



## Greenhouses: Cultivating Students' Understanding of Art, Materials, and Science

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### Purpose

Global Warming is an issue that concerns many people in our society today. Educational efforts have been made to instruct students in the importance of conservation and the use of renewable resources. Through this unit, we wanted to reinforce in students a two-fold theme reflecting personal choices and increased artistic technical skill as they moved to mastery of global warming, natural resources, and the greenhouse effect.

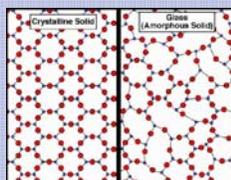
Students designed a greenhouse structure on paper (2-D) and constructed it in 3-D form. They chose a material to cover the greenhouse based upon prior knowledge of the material's characteristics. Students then tested the greenhouse to explore the relationship between temperature and insulating material.

In this unit, we provided students the opportunity to explore and integrate physical, visual, and scientific phenomena. It was our hope to not only engage students in the scientific process, but through art, gain a better understanding of the world around them.



### Integrating Materials Science

#### Structure of Materials



Glass



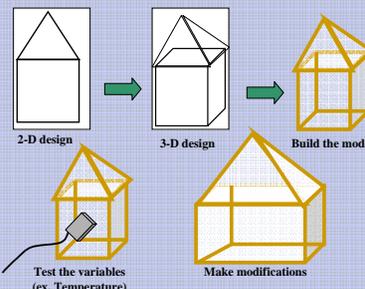
Aluminum Foil



Paper

**BIG IDEA:**  
Everyone makes material choices based upon its properties!

#### Student Greenhouse Design Process



### Integrating Art and Science\*

#### ART:

- Students draw a 2-point perspective greenhouse using a computer paint program.
- Students draw a 2-point perspective greenhouse by hand with a ruler and draw a landscape using 1-point perspective.
- Students build a handheld greenhouse frame using popsicle sticks and tacky glue.
- Students cover their greenhouse using foil, paper or plastic wrap.
- Students predict results of interior conditions based on their knowledge of greenhouse coverings.
- Students test their greenhouses for temperature.
- Students critique and articulate reasons for changes.

#### SCIENCE:

- Students learn about the difference between renewable and nonrenewable resources.
- Students understand that the sun is the source of all energy.
- Students understand the concepts of the greenhouse effect and global warming.
- Students debate on the nation's continued use of fossil fuels as a primary energy source.

\*We taught this unit twice. The first time we taught sixty 6th graders in the Fall at Vandenberg Middle School. Then, we critiqued, edited the unit and re-taught the unit to sixty 6th graders in the Winter.

### Reflections

- Students were keen on choosing materials based more upon aesthetic preferences than scientifically-informed decisions. Students were excited about using scientific equipment such as the thermometer. In future, we would like to increase the number of materials from which the students can choose.
- There were great advantages of team teaching and working across the curriculum. We experienced professional growth – an increase in knowledge and awareness of materials science.

### Acknowledgements

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