

Geometry CP Project – Building a 3-D Object

3rd hour

In this project, you will build and decorate a 3-D object of your own design, and you will calculate the surface area and volume of this object. As part of the write-up, you will show step-by-step how you arrived at your calculations.

Friday, May 25th Part 1: Design

- You'll design a pyramid with a regular-polygon base. A square base is fine, but a base with more than 4 sides is worth a small bonus.
- You may want to design, cut out, and test several prototypes before settling on your design.
- You may collaborate with classmates but everyone must submit their **OWN** object, drawings, and calculations. **ORIGINALITY WILL BE TAKEN INTO ACCOUNT.**
- As a general **guideline for size**, the **base of your object should have an area between 144 and 400 square centimeters. **Note: be careful of selecting your slant height. This should be a 3-D figure and should not lie flat on the base. (Slant height should be between 10 and 14 cm.)**
- **By the end of Part one**, you will need to include the following on a piece of graph paper:
 - a scale drawing of a net for your object → build one you can lie flat.
 - all the important dimensions that you can measure should be labeled. For example: **base edge length, slant height, lateral edge length, apothem**

Tuesday, May 29th and Wednesday, May 30th - Part 2: Building

- We will build in class.
- You will need to color your base a different color than the lateral faces.
- Label your slant height on your object.
- **By the end of Part two**, you should have your labeled scale drawing of the net, and your 3D object. Make sure your name is written on the bottom. You may leave it in the classroom.

Thursday, May 31st - Part 3: Calculations

- You will need to complete the calculations worksheet including a labeled picture of your object and calculations listed below.
- You will be calculating the volume, lateral surface area, *and* total surface area of your object. For full credit, show all formulas used, substitutions, and label results with appropriate units of measure. You will need to submit a neat sheet of calculations, complete with all work and explanations in your own words. The clarity, accuracy, and organization of your math work will make up the majority of your project grade.
- Every submitted object must be appropriately decorated and attractive.
- **By the end of part three**, you will need to have your net drawing, 3D object, and your calculations ready to turn in.

You will need to bring in:

1 poster board

It will be helpful if you also bring in:

1 pair of scissors

Colored pencils

See reverse side for scoring rubric.

Make sure you turn in all required elements.

Scoring

Name: _____

	Your Score	Max Score
1. Turn in this page, neatly stapled with the two required drawings (net and 3-D object) and required calculations.		1
2. Your design is a <ul style="list-style-type: none">Pyramid with a square base or a(Pyramid with regular polygon base with greater than 4 sides: +1 bonus)		2
3. Your design follows the size guidelines.		1
4. Scale drawing of net is turned in, accurate, and neatly labeled.		4
5. 3-d object is turned-in, neatly constructed, and attractively decorated, base is a different color than lateral faces and slant height is clearly labeled		4
6. Drawing of 3-d object is turned-in, neat, and accurately labeled.		4
7. Volume calculation is submitted, including all formulas used, substitutions, and results labeled with appropriate units of measure.		4
8. Total surface area calculation is submitted, including all formulas used, substitutions, and results labeled with appropriate units of measure.		4
Final Score		24

Day 3: Calculations

3D Drawing

Create a drawing of your 3D solid below. (Hint: Think about all of the diagrams in notes, hw, reviews, etc.)

All important terms must be labeled including:

- Base edge
- Slant height
- Height of the 3D solid
- Lateral edge
- Apothem or anything else that applies

Note: Only some of the above will apply to your figure. ie: Your figure may or may not have an apothem. .

Now fill in the lengths of these key terms below. Fill in all that apply to YOUR solid

Base Edge: _____ Slant Height: _____ Height: _____ Lateral Edge : _____

Apothem: _____

Calculations

The clarity, accuracy, and organization of your math work will make up a majority of your project grade.

Calculations Part 1:

Before we find volume, lateral area and surface area, we need to find a few calculations first using the measurements above. Show the mathematical work necessary to calculate any additional information. Show all formulas used, substitutions, algebraic work, and label results with appropriate units of measure. **Box your final answers.**

Height of the Solid

Base Area

Perimeter of the base

Calculations Part 2:

Use your answers from part 1 to calculate the lateral area, total surface area, and volume of your 3D solid using your actual measurements. Show all formulas used, substitutions, algebraic work, and label results with appropriate units of measure.

The clarity, accuracy, and organization of your math work will make up a majority of your project grade.

Lateral Area**Surface Area****LA =****SA =****Volume****V =**

To Turn In: Staple together: Your net on graph paper, this calculation sheet, and the rubric. These items should be turned in with your 3D solid. Make sure your name is on everything!