

NATIONAL SCIENCE EDUCATION STANDARDS

A. Science as Inquiry

Abilities necessary to do scientific inquiry

Understanding about scientific inquiry

K–4

C. Life Science

The characteristics of organisms

- o Organisms have basic needs. For example, animals need air, water, and food; plants require air, water, nutrients, and light.

F. Science in Personal and Social Perspectives

Types of resources

- o Resources are things that we get from the living and nonliving environments to meet the needs and wants of a population.
- o Some resources are basic materials, such as air, water, and soil; some are produced from basic resources, such as food.

Science and technology in local challenges

- o Science and technology have greatly improved food quality and quantity.

5–8

F. Science in Personal and Social Perspectives

Personal health

- o Food provides energy and nutrients for growth and development.

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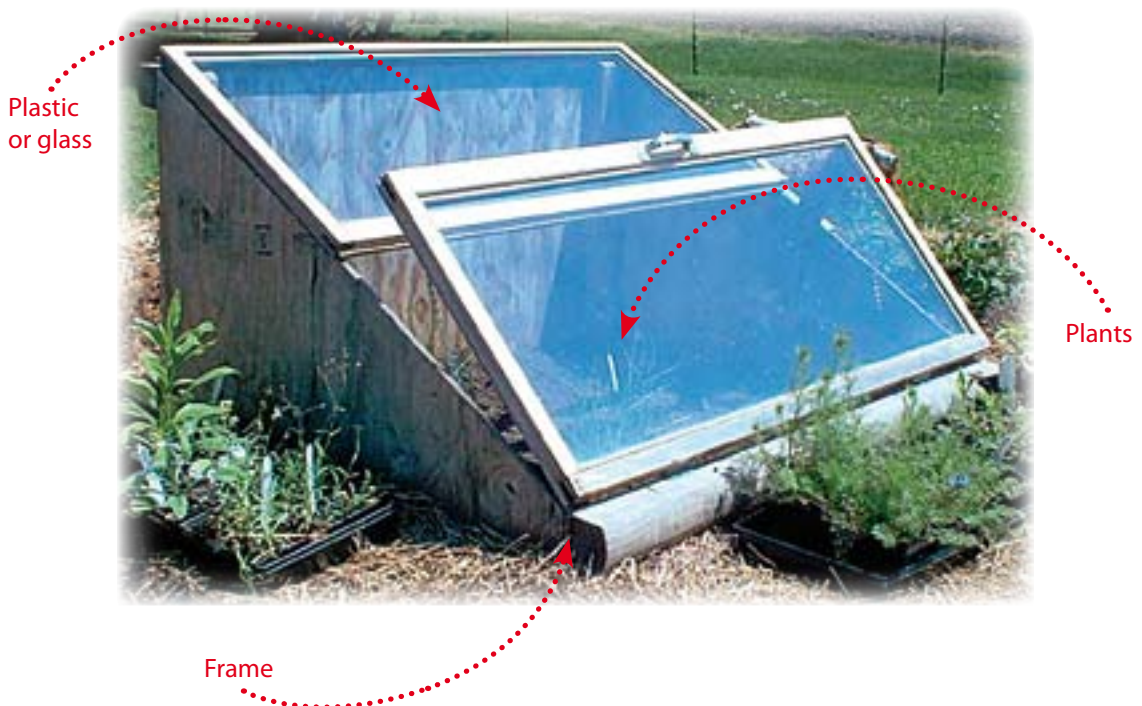
HOW GREENHOUSES WORK

What exactly is a greenhouse, and how does one work? The idea behind a greenhouse is quite simple. A greenhouse is a **structure** that shelters plants from harmful weather.

Cold Frames

Lots of gardeners make their own small, moveable greenhouses, which are called cold frames. Cold frames are simple frames that gardeners often make out of wood. They use glass or plastic to cover the top.

A cold frame

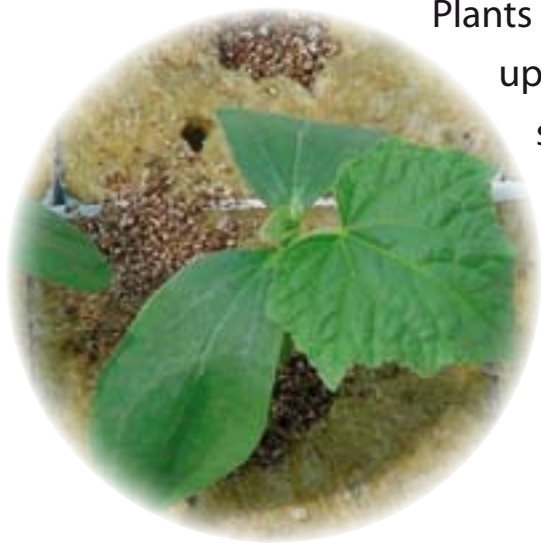


In hydroponic greenhouses, plants are grown in water-filled containers instead of in soil. Minerals are mixed into the water. This system is very **efficient**. Plants take up less room because they don't need to spread out their roots to absorb water from the soil.



Growing plants hydroponically

hydro (water) + **ponics** (labor) = **hydroponics**



Growing in rock wool

Plants that need to hold themselves upright are grown with their roots in substances like rock wool instead of just in water.



Did you know that rock wool is made by melting rock? It's then spun like cotton candy. One cubic yard (0.76 cubic meters) of rock makes 37 cubic yards (28.3 cubic meters) of rock wool!

A Plastic Bottle Greenhouse

Miniature greenhouses can even be made out of old, empty plastic bottles.

You will need:

- a knife or a box cutter
- a plastic bottle
- a seedling

What to do:

1. Get an adult to cut the top off a plastic bottle, about a quarter of the way down.
2. Plant the seedling.
3. Before you go home from school each day, put the bottom of the bottle over the seedling upside-down.
4. When you get to school in the morning, take the bottle off again.



Compare your results:

Compare your results with others. Does the size of the bottle make a difference—or the type of seedling? What happens if you forget to cover your seedling before you go home?

Does a miniature greenhouse made out of a plastic bottle really work as a food machine? Absolutely!

How a plastic bottle greenhouse works

