

**CULMINATING ACTIVITY**  
**\*DESIGNING AN EFFICIENT COOLER\***  
**(part 1 of year end summative)**

As part of your summer job at the Cooley Cooler Company you've taken it upon yourself to convince the Product Manager that the standard portable cooler can be more efficiently designed. You've decided to demonstrate the differences in surface areas for 3 different designs which each have a volume of 50 litres ( $50000\text{cm}^3$ ).

The designs you will compare and contrast are:

1. Square-based rectangular prism
2. Cylinder
3. Combination cylinder and hemisphere.

Your bound report(just staple...don't use folders) must include the following:

Page 1: Cover Page

Page 2: Table of Contents

Page 3: Letter to Product Manager

Pages 4, 5, and 6: \*Spreadsheet, graph and explanation of mathematics for each of the three models.

Page 7: Comparison of the three models using a chart, such as a bar chart, to show the different surface areas, including the reasons for your choice.

Page 8: \*\*A rendering of the design of choice must be complete with any and all additions that will make the design functional and user friendly.

Page 9: Ideas for future designs with added features.

\*For each of the three models you must include one page which shows:

1. Spreadsheet data (no more than 9 points needed) showing side length or radius, height and surface area.
2. Graph of surface area versus height, showing the minimum surface area.
3. An explanation of the mathematics used for the spreadsheet...show how the formulas were developed for the spreadsheet.

\*\*The rendering of your cooler must be drawn/computer generated or built to scale. Indicate the scale with your rendering, including all relevant dimensions.

The deadline for this report is the last regular school day before final exams begin.

You may submit the report any time before the deadline, but not after.

**Tentative Marking Scheme**

Bound report including table of contents and introductory letter	/3
Spreadsheet, graph of data, and mathematics explanation for each model:	/3 x 5
Rationale for choice which includes surface area comparison graph:	/5
Rendered design	/5
Ideas for future	/2
<b>TOTAL</b>	<b>/30</b>

**5% BONUS-**You may wish to explore a model which is a cylinder with hemispheres at each end. If this is your choice then it must be added as an extra page, similar to pages 4, 5 and 6. As well, you must include it in your comparison and rendering(if it is the design you choose).