



## Temperature Control – South African Roofing Materials

### **Goal**

Students will understand how different roofing materials can have an impact on the temperature inside a house through the construction of box houses.

### **Objectives**

Upon completion of these lessons, students will be able to:

1. Identify different materials used for roofing in Wisconsin and South Africa.
2. Understand why some materials are chosen over others.
3. Record temperatures in different box houses.
4. Discuss reasons for temperature differences.

### **Subject Areas**

Science, Math, Social Studies

### **WI Standards**

Math: E.4.1, E.4.3, B.4.1, B.4.5, A.4.1, A.4.3

Science: E.4.5, E.4.6, C.4.5

Social Studies: E.4.7, E.4.13

### **Materials Needed**

Cardboard shoeboxes, tile, aluminum foil, wood, plastic bags, carpet square, tape, thermometers, data sheets, overhead projector and supplies

### **Introduction**

Students will have already seen pictures from South Africa and understand how to read a thermometer.

## **Lesson Procedure**

1. Using the pictures of South Africa as a guide, discuss with students the different types of materials used for roofs. Also discuss possible reasons for these types of roofs – economic, aesthetic, cultural, etc. Compare the types of housing there with different types of homes in Wisconsin.
2. Introduce the box house model to students. In small groups, they will be building a box house that has one of five different types of roofing material. A thermometer will be placed inside the box to record the temperature. Model for students the basics of covering the box with their assigned material, and then let them use available materials to build their box.
3. When all boxes are completed, take them outdoors and set them in a sunny location. Include a control box that has no covering but contains a thermometer.
4. Have students predict what the temperature is going to be in each box.
5. After a couple of hours, have students go back outside and record the temperatures on the thermometer inside their box.
6. Back in the classroom, compile their data on the overhead.
7. Discuss the results obtained: Surprises? Questions? Reasoning? Compare the results to how they would feel about having the different types of housing material and which one they would choose for their own home.
8. Discuss why some box houses were warmer than others.

## **Assessment Ideas**

- 🌐 Have students illustrate a house that they would like to build and indicate the type of roofing material they used and why.
- 🌐 Assess cooperative learning skills during the construction of the box houses.

## **Adaptations**

- 🌐 Extend the idea of roofing to include insulation. Students can investigate different types of insulation and experiment with the box houses to create the warmest home.

