

I'm not a robot





























the case of plants, the large central vacuole is filled with water. The turgor pressure exerted by water filling the central vacuole pushes on the cell walls, causing the plant to stand upright and giving it its rigidity. This is why unwatered plants wilt—the loss of water deflates the central vacuole causing the cell to lose shape Lastly, plant cells have a unique mechanism in cell division not seen in other eukaryotes. During plant cell mitosis, the cell will form a structure called a phragmoplast. The phragmoplast serves as a physical scaffolding for the construction of a new cell wall. Phragmoplasts are not seen in animal cells, as they lack cell walls. Plant Photosynthesis Plants are autotrophs meaning that they can create their own food supply from inorganic carbon. Autotrophs are contrasted with heterotrophs, like humans, that must get their food from other sources. Plants are a particular kind of autotroph that uses energy from sunlight to run their metabolism. As such, plants are photoautotrophs — i.e. they make their own food using energy from light. "Plants give us oxygen for the lungs and for the soul." — Linda Solegato Plants synthesize carbohydrates via photosynthesis. During photosynthesis, carbon dioxide and water are converted into sugars and molecular oxygen. The basic chemical equation for photosynthesis is: 6H2O + 6CO2 → C6H12O6 + 6O2 Photosynthesis takes place in the chloroplasts of plant cells. Chloroplasts contain small structures on the inside called thylakoids. thylakoids are stacked together into larger structures called grana. Each thylakoid is coated in chlorophyll molecules. Chlorophyll absorbs all visible light except green and is the reason most plants have a green color. Photons from light enter chloroplasts and strike molecules of chlorophyll, stripping them of electrons. These electrons get passed down a chain pigments via a series of redox reactions, releasing energy. The energy generated from the transport of electrons is used to break the bonds of carbon dioxide and water and synthesize a complex carbohydrate, leaving molecular oxygen as a by-product. Energy from the process is also used to regenerate the electrons on chlorophyll molecules so they can capture light again. A handful of plants supplement their energy from other sources, and some do not even photosynthesize at all. Carnivorous plants like the Venus flytrap supplement their photosynthetic activity by eating insects arthropods and, in some cases, small mammals and birds. Other kinds of plants have evolved to parasitize other plants and have thus lost their chloroplasts and chlorophyll. Cuscuta is a genus of parasitic plants that feed on other plants. Credit: Bogdon via WikiCommons CC BY-SA 3.0 Ecological Role Of Plants Plants exist on every continent and play a number of important ecological roles. Plants are the source of the majority of the oxygen that other organisms breathe. Plant photosynthesis creates oxygen as a byproduct which is expelled into the air. The photosynthetic activity of land plants (and sea algae) is crucial to maintaining atmospheric oxygen levels. The average houseplant can produce about 5-7 mL of oxygen per hour. Plant photosynthesis has the additional effect of controlling carbon dioxide levels in the air. Plants remove carbon dioxide from the atmosphere and are a major mechanism for carbon dioxide regulation. "Trees and plants always look like the people they live with, somehow." — Zora Neale Hurston Plants and other photoautotrophs also serve as the base of every food chain in every ecosystem. Plants fix organic carbon from inorganic carbon and are the source of all the food and energy found in an ecosystem. All other heterotrophic organisms cannot create their own food and so rely on the activity of plants and other photosynthates to create organic materials. Even carnivorous animals require plant activity for their food as the prey they eat can trace their energy back to plants. Plants also play a role in several ecological cycles. Plant activity is a major component of the nitrogen cycle as plants regenerate nitrogen in the soil and disperse it into the ecosystem. Plants also play a role in the sulfur cycle. With respect to humans, plants are used in many ways. Plants are a primary source of food for humans. The cultivation of plant material for consumption is called agriculture. The main kinds of plants farmed to eat include rice, wheat, vegetables, fruits, and starches like potatoes. Plants are also farmed for industrial purposes and are used to make oils, pigments, paper, waxes, plastics, soaps, and textiles. Many plants also have medicinal properties and are cultivated for medical use. Modern medicines like aspirin, morphine, and quinine were originally derived from plants. To sum up, Plantae is one of the 6 taxonomical kingdoms and consists of multicellular eukaryotes that perform photosynthesis. Plant cells have thick rigid cell walls and contain specialized organelles called chloroplasts that are the site of photosynthesis. In photosynthesis, carbon dioxide and water are converted into sugars and oxygen. Nearly all plants photosynthesize but a handful of species have evolved to find their food from other sources. Plants produce the majority of oxygen in the atmosphere and regulate the amount of carbon dioxide. They form the bottom of the food chain in virtually every ecosystem and their ecological activity is required for several chemical cycles on Earth.