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We have something incredible in common We all breathe the same air! But have you ever wondered what exactly makes up this air we breathe? What does fresh air really mean? How does the atmosphere and its characteristics! The atmosphere is a vital, dynamic layer of gases enveloping our planet, extending from the Earths surface to the edges of outer space. Understanding its characteristics is key to grasping Earths processes, weather patterns, and the intricate workings of our ecosystems. Teaching about the atmosphere goes beyond lecturesits about hands-on activities, experiments, and simulations. These immersive experiences allow students to witness atmospheric phenomena like air pressure, temperature changes, and cloud formation. They also explore weather patterns, storm genesis, wind dynamics, and precipitation, and learn about the impact of human activities on the atmosphere. By understanding the atmosphere, students see the interconnectedness of Earths systems and develop a deeper appreciation for the delicate balance that sustains life. They become informed decision-makers, ready to tackle environmental issues and advocate for sustainable practices. The Layers and Characteristics of the Atmosphere unit is available for purchase. Im thrilled to introduce my newly revamped Layers and Characteristics of the Atmosphere unit! This two-week, no-prep unit revolves around the essential question: How do scientists describe the composition, particulates, aerosols, atmospheric pressure, temperature variations, and the structure of the troposphere, stratosphere, stratosphere, mesosphere, thermosphere and so on. This unit is packed with activities catering to various learning styles and abilities. From PowerPoint presentations to worksheets, labs, and assessments, students will engage deeply with atmosphere concepts. Students particularly love the Are We Losing Our Air? project, the culminating activity of this unit. They creatively demonstrate their understanding of the atmospheres layers and characteristics, conduct research, and develop a plan to combat pollution. Download your free copy of the Are We Losing Our Air project now!Heres whats included in this fantastic unit: Earths Atmosphere Lesson Plan Characteristics of the Atmosphere PowerPoint Presentations & Guided Notes(multiple versions of each) Describing Earths Atmosphere Lab & Answer Key Ozone Enrichment Worksheet & Answer Key The Air Around You Lesson Plan The Air Around You Lesson Plan The Atmosphere Quizzes (three versions) & Answer Keys Are We Losing Our Air? ProjectCheck out the two-month-long Earths Atmosphere bundle, packed with additional activities covering the greenhouse effect, heat transfer, phase changes of water, air pressure, winds, clouds, dew point, humidity, global climate factors, and more. Enjoy the ease of ready-to-go activities that make teaching a breeze! Our planet earth is enveloped by a deep blanket of gases extending several thousands of kilometres above its surface. This gaseous cover of the earth is known as the atmosphere appears to be only a very thin layer of gases. However, because of the force of gravity, it is inseparable from the earth. Atmospheric pressure: The air exerts pressure is the most important climatic element. The atmospheric pressure is the most important climatic element. The atmospheric pressure is the most important climatic element. The atmospheric pressure is the most important climatic element. The atmospheric pressure is the most important climatic element. The atmospheric pressure is the most important climatic element. The atmospheric pressure is the most important climatic element. nitrogen etc. Plants require carbon dioxide to survive while animals and many other organisms need oxygen for their survival. The atmosphere supplies these life giving gases. All life forms need a particular range of temperature and a specific range of frequencies of solar radiation to carry out their biophysical processes. The atmosphere absorbs certain frequencies and lets through some other frequencies of solar radiation. In other words, the atmosphere extremes of temperature would exist between day and night over the earths surface. Harmful ultraviolet radiation would find its way through, if the atmosphere (ozone in stratosphere to be precise) due to friction. Weather is another important phenomenon which dictates the direction of a number of natural and man-made processes like plant growth, agriculture, soil-formation, human settlements, etc. Various climatic factors join together to create weather. The atmosphere is a mixture of many gases. In addition, it contains huge numbers of solid and liquid particles, collectively called aerosols. Some of the gases may be regarded as permanent atmospheric components which remain in fixed proportion to the total gas volume. Other constituents vary in quantity from place to place and from time to time. If the suspended particles, water vapour and other variable gases were excluded from the atmosphere, then the dry air is very stable all over the earth up to an altitude of about 80 kilometres. The proportion of gases changes in the higher layers of the earth. Nitrogen and oxygen make up nearly 99% of the clean, dry air. The remaining gases are mostly inert and constitute about 1% of the atmosphere. Besides these gases, large quantities of water vapour and dust particles are also present in the atmosphere, with their individual characteristics. are discussed below.Oxygen, although constituting only 21% of total volume of atmosphere, is the most important compounts, such as, oxides. Also, combustion is not possible without oxygen. Nitrogen accounts for 78% of total atmospheric volume. It is a relatively inert gas, and is an important constitutes only about 03% of the dry air and is a product of combustion. Green plants, through photosynthesis, absorb carbon dioxide from the atmosphere and use it to manufacture food and keep other bio-physical processes going. Being an efficient absorber of heat, carbon dioxide is considered to be a very important factor in the heat energy budget. With increased burning of fossil fuels oil, coal and natural gas the carbon dioxide in the atmosphere has been increasing at an alarming rate. More carbon dioxide in the atmosphere thus inducing drastic climatic changes.Ozone (03) is another important gas in the atmosphere, which is actually a type of oxygen molecule consisting of three, instead of two, atoms. It forms less than 0.00005% by volume of the atmosphere and is unevenly distributed. It is between 20 km and 25 km altitude that the greatest concentrations of ozone are found. It is formed at higher altitudes and transported downwards. Ozone plays a crucial role in blocking the harmful ultraviolet radiation from the sun. Other gases found in almost negligible quantities in the atmosphere are neon, helium, hydrogen, xenon, krypton, methane etc. Water Vapour is one of the most variable gaseous substances present in atmosphere constituting between 02% and 4% of the total volume (in cold dry and humid tropical climates respectively). 90% of moisture content in the atmosphere exists within 6 km of the atmosphere exists within 6 km of the surface of the earth. Like carbon dioxide, water vapour plays a significant role in the insulating action, of the atmosphere exists within 6 km of the surface of the earth. Like carbon dioxide, water vapour plays a significant role in the insulating action, of the atmosphere exists within 6 km of the surface of the earth. or heat emitted by earth during nights), but also a part of the incoming solar radiation. Water vapour is the source of precipitation and clouds. On condensation the ultimate driving force behind all storms. The moisture carrying capacity of air is directly proportional to the air temperature. Solid Particles The Solid Parti Particles present in the atmosphere consist of sand particles (from weathered rocks and also derived from volcanic ash), pollen grains, small organisms, soot, ocean salts; the upper layers of the atmosphere may even have fragments of meteors which got burnt up in the atmosphere solid particles perform the function of absorbing, reflecting and scattering the radiation. The solid particles are, consequently, responsible for the orange and red colours at sunset and sunrise and for the length of dawn (the first appearance of light in the sky before sunrise) and twilight (the soft glowing light from the sky when the sun is below the horizon, caused by the reflection of the suns rays by the atmosphere. Dusk: the darker stage of twilight.). The blue colour of the sky is also due to selective scattering by dust particles are hygroscopic (i.e. readily absorbing moisture from air) in character, and as such, act as nuclei of condensation. Thus, dust particles are an important contributory factor in the formation of clouds, fog and hailstones. Major Greenhouse Gases Carbon dioxide is meteorologically a very important gas as it is transparent to the incoming solar radiation but opaque to the outgoing terrestrial radiation. It absorbs a part of terrestrial radiation but opaque to the outgoing terrestrial radiation. effect.Ozone is another important greenhouse gas. But it is very small proportions at the surface. Water vapour is also a variable gas in the atmosphere, which decreases from the equator towards the poles. In the warm and wet tropics, it may account for four per cent of the air by volume, while in the dry and cold areas of desert and polar regions, it may be less than one per cent of the air. It also absorbs parts of the insolation from the sun and preserves the earth rediated heat. It thus, acts like a blanket allowing the earth rediated heat. It thus, acts like a blanket allowing the earth rediated heat. It thus, acts like a blanket allowing the earth rediated heat. It thus, acts like a blanket allowing the earth rediated heat. It thus, acts like a blanket allowing the earth rediated heat. It thus, acts like a blanket allowing the earth rediated heat. It thus, acts like a blanket allowing the earth rediated heat. It thus, acts like a blanket allowing the earth rediated heat. It thus, acts like a blanket allowing the earth rediated heat. It thus, acts like a blanket allowing the earth rediated heat. It thus, acts like a blanket allowing the earth rediated heat. It thus, acts like a blanket allowing the earth rediated heat. It thus, acts like a blanket allowing the earth rediated heat. It thus, acts like a blanket allowing the earth rediated heat. It thus, acts like a blanket allowing the earth rediated heat. It thus, acts like a blanket allowing the earth rediated heat. It thus, acts like a blanket allowing the earth rediated heat. It thus, acts like a blanket allowing the earth rediated heat. It thus, acts like a blanket allowing the earth rediated heat. important greenhouse gases. It is produced from decomposition of animal wastes and biological matter. The atmosphere can be studied as a layered entity each layer between the earths surface and an altitude of 8 km at the poles and 18 km at the equator. The thickness is greater at the equator, because the heated air rises to greater fall in temperature above the rate of 5C per kilometer, and reaches -45C at the poles and -80C over the equator at Tropopause (greater fall in temperature above equator is because of the greater thickness of troposphere 18 km). The fall in temperature is called lapse rate. (more about this in future posts) The troposphere is marked by temperature inversion, turbulence and eddies. It is also meteorologically the most significant zone in the entire atmosphere (Almost all the weather phenomena like rainfall, fog and hailstorm etc. are confined to this layer). It is also called the convective region, since all convection stops at Tropopause. The troposphere is the theatre for weather because all cyclones, anticyclones, storms and precipitation occur here, as all water vapours and solid particles lie within this. The troposphere is influenced by seasons and jet streams. Top most layer of troposphere. It acts as a boundary between troposphere and stratosphere and stratosphere and stratosphere and stratosphere and stratosphere and stratosphere. This layer is marked by constant temperatures. It lies beyond troposphere, up to an altitude of 50 km from the earths surface. The temperature in this layer remains constant for some distance but then rises to reach a level of 0C at 50 km altitude. This rise is due to the presence of ozone (harmful ultraviolet radiation is absorbed by ozone). This layer is almost free from clouds and associated weather phenomenon, making conditions most ideal for flying aeroplanes. So aeroplanes fly in lower stratosphere, sometimes in upper troposphere where weather is calm. Sometimes, cirrus clouds are present at lower levels in this layer. It lies at an altitude between 30 km and 60 km from the earths surface and spans the stratosphere and lower mesosphere and lower mesosphere is also called chemosphere because, a lot of chemical activity goes on here. The temperature rises at a rate of 5C per kilometer through the ozonosphere. This is an intermediate layer beyond the ozonosphere temperature gradually falls to -100C at 80 km altitude of 80 km from the space. In thermosphere temperature rises very rapidly with increasing height. Ionosphere is a part of this layer. It extends between 80-400 km. This layer helps in radio transmission. In fact, radio waves transmitted from the earth by this layer. Person would not feel warm because of the thermospheres extremely low pressure. The International Space Station and satellites orbit in this layer. (Though temperature is high, the atmosphere is extremely rarified gas molecules are spaced hundreds of kilometers apart. Hence a person or an object in this layer doesnt feel the heat) Auroras are observed in lower parts of this layer. This layer are spaced hundreds of kilometers apart. Hence a person or an object in this layer doesnt feel the heat) Auroras are observed in lower parts of this layer. layer is characterized by ionization of atoms. Because of the electric charge, radio waves transmitted from the earth by this layer. Temperature again starts increasing with height because of radiation from the sun. This is the uppermost layer of the atmosphere extending beyond the ionosphere above a height of about 400 abou km. The air is extremely rarefied and the temperature gradually increases through the layer. Light gases like helium and hydrogen float into the space from here. Temperature gradually increases through the layer. (As it is exposed to direct sunlight) This layer coincides with space. This is because speed of sound is directly proportional to temperature as we move away from earth. Primary References: NCERT Geography, Certificate Physical and Human Geography [Amazon and Flipkart] and Spectrums Geography [Amazon and Flipkart]. Share copy and redistribute the material in any medium or format for any purpose, even commercially. Adapt remix, transform, and build upon the material for any purpose, even commercially. The licensor cannot revoke these freedoms as long as you follow the license terms. Attribution You must give appropriate credit, provide a link to the license, and indicate if changes were made. You may do so in any reasonable manner, but not in any way that suggests the licensor endorses you or your use. ShareAlike If you remix, transform, or build upon the material, you must distribute your contributions under the same license for elements of the material in the public domain or where your use is permitted by an applicable exception or limitation. No warranties are given. The license may not give you all of the permissions necessary for your intended use. For example, other rights such as publicity, privacy, or moral rights may limit how you use the material. Question: What is the state of the atmosphere at any given time and place? Answer: weather Question: What gas is the largest component of the atmosphere? Answer: nitrogen Question: T/F The source of all clouds and precipitation is water vapor. Answer: nitrogen Question: T/F The source of all clouds and precipitation is water vapor. Answer: nitrogen Question: T/F The source of all clouds and precipitation is water vapor. Answer: nitrogen Question: T/F The source of all clouds and precipitation is water vapor. Answer: nitrogen Question: T/F The source of all clouds and precipitation is water vapor. Answer: nitrogen Question: T/F The source of all clouds and precipitation is water vapor. Answer: nitrogen Question: T/F The source of all clouds and precipitation is water vapor. Answer: nitrogen Question: T/F The source of all clouds and precipitation is water vapor. Answer: nitrogen Question: T/F The source of all clouds and precipitation is water vapor. Answer: nitrogen Question: T/F The source of all clouds and precipitation is water vapor. Answer: nitrogen Question: T/F The source of all clouds and precipitation is water vapor. Answer: nitrogen Question: T/F The source of all clouds and precipitation is water vapor. Answer: nitrogen Question: T/F The source of all clouds and precipitation is water vapor. Answer: nitrogen Question: T/F The source of all clouds and precipitation is water vapor. Answer: nitrogen Question: T/F The source of all clouds and precipitation is water vapor. Answer: nitrogen Question: T/F The source of all clouds and precipitation is water vapor. Answer: nitrogen Question: T/F The source of all clouds and precipitation is water vapor. Answer: nitrogen Question: T/F The source of all clouds and precipitation is water vapor. Answer: nitrogen Question: T/F The source of all clouds and precipitation is water vapor. Answer: nitrogen Question: T/F The source of all clouds and precipitation is water vapor. Answer: nitrogen Question: T/F The source of all clouds and precipitation is water vapor. Answer: nitrogen Question: T/F The so pressure increases with height. Answer: FQuestion: What layer of the atmosphere contains the ozone? Answer: stratosphere contains the ozone. Answer: stratosphere contains the ozone. Answer: stratosphere contains the ozone. Answer: stratospher by gravity "Air" redirects here. For other uses, see Air (disambiguation). "Qualities of air" redirects here and is not to be confused with Air quality. This article is about atmosphere (disambiguation). "Atmosphere of Earth." For other uses, see Atmosphere of Earth. For other uses, see Atmosphere of Earth." For other uses, see Atmosphere of Earth. For other uses, see Atmosphere of Earth. scientific journal, see Atmospheric Environment. This article needs additional citations for verification. Please help improve this article by adding citations to reliable sources. Unsourced material may be challenged and removed. Find sources: "Atmosphere" news newspapers books scholar JSTOR (February 2024) (Learn how and when to remove this message) The atmospheric gases around Earth scatter blue light (shorter wavelengths) more than light toward the red end (longer wavelengths) of the visible in the background. An atmosphere (from Ancient Greek (atms) 'vapour, steam' and (sphara)'sphere')[1] is a layer of gases that envelop an astronomical object, held in place by the gravity of the object. A planet retains an atmosphere is low. A stellar atmosphere is low. A stellar atmosphere when the gravity is great and the temperature of the atmosphere is low. temperature might have outer atmosphere of Earth is composed of nitrogen (78%), oxygen (0.9%), carbon dioxide (0.04%) and trace gases. [2] Most organisms use oxygen for respiration; lightning and bacteria perform nitrogen fixation which produces ammonia that is used to make nucleotides and amino acids; plants, algae, and cyanobacteria use carbon dioxide for photosynthesis. The layered composition of the atmosphere minimises the harmful effects of sunlight, ultraviolet radiation, solar wind, and cosmic rays and thus protects the organisms from genetic damage. The current composition of the atmosphere of the Earth is the product of billions of years of biochemical modification of the paleoatmosphere by living organisms. [3] Atmospheres are clouds of gas bound to and engulfing an astronomical focal point of sufficiently dominating mass, adding to its mass, possibly escaping from it or collapsing into it. Because of the latter, such planetary nucleus can develop from interstellar molecular clouds or protoplanetary disks into rocky astronomical objects with varyingly thick atmospheres, gas giants or fusors. Composition and thickness is originally determined by the stellar nebula's chemistry and temperature, but can also by a product processes within the astronomical body outgasing a different atmosphere. Graphs of escape velocity against surface temperature of some Solar System objects showing which gases are retained. The objects are drawn to scale, and their data points are at the black dots in the middle. The atmospheres of the planets Venus and Mars are principally composed of carbon dioxide and nitrogen, argon and oxygen. [4] The composition of the planets Venus and Mars are principally composed of carbon dioxide and nitrogen, argon and oxygen. average about 1% at sea level.[5]The low temperatures and higher gravity of the Solar System's giant planets Jupiter, Saturn, Uranus and Neptuneallow them more readily to retain gases with low molecular masses. These planets possess significant atmospheres. Titan, a moon of Saturn, and Triton, a moon of Neptune, have atmosphere of nitrogen and methane similar to Triton's, but these gases are frozen when it is farther from the Sun. Other bodies within the Solar System have extremely thin atmospheres not in equilibrium. These include the Moon (sodium gas), Mercury (sodium gas), Europa (oxygen), Io (sulfur), and Enceladus (water vapor). The first exoplanet whose atmospheric composition was determined is HD 209458b, a gas giant with a close orbit around a star in the constellation Pegasus. Its atmosphere is heated to temperatures over 1,000K, and is steadily escaping into space. Hydrogen, oxygen, carbon and sulfur have been detected in the planet's inflated atmosphere of the MoonAtmosphere of MarsAtmosphere of VenusAtmosphere of VenusA varies between 17km at the equator and 7.0km at the poles. The stratosphere extends from the top of the troposphere to the bottom of the mesosphere, and contains the ozone layer, at an altitude between 15km and 35km. It is the atmosphere rangesphere rangesphere rangesphere to the bottom of the mesosphere to the bottom of the mesosphere rangesphere rangesphere to the bottom of the mesosphere rangesphere rangesph surface in the daytime and decreases as the ionosphere rises at night-time, thereby allowing a greater range of radio frequencies to travel greater distances. The exosphere begins at 690 to 1,000km from the surface, and extends to roughly 10,000km, where it interacts with the magnetosphere of Earth. Main article: Atmospheric pressure Atmospher pressure is the force (per unit-area) perpendicular to a unit-area of planetary surface, as determined by the weight of the mass of the gas above the point of barometric measurement. The units of air pressure are based upon the standard atmosphere (atm), which is 101,325Pa (equivalent to 760Torr or 14.696psi). The height at which the atmosphere of uniform temperature, the scale height is proportional to the atmospheric temperature and is inversely proportional to the product of the mean molecular mass of dry air, and the local acceleration of gravity at the point of barometric measurement. Main article: Atmospheric escape Surface gravity at the point of barometric measurement. The product of the mean molecular mass of dry air, and the local acceleration of gravity at the point of barometric measurement. The product of the mean molecular mass of dry air, and the local acceleration of gravity at the point of barometric measurement. The product of the mean molecular mass of dry air, and the local acceleration of gravity at the point of barometric measurement. The product of the mean molecular mass of dry air, and the local acceleration of gravity at the point of barometric measurement. planet Jupiter retains light gases such as hydrogen and helium that escape from objects with lower gravity. Secondly, the distance from the Sun determines the energy available to heat atmospheric gas to the point where some fraction of its molecules' thermal motion exceed the planet's escape velocity, allowing those to escape a planet's gravitational grasp. Thus, distant and cold Titan, Triton, and Pluto are able to retain their atmospheres despite their relatively low gravities. Since a collection of gas molecules may be moving at a wide range of velocities, there will always be some fast enough to produce a slow leakage of gas into space. Lighter molecules move faster than heavier ones with the same thermal kinetic energy, and so gases of low molecular weight are lost more rapidly than those of high molecular weight. It is thought that Venus and Mars may have lost much of their water when, after being photodissociated into hydrogen escaped. Earth's magnetic field helps to prevent this, as, normally, the solar wind would greatly enhance the escape of hydrogen. However, over the past 3 billion years Earth may have lost gases through the most important escape processes into account, is that an intrinsic magnetic field does not protect a planet from atmospheric escape and that for some magnetizations the presence of a magnetic field works to increase the escape rate.[11]Other mechanisms that can cause atmosphere depletion are solar wind-induced sputtering, impact erosion, weathering, and sequestrationsometimes referred to as "freezing out"into the regolith and polar caps. Atmosphere have dramatic effects on the surfaces of rocky bodies. Objects that have no atmosphere, the planet has no protection from meteoroids, and all of them collide with the surface as meteorites and creates. craters. For planets with a significant atmosphere, most meteoroids burn up as meteors before hitting a planet's surface. When meteoroids do impact, the effects are often erased by the action of wind. [12] Wind erosion is a significant factor in shaping the terrain of rocky planets with atmospheres, and over time can erase the effects of both craters and volcanoes. In addition, since liquids cannot exist without pressure, an atmosphere allows liquid to be present at the surface and terrain on the planet suggests that Mars had liquid on its surface in the past. Main article: Extraterrestrial atmosphere Atmosphere of HD 209458 bMain article: Atmospheric circulation. On planets where the primary heat source is solar radiation, excess heat in the tropics is transported to higher latitudes. When a planet generates a significant amount of heat internally, such as is the case for Jupiter, convection in the atmosphere can transport thermal energy from the higher temperature interior up to the surface. Wind picks up dust and other particles which, when they collide with the terrain, erode the relief and leave deposits (eolian processes). Frost and precipitations, which depend on the atmospheric composition, also influence the relief. Climate changes can influence a planet's geological history. Conversely, studying the surface of the Earth leads to an understanding of the atmosphere and climate of other planets. For a meteorologist, the Earth's atmosphere is a factor affecting the climate and its variations. For a biologist or paleontologist, the Earth's atmospheric composition is closely dependent on the appearance of life and its evolution. Weather portal Atmometer (evaporimeter) Atmospheric pressureInternational Standard AtmosphereKrmn lineSky Liddell, Henry George; Scott, Robert (2015-09-24). "". A Greek-English Lexicon. Perseus Digital Library. Archived from the original on 24 September 2015. "Earth's Atmosphere Composition: Nitrogen, Oxygen, Argon and CO2". 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The atmosphere, Mesosphere, Mesosphere, and Thermosphere helps to retain the suns heat and aids in nitrogen (78%), oxygen (21%), argon (0.9%), argon (0.9%), argon (0.9%), and trace gases. The atmosphere is known as the greenhouse effect. The lowest layer of the atmosphere is known as the greenhouse effect. The lowest layer of the atmosphere is known as the greenhouse effect. troposphere. The stratosphere is the layer of the atmosphere that features the ozone layer. The stratosphere features 75% of the atmosphere mass, and it is one of the main layers of the atmosphere responsible for the changes in weather thermosphere. The thermosphere is the region of the atmosphere that lies above the mesosphere in this layer, the temperature increases as you go higher up. The temperature increases as you go higher up. The temperature increases due to the atmosphere is \_ Ionosphere Troposphere Answer: d) Troposphere Explanation: Troposphere is the lowest layer of the atmosphere is one of the critical reasons for life on the Earth. 4. Fill in the blanks: Meteors burn in this layer Mesosphere Ionosphere Troposphere Answer: b) Mesosphere Explanation: Mesosphere Explanation: The atmosphere Consists of gases like carbon dioxide, oxygen Stratosphere Mesosphere Ionosphere Troposphere Answer: a) Stratosphere Explanation: Since less turbulence is seen than other layers of the atmosphere, jet planes fly in this region (lower nitrogen, argon, along with the traces of nitrous oxide, ozone, helium, hydrogen, neon, and other noble gases. 6. The jet planes fly in the lower Storm Burning of wood Burning of fossil fuels lightning Answer: c) Burning of fossil fuels. Explanation: Among the following options burning fossil fuels releases enormous amounts of sulfur. 8. Choose YES or NO: Air does not occupy space. Answer: b) NO Explanation: Air occupies space since air has mass. 9. Air pressure is measured using which of the following device? Thermometer Compass Solenoid Barometer Explanation: A barometer Explanation: A barometer Explanation: A barometer Explanation are seen on the planet mars? Yes, the atmosphere is seen on the planet Mars. The composition of the atmosphere varies from that of the Earth. Practice Questions What are the layers of the atmosphere? Explain the greenhouse effect. List the properties of the atmosphere? Watch the video below to understand the composition of air and its properties in detail. 2025 Copyright. All Rights Reserved Privacy Policy How can financial brands set themselves apart through visual storytelling? Our experts explainhow. Learn MoreThe Motorsport Images Collections captures events from 1895 to todays most recentcoverage. Discover The Collection Curated, compelling, and worth your time Explore our latest gallery of Editors Favorites work and financial brands set themselves apart through visual storytelling? Our experts explainhow. Learn MoreThe Motorsport Images Collections captures events from 1895 to todays most recentcoverage. Discover The Collection Curated, compelling, and worth your time. Explore our latest gallery of Editors Favorites work and some through visual storytelling? Our experts explainhow. Learn MoreThe Motorsport Images Collections captures events from 1895 to todays most recent from 1895 todays most recent from 1895 todays most recent from 1895 todays most rece latest gallery of EditorsPicks.Browse Editors' FavoritesHow can financial brands set themselves apart through visual storytelling? Our experts explainhow.Learn MoreThe Motorsport Images Collections captures events from 1895 to todays most recentcoverage. Discover The Collection Curated, compelling, and worth your time. Explore our latest gallery of Editors Picks. Browse Editors Favorities For Prelims: Atmosphere & Its Layers, Composition of Earths Atmosphere For Mains: Significance of Atmosphere For Mains: Significance of Atmosphere & Its Layers, Composition of Earths interdependent physical systems is the atmosphere is made of the layers of Atmosphere For Mains: Significance of Atmosphere For Mains: Significance of Atmosphere About: One of the main components of Earths interdependent physical systems is the atmosphere is made of the layers of Atmosphere For Mains: Significance of Atmosphere About: One of the main components of Earths interdependent physical systems is the atmosphere atmosphere is made of the layers of Earths Interdependent physical systems is the atmosphere at the system of Earths Interdependent physical systems is the atmosphere is made of the layers of Earths Interdependent physical systems is the atmosphere at the system of Earths Interdependent physical systems is the atmosphere at the system of Earths Interdependent physical systems is the atmosphere at the system of Earths Interdependent physical systems is the atmosphere at the system of Earths Interdependent physical systems is the atmosphere at the system of Earths Interdependent physical systems is the earth of Earths Interdependent physical systems is the earth of Earth Interdependent physical systems is the earth of Earth Interdependent physical systems is the Earth Interdependent physical systems in the Earth Interdependent physical systems is the Earth Interdependent physical systems in the Earth Interdependent physical systems is the Earth Interdependent physical systems in the Earth Interdependent physical systems in the Earth Interdependent physical systems in the Earth Interdependent physical s gases surrounding a planet or other celestial body. Composition: Earths atmosphere is composed of about 78% nitrogen, 21% oxygen, and 1% other gases. Nitrogen (N2): It is the most plentiful gas in the air. It is one of the primary nutrients critical for the survival of all living organisms. Oxygen (O2): Humans and animals take oxygen from the air as they breathe. Green plants produce oxygen during photosynthesis. In this way oxygen content in the air remains constant. Carbon dioxide (CO2): It is an important heat-trapping gas, or greenhouse gas, that comes from the extraction and burning of fossil fuels. These gases are found in atmospheric layers defined by unique features such as temperature and pressure. What are the Different Layers of the Atmosphere? Troposphere extends from Earths poles and higher at the equator. Yet this very shallow layer is tasked with holding all the air that plants need for photosynthesis and animals need to breathe, and also contains about 99% of all water vapor and aerosols (minute solid or liquid particles suspended in the atmosphere). The temperature in the troposphere also decreases with height. On top of this layer is what is referred to as tropopause. It is the densest atmospheric layer, compressed by the weight of the rest of the atmosphere above it. Most of Earths weather happens here, and almost all clouds that are generated by weather are found here. Most aviation takes place here, including in the transition region between the troposphere and the stratosphere is above Earths surface, the stratosphere and the stratosphere is above Earths surface, the stratosphere and the stratosphere is above Earths surface, the stratosphere is perhaps best known as home to Earths ozone layer. In this region, the temperature increases with height. Heat is produced in the process of the formation of Ozone, and this heat is responsible for temperature increases. It is nearly cloud- and weather-free, but polar stratospheric clouds (occur mainly at high latitudes during the winter) are sometimes present in its lowest, coldest altitudes. Its also the highest part of the atmosphere that jet planes can reach. Mesosphere gets progressively colder with altitude. The top of this layer is the coldest place found within the Earth system, with an average temperature of about minus 85 C (-120 F). The very scarce water vapor present at the top of the mesosphere forms noctilucent clouds, the highest clouds in Earths atmosphere. Most meteors burn up in this atmosphere forms noctilucent clouds, the highest clouds in Earths atmosphere. stratosphere is called the stratopause. Thermosphere: It is located between about 80 and 700 kilometers above Earths surface, whose lowest part contains the ionosphere. Because this layer is much closer to the sun, it can reach temperatures up to 2,000 C (3,600 F) In this layer, temperatures increase with altitude due to the very low density of molecules found here. It is not a distinct layer as the others mentioned above. Instead, the ionosphere overlaps the mesosphere in the thermosphere. It is not a distinct layer as the others mentioned above. Instead, the ionosphere overlaps the mesosphere thermosphere, and exosphere. Its a very active part of the atmosphere, and it grows and shrinks depending on the energy it absorbs from the sun. It is an electrically conducting region capable of reflecting radio signals back to Earth. The electrically charged atoms and molecules that are formed in this way are called ions, giving the ionosphere its name and endowing this region with some special properties. Exosphere and, at its top, merges with the solar wind. Molecules found here are of extremely low density, so this layer doesnt behave like a gas, and particles here escape into space. While theres no weather in the exosphere, the aurora borealis and aurora australis are sometimes seen in its lowest part. Most Earth by shielding it from incoming ultraviolet (UV) radiation, keeping the planet warm through insulation, and preventing extremes between day and night temperatures. Weather and climate: The atmosphere play a crucial role in determining weather and climate patterns, including temperature, precipitation, and wind. These patterns have a significant impact on ecosystems, agriculture, and human activities. Regulates the Earth's Temperature: The atmosphere helps regulate the Earth's temperature by trapping heat from the sun and preventing it from escaping into space. This process, known as the greenhouse effect, helps keep the planet warm enough to support life. A Major Role in the Water Cycle: The atmosphere helps regulate the Earth's water cycle by transporting water vapor from the oceans to the land, where it falls as precipitation. Earth SciencesThe atmosphere is a gas layer that surrounds a celestial body. These gases are attracted thanks to the bodies' gravity and in that way, they manage to stay in it if the force of gravity is sufficient and the temperature of the atmosphere is low. It is approximately 10,000 km thick and we find it around the lithosphere and the hydrosphere at the same time. It is made up of solid and liquid particles in a suspension state besides the gases included in it, which are attracted by terrestrial gravity. The earth is not the only one that has atmosphere, we can see it in other planets like Mercury, Venus, Mars, Pluto, Uranus and even the sun. Among the main characteristics of the atmosphere we can mention the following: Its total mass is 5.1 x 1015 kg, however, that amount is variable according to the amount of water vapor in it, time and place also affects the amount. Its density is related to altitude, so the higher the altitude, the lower the density. Factors such as temperature, humidity, environment, are factors that directly influence the atmosphere is divided into different layers, classified and named according to their variation in temperature and atmosphere is divided into different layers, classified and named according to their variation in temperature and atmosphere is divided into different layers, classified and named according to their variation in temperature and atmosphere is divided into different layers, classified and named according to their variation in temperature and atmosphere is divided into different layers, classified and named according to their variation in temperature and atmosphere is divided into different layers, classified and named according to their variation in temperature and atmosphere is divided into different layers, classified and named according to their variation in temperature and atmosphere is divided into different layers, classified and named according to their variation in temperature and atmosphere is divided into different layers. oxygen, ozone and carbon dioxide. At the same time, we can find a large amount of water vapor in it. Atmosphere composition varies, because living beings also release and consume some types of gases that are in direct contact with the atmosphere has important and vital life functions. It allows biochemical cycles to be adequate when it correctly supplies gases that are indispensable for life. It is responsible for preventing heat leaks and acts as a shield against meteorites, because they disintegrate when they come into contact with atmospheric air. It gives us important protection against solar radiation, without it we would be totally exposed to ultraviolet rays that are extremely harmful to living beings, to space objects that could collide with earth and to important and dramatic variations in temperature and climate during the day and night. The oxygen is vital to our organism, and necessary to be able to complete basic life functions. The atmosphere is divided into different layers, which vary according to temperature and pressure forming a scale called atmospheric thermal gradient. These layers are the following: Troposphere: It is the lower layer, located in the first 6 to 20 kilometers high. Here climatic and atmospheric phenomenaStratosphere: It is the lower layer, located in the first 6 to 20 kilometers high and is arranged in different layers or phases of air. In it the transformation of oxygen into ozone occurs thanks to ultraviolet rays. Ozonosphere: It produces the largest amount of ozone and is the layer responsible for protecting against ultraviolet rays. Mesosphere: This is the coldest layer. It can reach temperatures as low as -80 C. It extends between 50 and 80 kilometers in height and contains only 0.1% of the total mass of atmosphere. It goes from 90 to 800 kilometers of altitude, and its temperature increases depending on the altitude, because solar rays influence its temperature. Exosphere: This is the outer layer. It starts around 800 kilometers and ends at 10,000 kilometers. In this atmosphere has three different stages which are explained below: Prebiotic stage: The atmosphere suffered some important changes before having life, such as the condensation of water vapor that originated ocean formation and the dissolution of gases. The main gas it contains is nitrogen. Microbiological stage: In this stage, oxygen formation began in the ocean, which was used to oxidize substances from the ocean and the earths crust, in order to start the accumulation of this element in the atmosphere. Biological stage: The eukarvotic organisms appeared with photosynthesis. There was an increase in O2 until the current concentration of 21% was reached. It originated the formation of the O3 layer, responsible for protecting us from ultraviolet rays. The atmosphere is extremely important for life because it protects the Earth, absorbing much of the ultraviolet solar radiation from the ozone layer. In addition, it acts as a protective shield against meteorites and other space materials, which disintegrate into dust thanks to the friction they suffer when they come into contact with air. Atmosphere in other planets have atmospheres, all with different characteristics: Venus: Its atmosphere is dense, consisting mainly of CO2 and a small amount of carbon monoxide. Its temperatures are very high and do not vary between day and night. Its winds are fast, approximately 360 km/hour. Mars: It is very tenuous, its pressure varies according to the altitude, composed mainly of carbon dioxide and water vapor among others. It is common to see winds and dust storms that last for months due to their density. Jupiter: Clouds of different compositions. Saturn: Saturn has different dark bands and light areas; strong winds can be found in the atmosphere following parallels direction. Uranus: It atmosphere is very ticked, and it is formed by a mixture of hydrogen, helium and methane, responsible for providing it a greenish blue color. Its particles are slightly more separated than they should be because of the temperature, which is -200 C.Written by Gabriela Briceo V. 2025 Copyright. All Rights Reserved Privacy Policy

What are the characteristics of the atmosphere's layers. What are characteristics of the atmosphere. Characteristics of the atmosphere worksheet answer key.