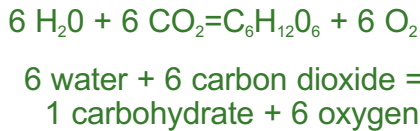




# Photosynthesis and Chlorophyll

## What is photosynthesis?

**T**he leaves (or needles) are a key part of the tree. Tree leaves take in carbon dioxide as a part of photosynthesis, a process that converts carbon dioxide into organic material by reducing the gas to carbohydrates. These carbohydrates are the trees' "food" that provide it with energy to live and grow. Chemically speaking:



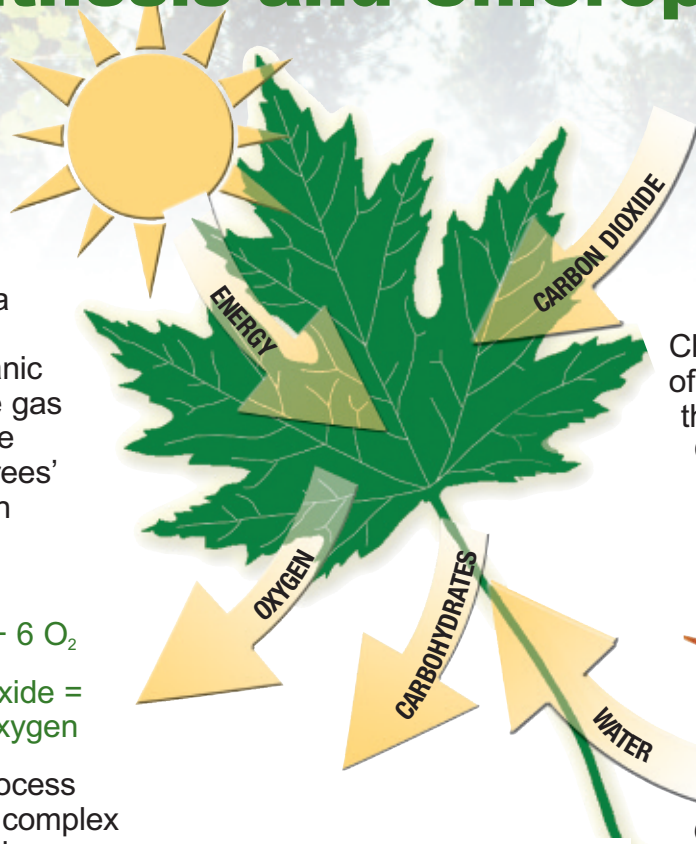
Energy for this entire process comes from sunlight. A complex chain of reactions involving a green pigment called chlorophyll makes the unusable light energy into usable chemical energy.

The process of photosynthesis plays an enormous role in our environment. Trees and plants reduce the amount of carbon dioxide in the atmosphere.

### Pan-Canadian Learning Outcomes:

**Grade 7: 306-3** describe interactions between biotic and abiotic factors in an ecosystem

**306-1** describe how energy is supplied to, and how it flows through, a food web



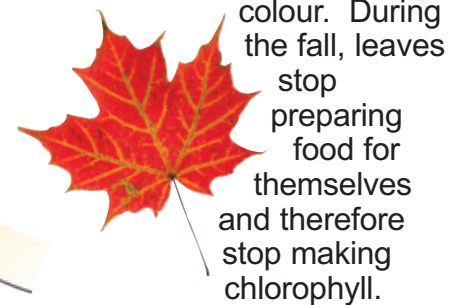
Carbon dioxide is one of the greenhouse gases that contributes to climate change and global warming.

The process of photosynthesis is nature's own filtration system!

- Trees absorb 75% of carbon dioxide produced by the average car.
- Trees supply enough oxygen to support four people for one day.
- Trees absorb as many as 7000 dust particles per litre of air.

- One hectare of Christmas trees produce enough oxygen for 45 people.
- Researchers estimate that an urban tree can save five to ten times more overall carbon than a rural tree.

Chlorophyll is one of the variety of pigments that absorb light in the process of photosynthesis. Chlorophyll is what makes the leaves their bright green



colour. During the fall, leaves stop preparing food for themselves and therefore stop making chlorophyll. Other red and yellow pigments persist in the leaves and make them the bright red and yellow colours seen in the fall.

## Did you know?

Did you know that elevated levels of carbon dioxide cause certain types of trees to grow up to 30% larger? Learn more about the effects of greenhouse gases and trees from the researchers at CFS working on the Aspen Free Air Carbon Dioxide Experiment.

Visit the Aspen FACE website at <http://aspenface.mtu.edu/index.html>



## Why do Leaves Change Colour?

Watch the power of chlorophyll in action



### Materials Needed:

- Green leaves
- Wide-mouth jar or bowl
- Rubbing alcohol
- Spoon
- Scissors
- Coffee filter
- Tape
- Pencil

### Directions:

1. Tear the leaves into small pieces and place them in a jar with rubbing alcohol.
2. Stir and leave the mixture for five minutes.
3. Cut a strip from the coffee filter about 5x10 cm. Tape one end to the middle of the pencil. Place the pencil on the rim of the jar with the filter hanging into the solution.
4. The filter will soak up the solution. When the end of the filter closest to the pencil is wet, remove the filter and allow it to dry.
5. When dry, all the colours present in the leaves will be seen on the filter paper.



*Repeat steps with fall leaves. Are the green bands visible?*

Duration of activity: 30 minutes plus time for filter to dry.