the Earth became desert, and over 90% of all species living at that time went extinct. This is a good example of what can happen if our planet's essential cycles experience a big change. A loss in biodiversity is like a soccer team without a defense. For example, a diverse ecosystem can withstand disease because it has a variety and diversity in species. From human actions, we can threaten biodiversity. If you remove specific habitats like wetlands, grasslands, and forests, then you cut off habitats for species that thrive there. Two of the most diverse ecosystems on the planet are tropical rainforests and coral reefs. Before we get into them, first let's get into why we want to preserve biodiversity. Biodiversity or biological diversity refers to the variety of species and genetic diversity in an ecosystem. Ecosystems rely on biodiversity for resiliency, health, and food. There are limitless benefits to preserving biodiversity in any ecosystem. Not only does biodiversity directly impact industries like tourism, recreation and fisheries, but they help balance nature. Variety of species helps fill all the niches (ecological roles) in their environment. For example, this includes anything from predation, decomposition, parasitism, and mutualism. And this is no different from human societies with the different roles we play. There are also significant benefits for pharmaceutical products related to biodiversity and the richness of species. For example, about of the drugs we commonly use today were originally derived from plants such as those in tropical rainforests. Tropical rainforests have an overabundance of water and nutrient deficient soils. Living organisms have adapted to these hostile conditions with evolution doing the work. Without evolution, there would be no biodiversity hotspots like tropical rainforests. This is because life evolved in some of the toughest conditions. Over time, these plants, animals and fungi have developed immunity to harmful bacteria and viruses. This is why we find the most resistant chemicals for medicine in tropical rainforests. Like tropical rainforests, coral reefs are a biodiversity hotspot for ocean life. Remarkably, about 25% of marine species reside in coral reefs. But they only occupy about 5% of the area. Coral are invertebrate animals similar to jellyfish. They feed on suspended particles like dissolved calcium and build stony polyps as an exoskeleton. But similar to rainforests, coral is under threat from rising temperature, ocean acidity, and human actions. Scientists estimate that coral reefs face extinctions in 50 years. That's why scientists shine the spotlight on coral reefs. Ultimately, it comes down to preventing human actions like nutrient runoff (and even sunscreen) that will restore these underwater biodiversity hotspots. Biodiversity is the variety of life, including animal and plant species, genetic variation within species, and ecosystems. It is not only important to preserve biodiversity but also to have an understanding of it. Understanding biodiversity is crucial for conserving Earth's ecosystems, as it helps us recognize the intricate connections between species, their ecological role, and the resiliency of the planet's natural systems in the face of environmental changes. Do you have anything to say about biodiversity? Please let us know any comments or questions you have in our form below.Subscribe to our newsletter: Thank you about it for a second: If you could rewind the clock 230 million years back, dinosaurs dominated the land. They didn't reign for just a short period of time. But they lived for over 175 million years. Today, we unearth dinosaur fossils of unfathomable size. And we live to tell stories about how extraordinary they were. These remarkable findings allow us to learn about the diverse array of dinosaurs that once roamed the planet. From massive, long-necked sauropods to swift and cunning predators like Tyrannosaurus rex, each one sparks our imaginations and deepens our understanding of the incredible creatures that once ruled the prehistoric world. But how did they get so big? And what was their demise? In this article, you'll learn about the era of dinosaurs. If you turn back the clock 252 million years back, dinosaurs didn't exist. But ideal conditions were shaping up for dinosaurs. Earth's climate was much hotter and drier. Eventually, rainforests collapsed and deserts swept the land. Amphibians already partially evolved to land conditions. But reptiles were different because they could lay their hard-shelled eggs.Reptiles evolved into dinosaurs due to their ability to adapt to land and travel long distances. In dryland conditions, there was less competition for food, giving reptiles an ecological advantage. As a result, they gained an upper hand, leading to the start of the age of reptiles. Dinosaurs are simply evolved reptiles, with their lineage tracing back to archosaurs. The supercontinent of Pangaea witnessed dinosaurs evolving around 231 million years ago. They shared similarities with reptiles, such as scaly skin and egg-laying habits. As time went on, dinosaurs branched off into two groups: Theropods and Sauropods. Meanwhile, Pterosaurs took to the skies, while Ichthyosaurs dominated the ocean.During the Triassic period, a variety of dinosaurs thrived, followed by the Jurassic Period where they reached peak dominance. Dinosaurs ruled the land, sea, and sky for 160 million years before the Cretaceous-Paleogene extinction event.Understanding gigantism in dinosaurs is key to grasping their biology and evolution. The environment played a significant role, with conifers filling landscapes and oxygen levels increasing to 35%. This led to theories about dinosaur size and gigantism. Indiscriminate cutting of trees or deforestation. Burning of fossil fuels releases dioxide in the atmosphere, which is way more than the amount removed by plants during photosynthesis. This results in an increase in atmospheric nutrients dioxide, thus disturbing the balance of the nutrient cycle. As trees and forests balance the amount of nutrients in the atmosphere through photosynthesis, excessive cutting of trees increases the nutrients dioxide level in the atmosphere, thus raising the temperature of the earth. This is one of the primary reasons for the negative greenhouse effects and global warming. Article was last reviewed on Monday, November 2, 2020. The nutrient cycle exchanges nutrients between the atmosphere, oceans, soil, and living organisms. The nutrient cycle is a fundamental and complex process in Earth's system, influencing climate, ecosystems, and life itself. It involves the movement of nutrients, a key element for life, through the atmosphere, oceans, soil, rocks, and living organisms. This cycle plays a critical role in regulating the Earth's climate by controlling the concentration of nutrients dioxide, a major greenhouse gas, in the atmosphere. The nutrient cycle is the series of processes through which nutrients atoms continually travel from the atmosphere into organisms, the oceans, and the Earth and then back into the atmosphere. This cycle maintains the balance of nutrients on Earth, making it available to living organisms and regulating the Earth's climate. The nutrient cycle involves several key reservoirs where nutrients are stored in different forms: Atmosphere: Nutrients mainly occur as nutrients dioxide gas. Oceans: Nutrients occur as dissolved nutrients dioxide, carbonate, and bicarbonate ions. Terrestrial Ecosystems: Plants and soils store nutrients in organic forms through photosynthesis. Fossil Fuels: Coal, oil, and natural gas store nutrients. Rocks and Sediments: Carbonate rocks like limestone and organic-rich sediments store large amounts of nutrients. The nutrient cycle involves a series of steps through which nutrients exchange between the atmosphere, hydrosphere, lithosphere, and biosphere. Here's an outline:##ARTICLECarbon Dioxide in the Atmosphere: The Cycle BeginsThe cycle starts with carbon dioxide present in the atmosphere. Photosynthesis occurs when plants, algae, and phytoplankton absorb CO2 from the atmosphere or water, converting it into glucose and oxygen through photosynthesis. Animals and other organisms consume plants, transferring carbon through the food chain. Organisms release carbon into the atmosphere as CO2 through respiration. Decomposers like bacteria and fungi break down dead bodies, releasing carbon into the soil or water. Some carbon is buried over long periods, forming fossil fuels or sedimentary rocks like limestone.##ARTICLEThe global carbon cycle plays a vital role in absorbing CO2 through photosynthesis and releasing stored carbon into trees and soil. Industrial processes, such as cement production and the burning of fossil fuels, also release large amounts of CO2 into the atmosphere. Additionally, agricultural practices like fertilization and livestock farming produce greenhouse gases like methane and nitrous oxide, affecting the carbon cycle.Furthermore, waste management methods like decomposition in landfills and incineration of waste materials can also release significant amounts of CO2. Archer's research on the global carbon cycle highlights the importance of understanding Earth as a system to mitigate these effects.Interestingly, nitrogen is more abundant than oxygen in the Earth's atmosphere, making up 75% of its mass in the troposphere. However, it only constitutes a small percentage of the crust. Nitrogen plays a crucial role in the nitrogen cycle, constantly exchanging between the atmosphere and living organisms.Oxygen, on the other hand, is essential for human life but is difficult to break down and use for chemical processes. In contrast, carbon is the most important element for building molecules essential for living things, with various forms like CO2, methane, and glucose occurring in the long-term carbon cycle.Human activity has led to a significant increase in CO2 levels since 1900, mainly due to the burning of fossil fuels. This has resulted in air pollution and climate change. Trace gases like neon, helium, and krypton make up a small part of the atmosphere, while chlorofluorocarbons have damaged the ozone layer.Water vapor, a highly variable gas, regulates air temperature by absorbing solar radiation and evaporating from lakes and rivers. The hydrological cycle, driven by the sun's energy, involves the storage of water in various forms like glaciers, oceans, plants, and humans.The Northern Hemisphere shows the highest concentrations of CO2 from major emission sources, but it disperses globally due to weather patterns and ocean currents. Seasonal changes also affect carbon dioxide levels in the atmosphere, with photosynthesis in spring and summer absorbing significant amounts of CO2.Dry and arid climates have low precipitation rates. Temperate or mesothermal climates maintain mild annual temperatures. Continental or microthermal climates have hot summers and cold winters occurring typically at the interior of a continent. Polar or alpine climates sustain consistent cold temperatures throughout the year. These climates can be divided into finer units. So let's go through each class and explore where you fit the criteria. Its warm all year round for tropical climates. You can typically find this type of climate near the equator from 15N to 15S latitude. For example, tropical rainforests are hot, moist regions easily distinguishable by their enormous trees, diverse species and thick soils.The food chain is a vital component of the ecosystem, with phytoplankton producing 95% of primary production in the ocean, contributing 50% of oxygen to our atmosphere. Photosynthesis allows plants to create essential sugars and nutrients for survival, using solar energy and inorganic nutrients. Plants are autotrophs, natural producers that provide food and nutrients to consumers like herbivores and omnivores.Herbivores nourish plants by taking energy from the sun, with examples including rabbits, cows, sheep, giraffes, elephants, cattpillars, and butterflies. These primary consumers transform plant tissue into animal tissue, as they are heterotrophs unable to produce their own food. Instead, they rely on sources of organic carbon like plants and animal matter.At the top of the food chain, predators prey on herbivores or other predators, with carnivores only eating meat and omnivores consuming both meat and plants. Examples include foxes, wolves, lions, sharks, humans, bears, pigs, and pandas. Carnivores have sharp teeth and efficient digestive systems suited for obtaining nutrients from meat.Decomposers, including microorganisms and large fungi, act as the clean-up crew, returning materials to the physical environment. When an animal dies, scavengers and decomposers break it down, fragmenting carcasses into separate pieces. Decomposers transform complex compounds into simple chemicals, playing a crucial role in recycling matter back to the food chain.The four levels of the food chain are primary consumers, secondary consumers, tertiary consumers, and decomposers or phytoremediators. The non-living environment interacts with our environment through processes such as solar energy provision and inorganic nutrient availability.Decomposition is a fundamental natural process, breaking down organic matter into simpler substances. Decomposers include bacteria, fungi, and various invertebrates that consume and process complex organic compounds. This process transforms dead organic material back into the environment, releasing carbon dioxide and methane into the atmosphere.The carbon cycle describes the continuous movement of carbon atoms among Earth's major reservoirs: the atmosphere, oceans, land, and living organisms. Decomposition drives carbon movement by releasing carbon from dead organic matter back into the environment. As bacteria, fungi, and detritivores break down plant and animal remains, they perform cellular respiration, releasing CO2 into the atmosphere.Factors affecting decomposition rates include temperature, moisture levels, oxygen availability, and more. These environmental factors influence how quickly decomposition occurs, with optimal conditions promoting microbial activity and efficient breakdown.Carbon cycles from the earth's atmosphere into living things, where it plays a major role in producing glucose through photosynthesis. Plants pull carbon dioxide out of the air using this process, which also fuels all living organisms as an energy source by releasing oxygen. Decomposition breaks down plants and releases nutrients that support primary productivity. The breakdown of organic matter enhances soil structure, improves water retention, and supports diverse communities of soil organisms.##ARTICLECarbon is let go from the air into the earth and water. Plants take in carbon dioxide and make food. Animals eat plants and get carbon in their bodies. When animals and plants die, their bodies break down and carbon comes back to the air. Carbon is important for all living things. It helps make proteins, fats, and even DNA. Without carbon, life wouldn't exist. The carbon cycle is part of a big process that moves carbon between the earth, water, air, and living things. The ocean is like a big storage for carbon. It holds a lot of carbon for a long time. Fossil fuels and rocks also help store carbon for thousands of years. The carbon cycle has two types: short-term and long-term. Short-term happens quickly, like in days or months. Long-term takes thousands of years. The carbon cycle keeps the earth warm by trapping heat from the sun. Australopithecus Afarensis was the first kind of hominids. They lived a long time ago in Africa. They had a small brain and walked on two legs. They ate both plants and animals. They used simple tools made from rocks. Australopithecus Africanus came later and lived in Southern Africa. They had some ape-like traits but also human-like features. These early humans were small and had different sizes for males and females. They lived in forests and had a varied diet. The carbon cycle is connected to other cycles like the nitrogen and oxygen cycles. These cycles are essential for life on earth. Humans have been evolving for millions of years. Early mammals lived with dinosaurs but were small. After dinosaurs died, mammals became the main animals on land. Hominids like Australopithecus Afarensis were the first proto-humans. They used rocks to make sharp tools and started using their hands more. This helped them evolve into modern humans.Hominins, such as Australopithecus africanus, were characterized by small brain sizes compared to modern humans but exhibited bipedalism. They likely lived in woodlands and grasslands with a varied diet of plants and animals. Although they did not use advanced tools, simple ones like rocks and sticks might have been utilized.Homo habilis, which means "handy man," is an extinct species that lived approximately 2.4 to 1.4 million years ago. They were the first members of the Homo genus and exhibited significant advancements compared to earlier hominins. The discovery of tools in Olduvai Gorge supports their use. Homo Rudolfensis, discovered near Lake Turkana in Kenya, had a relatively large braincase but its classification is debated. Fossil evidence suggests they used simple stone tools, indicating some level of toolmaking.The existence of Homo Gautengensis is not widely accepted due to sparse fossil evidence and contentious debate among researchers. However, if recognized as a species, it would have likely exhibited primitive adaptations associated with bipedalism.Homo Ergaster, also known as "Workingman," lived approximately 1.6 to 1.3 million years ago in Africa. They were among the first members of the Homo genus and built sophisticated stone tools. Fossil evidence is primarily associated with sites in Africa, such as Koobi Fora in Kenya.Homo Erectus, which lived from 1.3 million to 0.7 years ago, expanded out of Africa and colonized different parts of the world. They had larger brains due to a meat-based diet and were believed to use fire deliberately. This species played a crucial role in human evolution as it bridged the gap between earlier hominins and anatomically modern humans.Homo Erectus Pekinesis existed 1.25 to 0.3 million years ago near Beijing, China. Fossils discovered in Zhoukoudian suggested advanced cognitive abilities and evidence of fire use.Homo Antecessor is recognized as "Human Pioneer" due to its association with the first human population in Europe. It lived during the Lower Pleistocene epoch, approximately 1.2 million to 650,000 years ago. Fossil evidence from Gran Dolina site in Spain supports its existence.The earliest known human ancestor in Europe, Homo Antecessor, was characterized by a mix of primitive and advanced features. Its brain size was relatively small compared to other hominins, but it showed evidence of tool use and possibly meat consumption. The discovery of cut marks on animal bones suggests that Homo Antecessor was involved in butchery and hunting activities.Homo Erectus Soelesiensis, found in Indonesia's Java island, lived around 150,000 to 1,000,000 years ago during the Middle and Late Pleistocene. Its fossils include skullcaps, teeth, and other skeletal elements, providing insights into its anatomy. Like other Homo erectus populations, it had a relatively large brain size compared to earlier hominins.Homo Heidelbergensis existed in both Africa and Europe around 0.7-0.4 million years ago. Fossils found near Heidelberg, Germany, indicate this species lived during the Middle Pleistocene period. It exhibited a mix of primitive and advanced anatomical features, with a larger brain size compared to earlier hominins.Homo Helmei is believed to have displayed a unique combination of physical traits, blending features from different known hominin species. Although its existence is short-lived, research suggests that Homo Helmei might be associated with an out-of-Africa movement and slightly larger brain volume than modern humans.Neanderthals, or Homo Neanderthalensis, lived in Eurasia and Africa from approximately 500,000 to 25,000 years ago. They had a robust build and adapted for cold climates. With prominent features like a large brow ridge and strong jaw, evidence suggests they had the ability to speak and used complex language.Modern humans, or Homo sapiens, emerged around 160-40 thousand years ago. With unique cognitive abilities, culture, and adaptability, they thrived and became the dominant species on Earth. Their success can be attributed to their artistic talents in cave paintings and clay work, as well as their invention of tools like hooks and spears.

Example of decomposition in the carbon cycle. Define decomposition in the carbon cycle. Decomposition carbon cycle definition. What is decomposition in the carbon cycle.

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