Virtual Greenhouse Tour

Teacher/Presenter Notes

Part 5 How does a Greenhouse work?

Attached at the end of this chart showing the slides and images in Part 5 is a brief summary that can be copied – How Greenhouses Work.

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| Slide/Image  Number | Image(s) | Teacher/Presenter Notes |
| 1 | A virtual Tour of a Greenhouse – How does a greenhouse work? | Greenhouses create an artificial environment, sheltered from the ”outside” environment that may be too cold, too hot or too variable for the growing of plants |
| 2 | Diagram of a greenhouse showing the warm air bouncing back into the greenhouse | Greenhouses use their glass enclosures to trap solar radiation; the radiant heat enters through the glass covering and warms the air, soil and plants inside |
| 3 | Exterior view | As you drive by a greenhouse, you may see the glass panels open to vent out the warm air. The venting also keeps the air in the greenhouse moving, allowing for a more even temperature throughout and cycling the carbon dioxide that plants need to grow. Most modern greenhouses have automatic systems to regulate the temperatures inside. |
| 4 | Irrigation system at work | In addition to the “heat component”, plants in greenhouses also require water. Many greenhouses use an automated irrigation system to keep the soil moist and flowering plants supplied with needed water. |
| 5 | Closeup of irrigation inside a greenhouse | These ferns are being watered automatically |
| 6 | Simple greenhouse | Although a greenhouse may appear to be a simple structure, the key components of any human-made structure are present; in a greenhouse, these include ….   * a strong foundation, * a sturdy frame to maintain the glass (or plastic) panels, * flooring that varies from simple dirt to concrete, wood or stone, * “glazing” - glass or other synthetic covering to allow in solar radiation and to help to provide insulation, * a system for irrigation of the plants and flowers. |
| 7 | Large greenhouse on solid foundation | Note the strong foundation to support the greenhouse. |
| 8 | Diagram of a greenhouse | Even smaller greenhouses require a sturdy frame – often aluminum - to maintain the glass panels or plastic covering |
| 9 | Small greenhouse | This relatively simple greenhouse still has a very strong framework; notice the watering system built in. |
| 10 | Inside with flowers and hanging baskets | The structure of this greenhouse is particularly strong, not only to withstand winds and changes in temperature, but also to support the numerous hanging baskets and the watering system required for plant growth. |
| 11 | Interior view showing moveable benches | This large greenhouse has a very strong foundation to support all of the “benches” that carry the plants at various stages of their development. The structure is complex. |
| 12 | Interior detail | Note the complex system of rollers and benches, most of which will be automated. Starting up a greenhouse involves a large investment of capital (money). |
| 13 | Interior – large greenhouse | Greenhouses are significant structures – they work efficiently and effectively to create the flowers (and vegetables) that we enjoy. They use their glass enclosures to trap solar radiation; the radiant heat enters through the glass or plastic covering and warms the air, soil and plants inside. |

**How Greenhouses Work**

Greenhouses create an artificial environment, sheltered from the ”outside” environment that may be too cold, too hot or too variable for the growing of plants. Greenhouses use their glass enclosures to trap solar radiation; the radiant heat enters through the glass or plastic covering and warms the air, soil and plants inside. This warm air rises and is replaced by cooler air that in turn is warmed up; this cycle raises the temperature quickly. The heat created by the solar radiation, plants and from the soil is “trapped” by the glass. Sometimes, the air inside can be overheated and has to be vented out. As you drive by a greenhouse, you may see the glass panels on top open to vent out the warm air vertically. Venting can also occur horizontally through side fans and vents. The venting also keeps the air in the greenhouse moving, allowing for a more even temperature throughout and cycling the carbon dioxide that plants need to grow. Most modern greenhouses have automated systems to regulate the temperatures inside.

The “heat” which is generated often comes from the sun. However, in really cold climates, heat is added to the air or to the soil.

In addition to the “heat component”, plants in greenhouses also require water. Many greenhouses use an automated irrigation system to keep the growing media moist and flowering plants supplied with needed water. Hydroponic systems, that don’t use soil to “hold” moisture, supply water directly to the roots on a more frequent basis.

Although a greenhouse may appear to be a simple structure, the key components of any human-made structure are present; in a greenhouse, these include ….

* a strong foundation,
* a sturdy frame to maintain the glass (or plastic) panels,
* flooring that varies from simple dirt to concrete, wood or stone,
* “glazing” - glass or other synthetic covering to allow in solar radiation and to help to provide insulation,
* a system for watering of the plants and flowers.