Name: ______________

Understanding the Reading Passage

1. Explain this sentence in your own words. “Saving energy is far easier and often cheaper than producing it.”

______________________________________________________________________________
______________________________________________________________________________
______________________________________________________________________________

2. Why is it important to have insulation in a home?

______________________________________________________________________________
______________________________________________________________________________
______________________________________________________________________________

3. What is the purpose of sealing around electrical wires and plumbing found in a home?

______________________________________________________________________________
______________________________________________________________________________
______________________________________________________________________________

4. Name three types of barriers and how they are able to help reduce sun-generated heat from entering the home.

1.______________________________________________________________________
2.______________________________________________________________________
3.______________________________________________________________________

5. What are energy efficient appliances?

______________________________________________________________________________
______________________________________________________________________________
______________________________________________________________________________

6. List two ways that a properly ventilated attic helps reduce solar heat gain?

1.______________________________________________________________________
2.______________________________________________________________________
Vocabulary

Based on the Reading Passage, write down your understanding of these words or word pairs and verify your definitions in a dictionary, on the Internet if available or with your teacher:

caulk  

conductor  

duct  

heat  

insulation  

radiant barrier  

radiation  

R-value  

U-value
Lab Activity – Testing Materials for Conducting Heat

Introduction
The purpose of this activity is to determine which materials act as better insulators. Insulation plays an important role in conserving energy in your home.

Before You Start
Review the vocabulary words from the Reading Passage. Ask your teacher if you are unsure of any of the meanings. Divide up all the steps in the Lab Activity first, so that everyone has a clear job to do.

Materials
Obtain an equipment kit from your teacher. Check that it contains the following materials:
• 3 chopsticks (plastic, metal, wooden)
• 1 glass stirring rod
• 500 ml beaker
• 500 ml hot water >85°C
• timer or stop watch
• 1 plastic knife
• 1 ea. 1/4 inch square slice of saturated margarine or butter (in stick form), very cold or frozen
• goggles
• 1 Vernier Temperature Sensor
• 4 thumbtacks

Performing the Activity (wear goggles)
1. Collect the plastic chopstick, metal chopstick, wooden chopstick, and glass stirring rod.
2. Take the 1/4 inch square of butter and cut it into quarters with a plastic knife (4 equal parts).
3. Pierce one piece of butter on each of the following:
   a. the end of the plastic chopstick
   b. the end of the metal chopstick
   c. the end of the wooden chopstick
   d. the end of the glass stirring rod
4. Place the testing utensils into the beaker and position them so the butter is placed beyond the rim (outside of) the beaker.
5. Place a thumbtack into the center of each of the 4 pieces of butter.
6. Obtain 500 ml of hot water, as the teacher directs, and carefully pour the hot water into the beaker, with the spoons, stirring rod, etc. DO NOT DISTURB THE BUTTER AND THUMBTACKS WHILE POURING THE WATER.
7. Place the Vernier Temperature Sensor in the beaker.
8. Start the timer. Measure the time in total seconds that it takes for each thumbtack to fall from its chopsticks and stirring rod. Record the time and temperature of the water for each thumbtack in Data Table 1 of your Lab Report Form. You must record 4 readings in the table.
9. After the thumbtacks have fallen off, touch the 4 materials and rate how they feel from the coolest to the hottest.
10. Make a graph showing the difference in melting time and temperature for the 4 materials.
6. Make any connections to the temperature of the water to the time the butter started to melt:

______________________________________________________________________________
______________________________________________________________________________
1. What was the method of heat transfer from the water to the butter? __________________

2. What are some materials used to reduce air leaks in your home? __________________

3. How is an attic ventilated without mechanical equipment? _______________________
**Multiple Choice Questions**

1. How much of an electric bill is from heating and cooling a home?
   a. 12%
   b. 17%
   c. 45%
   d. 85%

2. To save energy and money, a simple step is to add:
   a. caulking
   b. insulation
   c. both a and b
   d. an additional air conditioner

3. The easiest place to add extra insulation in an existing home is:
   a. a wall
   b. baseboard
   c. window frame
   d. attic

4. To save energy during the summer, adding ________________ is an easy solution.
   a. a furnace
   b. solar screens
   c. a toaster
   d. a water heater

5. A radiant barrier, which prevents heat from entering your home through the attic, is made from:
   a. copper
   b. putty
   c. reflective aluminum
   d. foam

6. High efficiency appliances:
   a. cost more to buy
   b. cost less to operate
   c. reduce energy use
   d. all answers a, b, and c

7. A roof overhang:
   a. shades out summer sun
   b. shades out winter sun
   c. lets sunlight in during winter
   d. a and c

8. The best R-value is
   a. R = 35
   b. R = 5
   c. R = 12
   d. R = 20

9. When you own a home you will:
   a. use insulation
   b. use efficient appliances
   c. use caulking
   d. all answers a, b, and c