Geometry of Three-Dimensional Figures

1. The Mulligatawny Soup Company will sell their product in a cylindrical can holds 500 mL of soup.

500 mL = 500 cm^3

a) Use guess and check to help you find a possible radius and height for the can.

Guess and Check:

Dimensions	Volume	Close to 500 cm^3?
$r = 3$ cm $h = 8$ cm	$V = \pi \times r^2 \times h$ $= 3.14 \times 3^2 \times 8$ = _____ cm^2	No

b) Make a model of your can.
Hint: If the material is not waterproof, use plastic wrap to wrap each piece of the net.

c) Show that the model will hold 500 mL of liquid.

For an interactive activity to adjust the height and the radius of a cylinder, follow the Web Links on the same page where you found this file on the *MathLinks 8 Adapted* Online Learning Centre.

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2. There are many pyramids in Egypt. One of these is the rhomboidal pyramid called the Bent Pyramid at Dashur. Use the Internet or the library to research this rhomboidal pyramid. Record its dimensions and find out why it is called the rhomboidal pyramid. Make a net for this shape. Use the net to construct a scale model of the rhomboidal pyramid.

For information about pyramids including the rhomboidal pyramid, follow the Web Links on the same page where you found this file on the *MathLinks 8 Adapted* Online Learning Centre.

3. Some of the nets used to make 3-D figures are very complicated. Use the Internet or the library to find the net for a soccer ball. This shape is called a *truncated icosahedron*.

a) Print the net for a soccer ball.

b) Cut out the net and assemble the model of the ball.

c) Compare the model of the ball to a real soccer ball. What kinds of geometric figures are used to make up the faces?

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e) This 3-dimensional shape also turns up in the world of chemistry in the form of a molecule known as a *buckyball*. Write a brief report on some features of a buckyball molecule, and why it is important in chemistry.

For information about truncated icosahedrons and the net of a soccer ball, follow the Web Links on the same page where you found this file on the *MathLinks 8 Adapted* Online Learning Centre.

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4. Use linking cubes to investigate the volume of a pyramid with a square base.

a) Build the smallest "step" pyramid possible using linking cubes. Each "step" must move in 1 cube and up 1 cube. The last step consists of a single cube.
Hint: Start at the top of the pyramid and work down.
Find the base length, height, and volume of the pyramid. Record your findings in the table in part d).

b) Build the next smallest "step" pyramid possible. Find the base length, height, and volume of the pyramid. Record your findings in the table in part d).

c) Continue building pyramids until you run out of cubes.

d) Organize your results in the table. Continue the pattern in the table. Try to figure out the formula for the volume of the pyramid.

Base Length	Height	Volume

e) Research to find the actual formula and compare your formula to the actual formula.

For a photograph of a step pyramid, follow the Web Links on the same page where you found this file on the *MathLinks 8 Adapted* Online Learning Centre.

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