

## SPECIALTY STRUCTURES

### Introduction

Specialty structures, such as greenhouses and hydroponic gardens, can expand the potential of the gardening program and, at the same time, extend the growing season.

### Greenhouses

A greenhouse at a school can become a place of magic. It is not the structure of wood, plastic, or glass that is the magic, but rather what takes place within. Many different kinds of plants will flourish under the controlled environmental conditions of a greenhouse.

Outdoor gardens are subject to the mercy of the climates in which they exist. They depend on the weather for heat and light and are bound by seasonal timing for flowers to bloom and vegetables to grow. In a greenhouse, these seasonal limitations largely disappear because temperature, humidity, and ventilation are controlled. With lights even the length of the day can be extended. A school with a greenhouse is truly fortunate.

### Sources

How can a school acquire a greenhouse? Several schools in San Diego County have greenhouses that were built by 4H, PTA parents, or a local Boy Scout troop looking for a community project. In a middle school or high school, the industrial arts department may assist in a greenhouse construction project to challenge advanced and creative students. When selecting a place for the greenhouse, make sure the site is not in an area designated for future classroom expansion.

### Plans

Basic greenhouse plans are available in many gardening books and at some “do-it-yourself centers”. Greenhouse selection depends on several factors: size, orientation, location, and intended use. Of course, the big factor is the amount of money available for its construction.

### Structure

The structure need not be complex. A simple wood frame covered with a clear or translucent plastic, a method of ventilation, and a door is all that is required. Translucent plastic panels are recommended. They are less expensive, easier to repair, and less subject to breakage than glass. A heater may not be required unless you are in an area where the temperature drops to freezing. High daytime temperatures and low humidity can be controlled with a ventilation fan and misters.

### **Propagation**

A school greenhouse increases the planting season opportunities for students. It can be used to get a jump on the planting season. Seeds can be started at any time of the year. Summer flowers and vegetables planted from seed in mid-winter will be well-established plants for transplanting out-of-doors when the weather warms up in early spring. The greenhouse may also be used for growing vegetables to maturity. Imagine picking a fresh tomato in the middle of January! A greenhouse is an ideal location for a hydroponic system and can also be used to propagate plants from cuttings.

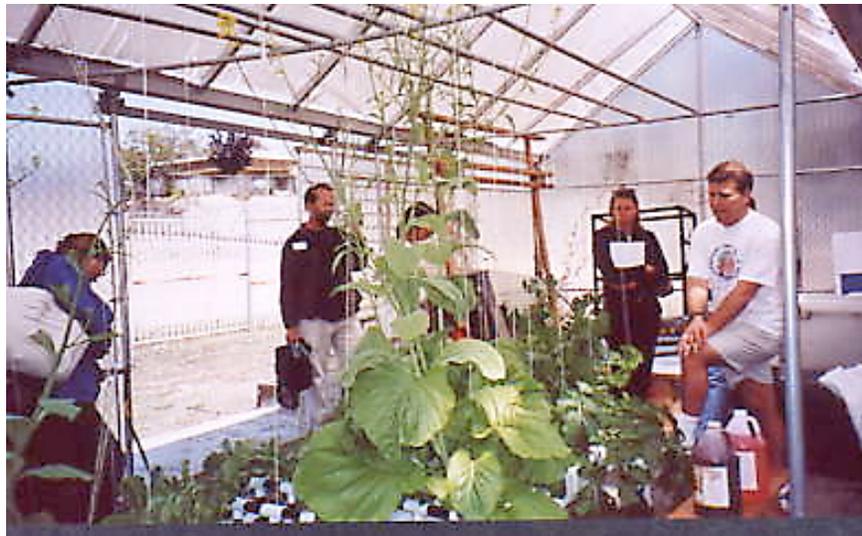
One aspect of greenhouse gardening that may appeal to some students is the ability to grow exotic plants with beautiful foliage and exquisite flowers, such as orchids, that will not do well without a controlled environment.

Greenhouses also have their downsides: initial construction costs, ongoing expense for utilities, and staff time required for maintenance and management.

### **Hydroponic Garden**

Hydroponic gardening is a method of growing plants in a nutrient solution without soil. It is also known as aquaculture, water culture or soilless gardening.

The novelty of this advanced technology may appeal to middle or high school students.



### **Location**

A hydroponic garden takes little space and is ideal for the classroom because it offers the students a laboratory for controlled experimentation for growing plants. It can be located almost anywhere: in a container on a patio, in a greenhouse, in front of a south facing window, or on a shelf in a classroom. All that is required is electricity to run the equipment, sufficient light (either natural or artificial), and the proper temperature.

### Example of a Hydroponic System



On the left is the hydroponic container before any planting and on the right is lettuce about 8 weeks after planting from seeds.

The Water Farm system pictured above consists of a four-gallon lower bucket for the nutrient or fertilizer solution and a two-gallon upper bucket for the growing media, in this case, horticultural rockwool cubes. Two gallons of nutrient solution is placed in the lower bucket. Several times a day the nutrient solution is pumped from the lower bucket to the upper bucket and, distributed over the growing surface by the hollow plastic ring. the solution drains back to the lower bucket through drainage holes. An interval timer controls the pump. Lettuce seed was planted directly on the top of the wet rockwool cubes.

### Advantages of a Hydroponic System

Some advantages of setting up a hydroponic garden are automatic watering and feeding, no cultivating or weeding, no mulching or soil-borne diseases, and low water use. On the other hand, some of the disadvantages are the high cost of setting up the system; regular monitoring of the nutrient solution, pH and nutrient levels; and not all plants will adapt to hydroponic growing techniques.

### Other Resources

There are many excellent books and pamphlets written on the subject of hydroponics. These are available at sources that offer hydroponic equipment and supplies and in the gardening section of large bookstores. [Click here to link to School Garden References for local supplier information.](#)