What Plants Need to Grow

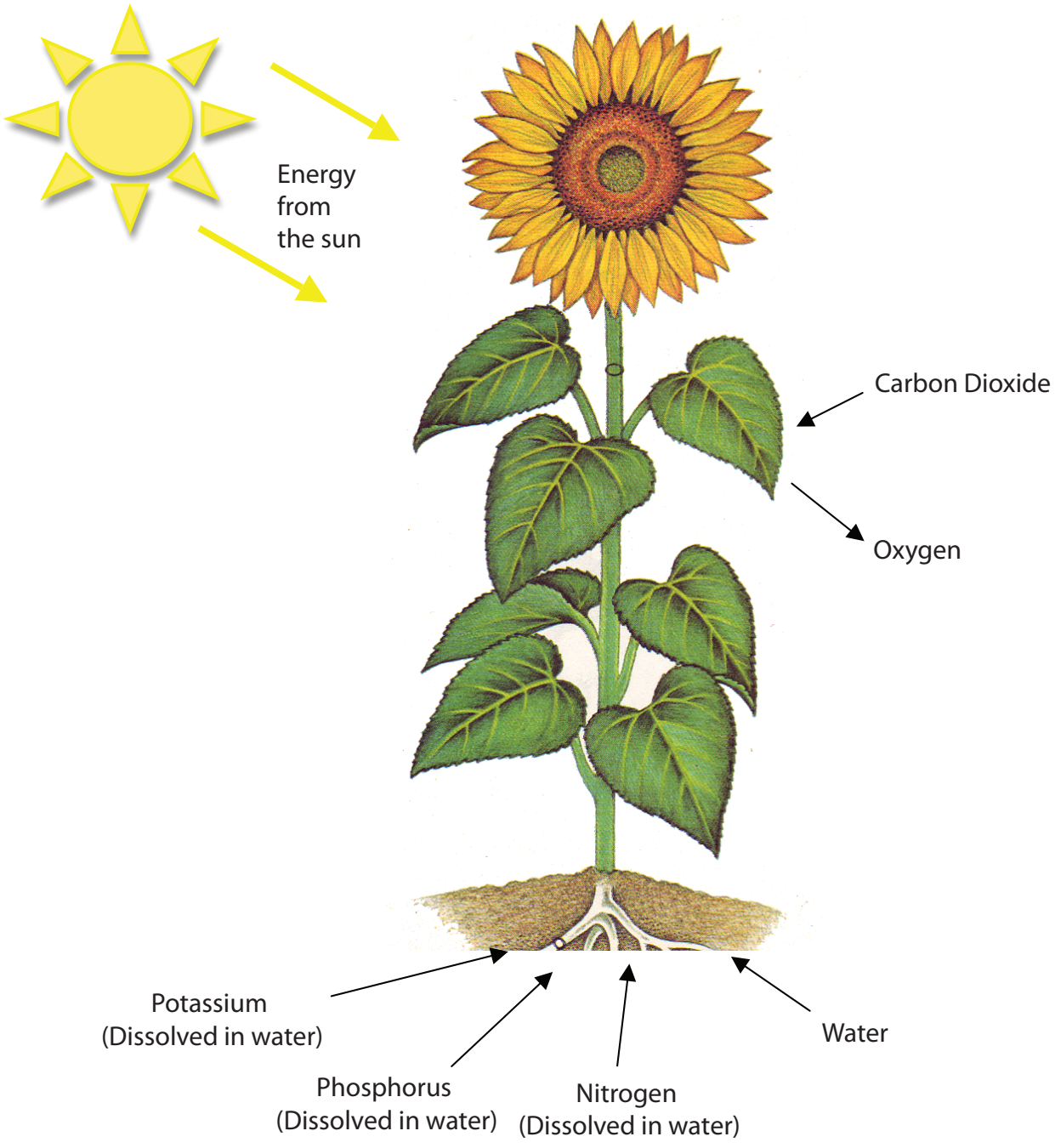


Illustration: Patricia Wynn

How to Grow Backyard Tomatoes

Temperature and Light

- Tomatoes like a warm area in full sun; they need at least 8 hours of sunlight a day or they get spindly and produce little mature fruit.
- In areas with high heat, you may have to put mulch (such as decaying leaves) around the base of the plants to help retain moisture and keep the roots from drying out.
- If you live in a cool climate you should also use mulch, because it helps warm the soil.

Soil and Nutrients

- Tomato plants should be planted in fertile, deep soil that is rich in organic matter.
- The soil's pH (the measure of acidity or alkalinity) should be from 5.5–6.8.
- To provide tomatoes with the nutrients they need, put down a small amount of balanced organic fertilizer, such as a 5-5-5 (equal parts nitrogen, phosphorous, and potassium), and work it into the soil right before planting. Too much nitrogen will give you lots of foliage and not a lot of tomatoes.
- Tomato plants can also get their nutrients another way: You simply place their roots in a solution of water and fertilizers, with no soil involved. But you need special equipment to do that. Most commercial tomato growers and backyard gardeners still grow tomato plants in soil.

Humidity and Moisture

- When watering, always aim the water toward the base of the plant; try to keep the leaves dry.
- Water regularly, but allow the soil to dry a bit between waterings. Tomatoes should have a regularly available water source, but one that doesn't keep them soggy.
- Water every morning if days get over 100°F (38°C). If you live in an area that stays fairly cool all day, you may need to water only every 2 or 3 days.

Photo: Berrucomons

Source: Weekend Gardener (http://www.weekendgardener.net/vegetable-gardening-tips/growingtomatoes-070707.htm)

Hydroponic Farming

Hydroponics (from the Greek words *hydro*, for water, and *ponos*, for labor) is a method of growing plants without soil, using mineral nutrient solutions in water. Most plants can be grown with their roots in nutrient-rich water.

Researchers in the 19th century discovered that plants absorb essential mineral nutrients when the nutrients are dissolved in water. In natural conditions, soil acts as a mineral nutrient reservoir, but the soil itself is not essential to plant growth.

When the mineral nutrients in the soil dissolve in water, plant roots are able to absorb them.

When the required mineral nutrients are introduced into a plant's water supply artificially, soil is no longer required for the plant to thrive.

The earliest published work on growing plants without soil was the 1627 book, *Sylva Sylvarum*, by Sir Francis Bacon. Water culture—a type of hydroponic farming—became a popular area of research after the book was published.

In 1699, John Woodward found that plants in less-pure water sources grew better than plants in distilled water. By 1842 a list of nine elements believed to be essential to plant growth had been identified.

Photos (left to right): NASA; Britt Conley

Tomato Facts and Records

Tomatoes come in many shapes and sizes. The tiniest are grape and cherry tomatoes, which weigh about half an ounce. The biggest are called beefsteak tomatoes. The average beefsteak tomato weighs about half a pound. The heaviest tomato ever grown weighed more than 7 pounds!

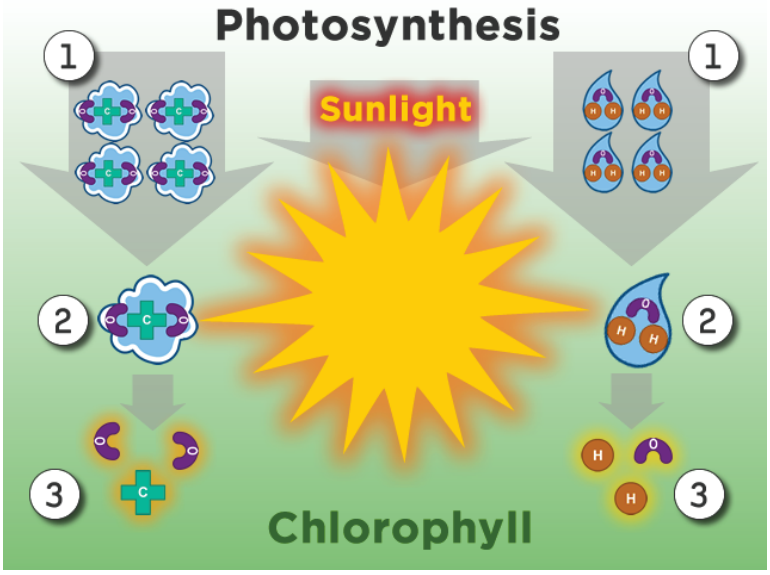
Tomato Variety	Average Weight	
Beefsteak	7.5 ounces (approx. 1/2 pound)	
Globe	5.5 ounces (approx. 1/3 pound)	
Cocktail	1.25 ounces (approx. 1/12 pound)	
Cherry & Grape	0.6 ounces (approx. 1/25 pound)	

Highest Yield

Gardener Charles Wilber's tomato plants were always very productive. A typical tomato plant in someone's back yard produces about 20 pounds of tomatoes. But Wilbur's plants often yielded 120 pounds each, far above the average. And one of them yielded 342 pounds of tomatoes, a world record recognized by the *Guinness Book of World Records*.

That record was set 24 years ago, and as of today (May 2011), it still stands. But *Guinness Book* officials are currently investigating a new claim by a man who says his plant smashed Wilber's record. Stay tuned!

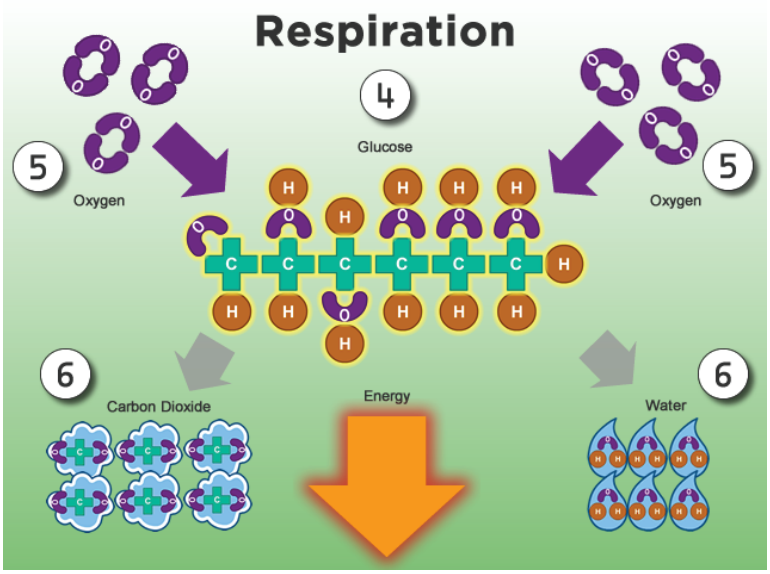
Photos (top to bottom): Renee Comet; Acres U.S.A



1. Carbon dioxide from the air enters a plant through the leaves. Water comes in through its roots.

2. Sunlight energy enters the leaves and breaks apart the carbon dioxide and water molecules.

3. The energy-charged carbon, oxygen, and hydrogen atoms form glucose molecules.



4. The newly formed glucose molecules store energy.

5. Oxygen breaks apart the glucose molecules, releasing the stored energy.

6. The carbon, oxygen, and hydrogen atoms reform into carbon dioxide and water molecules, which leave the plant.