

## THE DOGHOUSE

### Teaching Guidelines

**Subject:** Mathematics

**Topics:** Measurement (length, area)

**Grades:** 4 – 7

**Concepts:**

- Area
- Square unit
- Scale

**Knowledge and Skills:**

- Can apply the problem-solving strategy of "make a model"
- Can apply the strategy "use a chart or table"
- Can determine the area of a rectangle by computation
- Can use a spreadsheet to do routine calculations (optional)

**Materials** (for each team):

- Stiff construction paper and tape (to make models of the doghouse)

**Procedure:**

This activity is best done with students working in small teams of 2-4 students each.

We suggest that you allow your students to work their way through this problem with as little assistance as possible. If they do get stuck, here are some suggestions to give them:

- Decide the size of the dog that the doghouse is for. Then decide how big the floor of the doghouse should be, and how high the ceiling should be.
- Remember to slant the roof (so that rain and snow will slide off).

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- Make the model on a scale of 1 inch = 1 foot. Then you can take it apart and draw outlines of the pieces onto some 4” by 8” pieces of “plywood” to see how many such pieces you will need.
- To find out how many shingles you need, find the total area of the roof. Then decide what operation to use to find the number of shingles needed to cover that area.
- Once you know how much of everything you need, make a table\* to determine the total cost. For example:

<b>Item</b>	<b>Amount needed</b>	<b>Cost per unit</b>	<b>Item Cost</b>
4' X 8' sheet of plywood	3 sheets	\$15.00 per sheet	\$45.00
Carpet	20 square feet	4.50 per square foot	90.00
Shingles	45	1.50 per shingle	67.50
		Total	\$202.50

To make this activity more challenging, ask students to also find the cost of painting (assume a price of \$20 per gallon, that one gallon covers 300 square feet, and that all surfaces will be painted, inside and out).

For more realism and fun, arrange for students to visit a home building center and find actual prices for materials that they choose.

\*This is an ideal spreadsheet application for students who have access to computers with spreadsheet software.

## The Doghouse

Suppose that you are going to build a doghouse. The floor, sides and roof will be made of plywood. There will be carpeting on the floor and shingles on the roof.

First you will need to decide how much material to buy and how much it will cost.

1. Make a model of your doghouse, with all of the dimensions on it. (It is up to you to decide how big to make the doghouse.)
2. Use the data below to calculate how much it will cost to build:
  - Each 4' x 8' sheet of plywood sheet costs \$15.00.
  - The kind of carpet you will use costs \$4.50 per square foot.
  - Each of the shingles you will use will cover 64 square inches of roof area, and they cost \$1.50 each.