

Prickly Pear Cactus

How Do Prickly Pear Cacti Live and Grow?

Like other plants, the prickly pear cactus makes its own food (glucose) through the process of photosynthesis, then transports that glucose to all the cells in its body to use as food to live and grow. We can explain how a prickly pear cactus does this in four steps.

Prickly pears and other cacti are interesting because their leaves are actually spines that don't do photosynthesis. So how can they survive without leaves that photosynthesize?



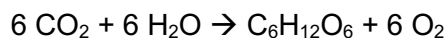
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The answer is that prickly pears have developed broad, flat stems, called pads, which are the large, rounded, flat segments that form the cactus' body. The pads do most of the plant's photosynthesis.

The pads are also good food for cattle and other herbivores to eat, but the spines prevent most animals from eating them. During times of drought grasses and shrubs wither, leaving little for cattle to eat. Sometimes ranchers use flamethrowers to burn off the spines. Then their cattle can eat the prickly pear pads and survive the drought.

Step 1: Cells in the pads make sugar through the process of photosynthesis.

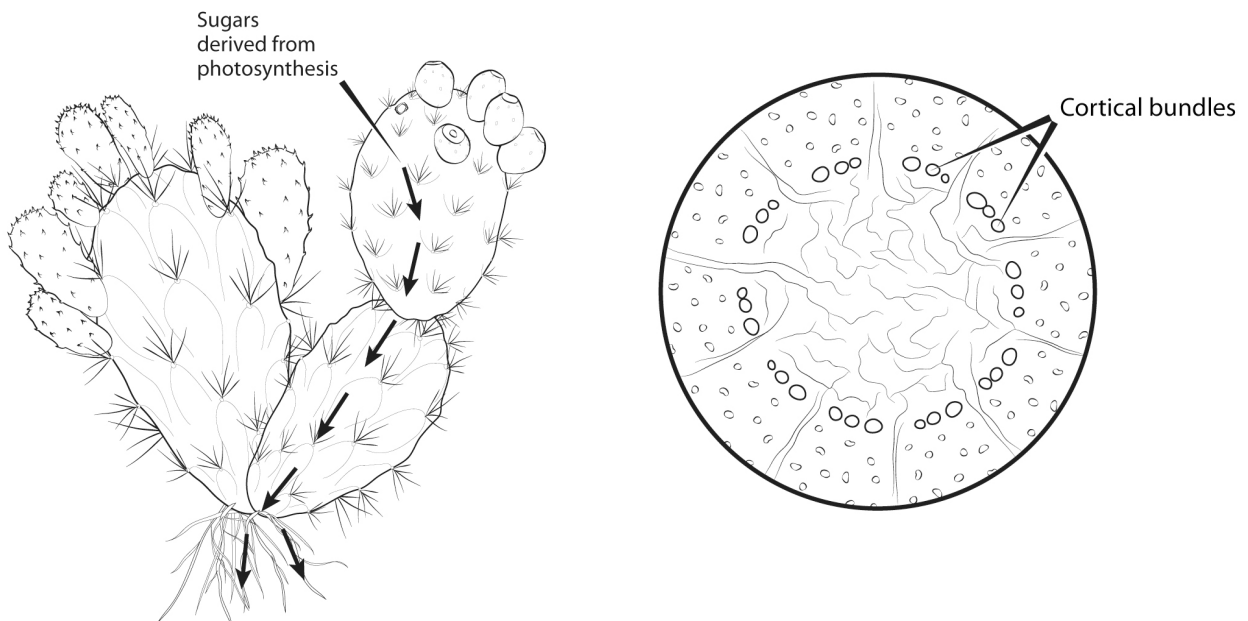
Special cells in the pads of the prickly pear cactus take in carbon dioxide (CO₂) from the air and water from the cactus' wide-spreading roots. These cells use energy from sunlight to combine the CO₂ and water molecules, making glucose, a kind of sugar that stores chemical energy. You are familiar with the chemical equation for photosynthesis:



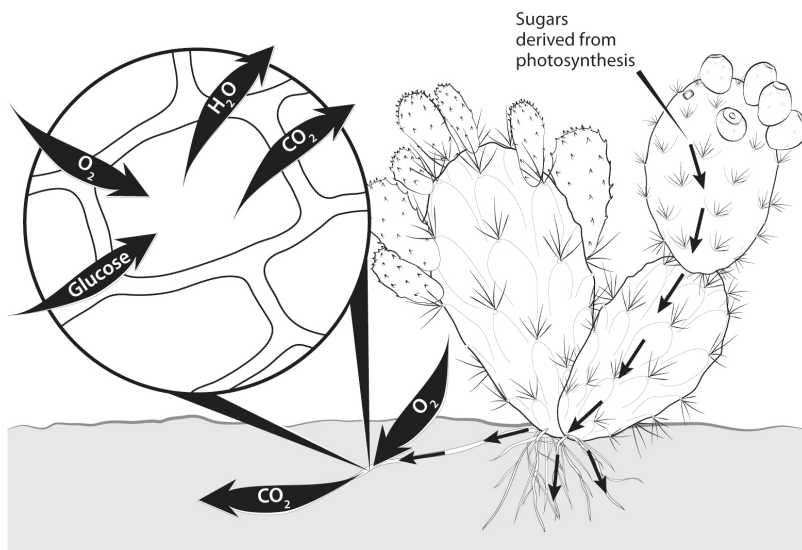
The cells in the pads keep some of the glucose for their own energy and growth, but they send most of the sugar to the rest of the plant.



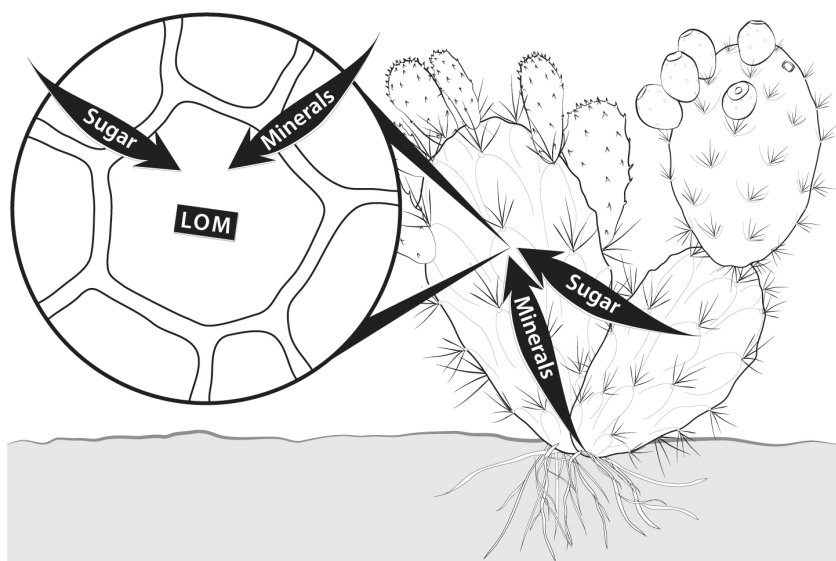
Step 2: Sugar moves to all the cells in the prickly pear cactus. Like other plants the prickly pear cactus has specialized cells (called phloem) that move sugar from the pad cells at the edges of the cactus to all the other cells in the flowers and roots. The phloem occurs in “cortical bundles” that are located throughout the thick pads of the cactus.



Step 3: All the cells get energy by combining sugar with oxygen in the process of cellular respiration. All the cells need energy to carry out their life functions, and they get that energy by combining the sugar with oxygen. You are familiar with the chemical equation for cellular respiration: $C_6H_{12}O_6 + 6 O_2 \rightarrow 6 CO_2 + 6 H_2O$



Step 4: Cells grow by making large organic molecules from sugar and minerals in the process of biosynthesis. Prickly pear cactus grow by using glucose and minerals that come through the roots from the soil to make all their other small and large organic molecules, including starches, cellulose, fats, proteins and other molecules.



LOM=Large Organic Molecules

Digging Deeper: Where You Can Learn More about Prickly Pear Cacti

If you'd like to learn more about prickly pear cacti, explore the resources below.

If you want to know more about the biology and management of prickly pear cacti, check out the AgriLIFE Extension publication from the Texas A&M system. In it, the authors describe the diverse group of succulent cacti known as prickly pear cactus. They also describe the kinds of fruit and flowers the cacti produce and describe the habitats where prickly pear are found. In some areas, prickly pear cactus are regarded as weeds – how do you pull out a weed with lots of sharp spines? Find out in this publication.

<http://counties.agrilife.org/somervell/files/2015/03/Prickly-Pear-Biology-Management.pdf>