The D.C. Booth Fish Hatchery
Teaching Tip

Inquiry: Heat Transfer

During this activity your students will design an experiment in which they will investigate the transfer of heat. This is a perfect science activity for an afterschool group, club or elementary through high school science class.

Process:

Day 1
- Introduce the activity by showing the, D.C. Booth Fish Hatchery - Part One, video found on the following website: Images of the Past
  - A section of the historic video (timecode - 2:30-3:02) introduces how the use of pond ice, sawdust and icehouses were used to keep food cold before the use of modern refrigeration.
- The students should research and discuss how the use of ice (cut from lakes and ponds in the winter), sawdust and/or straw (insulation) and icehouses were used to keep food cold throughout the spring, summer and fall months.
- Discuss how heat naturally transfers from an area of more heat to an area of less heat. For example: heat will transfer from the inside a warm house in the winter to the outside.
- Introduce the challenge – The students should design an experiment to investigate how the use of insulation reduces the transfer of heat. Below is a typical experiment that could be used for this investigation or as an example to get the conversation started.
  - Possible Experiment: Effectiveness of coffee cups in reducing heat transfer.
    - Selection of cups - Test disposable coffee cups from local eateries, coffee houses and/or convenience stores; test different name brand/generic disposable coffee cups; test insulated and non-insulated disposable cups.
    - Possible experiment - Freeze the same amount of water in each cup. The cups should have similar surface area to volume ratio. Place the cups in a warm bath. Heat should transfer from the warm bath into the cup increasing the rate of the phase change from a solid to a liquid. Throughout the experiment (at set intervals), pour out the liquid water from each cup. Record the amount of liquid water and the time.
  - Divide the class into groups of 2-4; provide time to discuss the challenge, design an experiment and have them make a list of needed supplies to bring from home.
  - Formulate additional requirements/restrictions to meet the needs of your group.

Day 2&3
- Conduct the experiment.
- Have the students share their results with the group and discuss design features of the experiment that worked well/did not work well.

Contact EdServices@sdpb.org for more information about SDPB’s educational resources.