Name_____ Period _____ Date _____

Sunny Shelter   STEM Sims

Lesson 7: Material R-value
The material R-value of a building is related to insulation. To determine the R-value you must measure the depth of the material and divide it by how well the heat conducts.

Doing the Science
1. Start the Sunny Shelter Simulation by clicking on the "Sim" tab.
2. Make the following selections:
    • House Size: Small
    • Sheltering: Earth Sheltered
    • Window Direction: North Facing
    • Window Size: Small
    • Window Tint: Present
    • Thermal Mass: Low
    • Material R-value: 10
    • Season: Summer
3. Click on the Design House Now button.
4. The Energy Usage Thermometer is to the right of the image. Record the value in Table 1 below.
5. Click the Design Menu button to return to the main screen.
6. Repeat steps 2-5 but change Material R-value to 20 and then 40 until you have measured all three values.

Table 1.

Material R-value	10	20	40
Energy Usage			

Do You Understand?
1. How does R-value affect energy efficiency?

2. Poured concrete has an R-value of 0.08, whereas cardboard has an R-value of 4. Which of the following would most likely be the R-value of wood panels?
   a. 0
   b. 2.5
   c. 5
   d. 10