A Safer Greenhouse?

SAFE SCI: Be Protected!

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Greenhouses have been around for several thousand years, allowing for the survival of domesticated plants during inclement weather by growing them indoors. History-wise, the first recorded primitive greenhouses are noted with the early Roman Emperor Tiberius who had a fascination for Armenian cucumbers. He charged his gardener to find a means of providing the Roman Emperor with his favorite Armenian cucumbers daily year round. The gardener developed artificial methods to address the command of his Emperor. The Armenian cucumbers were grown in wheeled carts so they could receive the most sun throughout the day. With cold night temperatures, the carts were moved indoors and in some instances in houses glazed with oiled cloth. This allowed for sunlight and trapped the sun's rays for warmth. Thus the first greenhouses were "born!"   The early greenhouses were referred to as botanical gardens. The rest is history as they say with the advent of technology and applications to glass and plastic structured greenhouses. The early Roman concept of creating a special environment conducive to planet growth year round has been captured by today's greenhouse structures.

With the advances in greenhouse design, thanks to the evolution and revolution at times in technology and science, primary and secondary schools have been able to make use of these affordable structures for formal academic research and study. Many schools foster the study of plants in biology and environmental science classes by using greenhouses. As with all science activities, use of the greenhouse needs to be done with safety in mind. What are some issues which should be addressed for safety consideration? Here is a beginning list of items that science teachers should embrace for a safer greenhouse operation:

1. **Engineering Controls –** Make sure ventilation, heating systems, fans and other engineering controls are operating at peek efficiency. This includes the adoption of a preventative maintenance (PM) schedule. Teacher should work with their school's maintenance department to schedule PM activities.

2. **Alarm/Sensor Systems –** Greenhouses should be monitored for environmental elements such as humidity, temperature, etc. Sensor systems are available and will help to maintain a safer and healthier working environment for all - teachers, students and plants.

3. **Standard Operating Procedures –** Have a list of standard operating procedures or SOPs for both students and teachers/custodians relative to working in and cleaning the greenhouse.

4. **Personal Protective Equipment –**

Always have appropriate personal protective equipment or PPE such as safety glasses, chemical splash goggles, gloves, aprons and footwear available with means of sanitizing. Use of fertilizers, pesticides, and other products used in a greenhouse often require use of such PPE.

5. **Housekeeping –** Included in SOPs should be housekeeping rules. From cleaning off tools after use to keeping walkways clear from trip/fall or slip/fall hazards must be addressed.

6. **Safety Acknowledgement Form –** Students and parents should sign off on a safety acknowledgement form noting the greenhouse can be an unsafe place and has Standard Operating Procedures and behaviors which must be followed for a safer operation and learning/working environment.

7. **Inspections –** Greenhouses should be inspected on a regular basis – each day of the week to insure appropriate plant specimens are being grown, housekeeping is being effected, security is in place and engineering controls are fully operational.

8. Electrical Security –
All electrical receptacles in the greenhouse should be GFI or GFCI protected to prevent electric shock or electrocution.
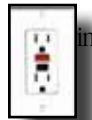
9. Produce – Before using any fruits or vegetables for academic investigations, greenhouse products should be thoroughly washed. Additionally, eating of any greenhouse products should be prohibited, given health controls cannot be guaranteed.

10. Food/Drink – Like all science laboratories, use of food and drink should be prohibited in the greenhouse to prevent the potential for cross contamination.

11. Fertilizer/Pesticide Use – Make sure school policies are reviewed relative to applications of fertilizers and pesticides before considering use on greenhouse plants. Pesticides can be especially toxic and hazardous. Natural alternatives should be explored and used whenever possible. Also provide appropriate application techniques and secured storage for these chemicals.

12. Trash – Many schools sort their trash. In this way plant material and other compostables should be placed in special containers for appropriate trash removal and potential composting activities.

13. Insect Magnets – Never leave food, wrappers, etc. around the greenhouse in that they will attract insect pests.

14. Sharps – Never leave sharps around like razor blades, knives, pruners – place them in appropriate and secured storage areas which should be dry to prevent rusting.

15. Labeling – Always label all equipment with the teacher's name, especially if the greenhouse is shared by several classes of students.

16. Slippery Surfaces – Avoid wearing flip flops, sandals and leather soles to prevent slip/ fall hazards.

17. Hand Washing – Always wash hands after working in the greenhouse with soap and water.

Bottom-Line!

The bottom-line is – greenhouses can be great educational vehicles for hands-on science activities in biology and environmental sciences. Always plan ahead safety-wise to secure and maintain a safer working environment for students and teachers.

References:

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