

Heat Transfer Lesson and Solar Oven Activity Sample Schedule

Week 1

0-45 Minutes: Introduction to the concepts of energy

1. Definition of Energy and Power (emphasis on power)
 - a. Energy- ability to do work
 - b. Power- amount of energy needed to accomplish task
2. Different Forms of Energy and Their Sources
 - a. coal
 - b. oil
 - c. wind
 - d. hydro
 - e. solar
3. Focus on Solar Energy
 - a. Introduction to basic heat transfer supplemented by vocabulary sheet
 - b. Cross-word puzzle to ensure understanding

45-75 Minutes: Introduction to Solar Ovens

1. Various Ways to Capture or Focus Sun's Energy
2. Current Uses of Solar Ovens and Their Designs
 - a. Why Used (i.e. cost effective) – cooking, pasteurize water
 - b. Diagrams of Designs
 - 1) Box Cookers
 - 2) Panel Cookers
 - 3) Parabolic Cookers
3. Design Specifications
 - a. Want design that is independent of position of sun
 - b. Temperature Needed and Time – food with water cannot exceed temperature of 212 degrees F until all water evaporates; need 20 minutes of sun an hour using a box cooker
 - c. Want maximum collection of sun's rays (i.e. 4 panels)
 - d. Materials: Cardboard (Paper burns at 451 degrees Fahrenheit), Aluminum Foil, and Glass (or plastic or oven cooking bag though not as good)
 - e. Heat Loss, Heat Gain, and Heat Storage – Best insulation is paper, foam, or actual insulation from a home improvement store; could leave space empty and use cardboard baffle; newspaper is a good cheap insulation; most heat loss is through the glass or plastic (ask kids where primary heat loss is, etc)
 - f. Painting of inside – not recommended since reflection of paint is more important
 - g. What to place food in (i.e. Size Dimensions) – Dark, light-weight, shallow metallic; Graniteware

- 75-120 Minutes:
1. Team Leaders guide students through decision making process and come up with design specifications
 2. Build

Week 2

- 0-120 Minutes:
1. Continue Building
 2. Time Permitting:
 - a. Have each group critique others' designs
 - b. Feat of the Week exploring storage of energy or energy dissipation