

Help Sheets: Things Plants Need

There are certain things that every living thing needs in order to live and grow. Just like you, plants need air, food, water, and shelter (protection). If any one of these things is missing, the plant will grow slowly or not at all. On the other hand, if there is too much of something, the plant's growth can also be harmed.

Water

If they have nothing else, plants must have water. You can grow some plants at least for a short time without nutrients and light, but they will not last very long without water. Water is used to make up most of the plant's body. Have you ever noticed that a plant that needs water flops down and wilts? That is because the plant uses water in its leaves, stems, and roots to give them strength.

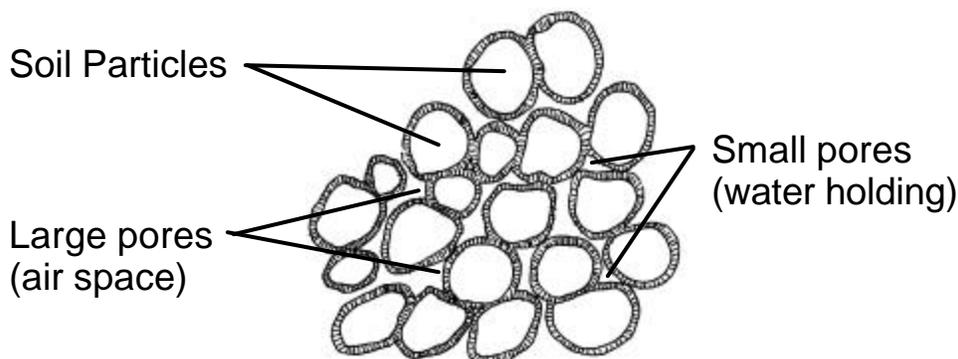


Even desert plants, like cacti, will dry up eventually if they have no water at all. But they have developed ways to conserve every bit of water they get, which lets them last much longer than other plants under dry conditions.

Most plants get their water from the soil, so it is important to have soil that can hold water for the plant to use. Adding **organic matter** to soil helps it to hold water (See *Watering HELP!* Sheet).

Air

Just like you, plants need air to stay alive. Plant leaves use carbon dioxide from the air to make sugars and starches for the plant to use as food. Another plant part that needs air is the roots. Plant roots need oxygen to stay healthy and to do their job of gathering water and nutrients for the plant. This is why it is important that water moves well through the soil. Good soil drainage allows air into the soil for the roots to use (see *Watering HELP!* Sheet).



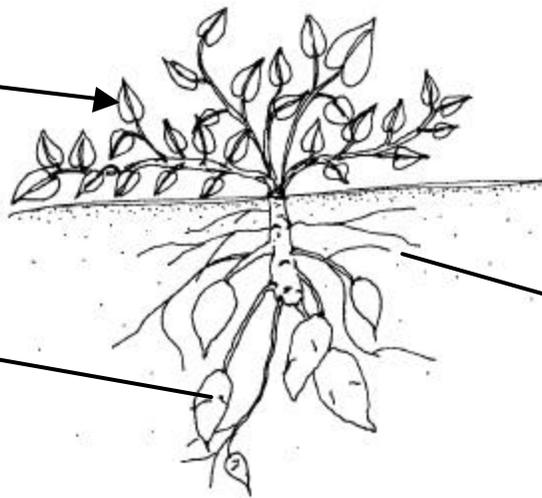
Plants that live in water have developed ways (**adapted**) to get air to their roots when water has filled up all the air spaces in the soil. Water plants, like water lilies and water hyacinth, grow in water but the water movement causes air bubbles in the water, which the plant can use.

Light

Another important element in the life of plants is light. Plants use energy from sunlight to make food. This type of energy is called solar energy. A pigment (coloring) called **chlorophyll**--which is contained in plant cells called **chloroplasts**-- gives leaves their green color and is used to collect this solar energy.

Leaves collect solar energy and carbon dioxide, sugars made and sent to all plant parts

storage organs hold sugars and starch



roots absorb water and nutrients

When light shines on leaves, the solar energy is collected by the chloroplasts. Plants then use this solar energy along with carbon dioxide from the air and water from the soil to make sugars and starches. This process is called **photosynthesis**. Isn't that amazing?

The sugars and starches made by photosynthesis are the food the plant uses for living and growing. These foods are stored in different parts of the plant; for example, starch in potato tubers (underground stems) and sugars in fruits. This stored food is also what animals and humans eat to live and grow.

Plants need plenty of light in order to grow properly. If they do not get enough, they will be weak and spindly, and have small leaves. Too much light, however, can burn or scorch leaves and fruit.

Soil Nutrients

Plants cannot grow on air, water, and light alone. They must have nutrients to make everything work right in their bodies. These nutrients are to plants like vitamins and minerals are to you. And just like you, the plant will not grow well without them.

Nutrients found naturally in garden soil come from the breakdown of minerals (inorganic matter) and plant and animal material (organic matter). Most nutrients are found naturally in the soil, but over time, many of the nutrients are used up by plants or get washed away by rainfall. In a garden, we must add organic matter or fertilizer to build up the soil with more nutrients (see *Fertilizing HELP!* Sheet).

Temperature

Different plants require different temperatures to grow.

Some plants, called cool-season plants, grow well at cool temperatures. Broccoli, spinach, radishes, and lettuce are cool-season plants that grow best when it is cool in the spring, and often flower and then die when the weather becomes warm. Farmers, who do not want these plants to flower, say that these plants **bolt** (send up flower stalks), or go to seed, at warm temperatures.

Other plants, called warm-season plants, only grow when the temperatures are warm. Many of the food plants that we eat, such as tomatoes, peppers, corn, and squash, are warm-season plants.

Before you grow a plant, you should always find out what temperature and what kind of weather it likes.

Protection

When you put a plant outdoors, you expose it to many things. A disease or insect can attack the plant, or it can suffer from the effects of the weather (too hot, too cold, too wet, too dry, hail, strong winds, etc.). By knowing the needs of each plant you can protect it as much as possible. Examples of plant protection are:

- covering the plants with boxes or baskets if there is a hail storm or a frost
- keeping young plants indoors until it is warm enough for them to grow outside
- growing plants that dislike strong sunlight in a shady area
- making sure plants get enough water when the weather is very hot and dry

One practice, which gives plants many kinds of protection, is mulching. **Mulch** is a material that is put on top of the soil around plants. Mulches can be **inorganic**, such as black plastic, or an **organic** material that will break down and become part of the **organic matter** in the soil. Some common organic mulches are grass clippings, leaves, pine straw, newspapers, and straw. Some benefits of organic mulches are:

- keeping the ground and the air around the plant warm in cool weather
- keeping soil temperatures cool during hot summer days
- reducing the amount of moisture lost from the soil

- helping to control weeds by keeping the light away from young weed seedlings
- allowing weeds to be pulled easily because the soil stays moist under the mulch

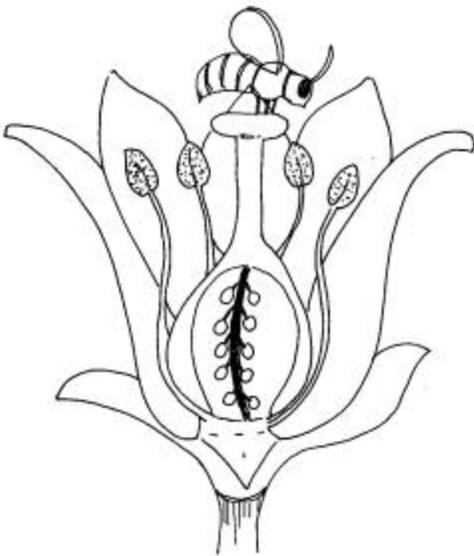
Inorganic mulches, like black plastic, warm the soil and allow you to plant earlier in the spring. These mulches do not add nutrients into the soil.

Finally, you're the doctor when it comes to protecting your plants from insects, diseases and too many weeds. Keep your eyes open for signs that something is wrong. It is up to you to find out what to do for sick plants (see the *Garden Pests and Problems* project).



Pollination

One factor that is often forgotten when listing the needs of plants is **pollination**. Pollination is the transfer of pollen from a male plant part to a female plant part. Many plants cannot make their fruits without insects or wind to pollinate them.



Honeybees are one of the most important insect pollinators in your garden. You can protect honeybees by using good gardening practices to reduce insect pests in your garden. With fewer insect pests you will not need to use **insecticides** which could also harm the honeybees. However, if an insecticide is needed, select one that is least harmful to bees and spray the insecticide at night when the bees are not very active. **Read the insecticide label to find out if it is harmful to bees or to people.**

Wind is important in pollinating some plants, like corn and tomatoes. You can help plants that are wind pollinated by growing them in blocks 4 rows wide so the wind can carry pollen to the flowers. If you're growing tomatoes inside, you may have to shake the flowers occasionally (and gently!) to help pollinate them.

New Words

absorb: to take in, or soak up

adapt: to adjust to

bolting: production of a tall seed stalk by vegetable plants which often leads to a decline in the growth of the rest of the plant.

chlorophyll: pigment which gives plants their green color

chloroplast: plant cells which contain chlorophyll

inorganic matter: any material that does not come from decayed plant or animal tissues, such as minerals or man-made materials

insecticides: chemicals that kill insects. They should be used with caution because they can be poisonous to plants and people too!

mineral: the non-organic part of soil; usually from weathered rock

mulch: material applied to the soil surface around plants

organic matter: the part of soil made from decayed plant and animal tissues and wastes

photosynthesis: production of sugar and starch from carbon dioxide and water, using light energy and releasing oxygen; brought about using chlorophyll.

pollination: the transfer of pollen from a male plant part to a female plant part