Section 2.4 Review

1. What are two different types of problems you will be asked to solve in this physical science course? Give an example of each.

2. Describe two benefits of following the 4-step method of problem solving.

3. Devise a memory device that could help you remember the 4 problem-solving steps. Describe the memory device.

4. For each of the following, set up the problem using the 4-step method of problem solving, and find the answer. Use the list of relationships at the right to help you with your setups.
   a. Downhill skiing burns about 600 calories per hour. How many calories would you burn if you skied for 3.5 hours?
   b. What is your mass in kilograms if you weigh 120 pounds on Earth?
   c. A car is moving at 65 miles per hour (mph). How many feet can it travel in one second?
   d. The density of Dead Sea surface water is about 1.166 g/mL. How much mass, in grams, would 2 liters of this salty water have?

5. There are four steps to help you solve design problems. What are the four steps?

6. Find a solution to the following design problem (Figure 2.19):
   What is the average mass of one grain of rice?
   You must use an electronic scale that measures to the nearest tenth of a gram. Also, your answer must be precise to one percent. Use the steps outlined on the previous page for solving design problems. Try out your solution in class, with your teacher’s permission and the right materials. Be sure to write down what you are trying to accomplish, what your constraints are, and what your idea is for finding the answer. Then show how you would follow the steps of the design cycle. Hint: One grain of rice will not register any mass on the electronic scale. The smallest mass you can measure on the scale with 1% precision is 10 grams (0.01x = 0.1 g; x = 10 g).

Figure 2.19: Question 6: How can you find the mass of a single grain of rice?

Helpful Relationships
Use these to help you with question 4.
1 mile = 5,280 feet
1 hour = 3,600 seconds
Cals = Calories/hr x activity hrs
1 kg = 2.2 lb.
1 kg = 9.8 N
\( m = D \times V \)
1 L = 1,000 mL