

6TH GRADE MATH

Unit 10

Problem Solving with
Volume and Surface Area

Date:

Extra! Extra! Read all about it!

We are going to start Unit 10 (Problem Solving with Volume and Surface Area). Here is a list of IXL topics, for every topic you complete you will earn some extra credit. Here are the possible points you can earn on each topic. The extra credit will be due by _____.

Smart Score on IXL

- 100% - 5 extra points
- 95% - 4 extra points
- 90% - 3 extra points
- 85% - 2 extra points
- 80% - 1 extra point

Unit 10 Topics – You can earn up to 65 extra credit points! You got this 😊

5.MD.C.3.a Understand that a cube with side length 1 unit, called a "unit cube," is said to have "one cubic unit" of volume and can be used to measure volume.

1. Volume of rectangular prisms made of unit cubes (5-EE.13)

5.MD.C.3.b Understand that a solid figure which can be packed without gaps or overlaps using n unit cubes is said to have a volume of n cubic units.

2. Volume of rectangular prisms made of unit cubes (5-EE.13)

5.MD.C.4 Measure volume by counting unit cubes, using cubic centimeters, cubic inches, cubic feet, and improvised units.

3. Volume of rectangular prisms made of unit cubes (5-EE.13)

5.MD.C.5.a Find the volume of a right rectangular prism with whole-number side lengths by packing it with unit cubes and show that the volume is the same as would be found by multiplying the edge lengths, equivalently by multiplying the height by the area of the base. Represent whole-number products of three factors as volumes (e.g., to represent the associative property of multiplication).

4. Volume of rectangular prisms made of unit cubes (5-EE.13)

5.MD.C.5.b Know and apply the formulas $V = l \times w \times h$ and $V = B \times h$ (where B represents the area of the base) for rectangular prisms to find volumes of right rectangular prisms with whole number edge lengths in the context of solving real-world and mathematical problems.

5. Volume of cubes and rectangular prisms (5-EE.15)
6. Volume of cubes and rectangular prisms: word problems (5-EE.16)
7. Compare volumes and dimensions of rectangular prisms: word problems (5-EE.)

5.MD.C.5.c Recognize volume as additive. Find volumes of solid figures composed of two non-overlapping right rectangular prisms by adding the volumes of the non-overlapping parts, applying this technique to solve real-world problems.

8. Volume of irregular figures made of unit cubes (5-EE.14)

6.G.A.2 Find the volume of a right rectangular prism with fractional edge lengths by packing it with unit cubes of the appropriate unit fraction edge lengths, and show that the volume is the same as would be found by multiplying the edge lengths of the prism. Know and apply the formulas $V = lwh$ and $V = Bh$ where B is the area of the base to find volumes of right rectangular prisms with fractional edge lengths in the context of solving real-world and mathematical problems.

9. Volume of cubes and rectangular prisms (6-FF.14)
10. Volume of cubes and rectangular prisms: word problems (6-FF.15)

6.G.A.4 Represent three-dimensional figures using nets made up of rectangles and triangles, and use the nets to find the surface area of these figures. Apply these techniques in the context of solving real-world and mathematical problems.

11. Surface area of triangular prisms (6-FF.18)
12. Surface area of cubes and rectangular prisms (6-FF.16)
13. Nets of three-dimensional figures (6-EE.3)

If you did not finish 6.EE.A.2.c from unit 11 you have another chance to complete! You're welcome :)

Volume of Rectangular Solids

Name: _____

Date: _____

Daily Target: I can find the volume of different rectangular solids.

Formulas:

$$\text{Volume} = B \times H \times W$$

$$\text{OR Volume} = AB \times H$$

Base =

Area of Base =

Height =

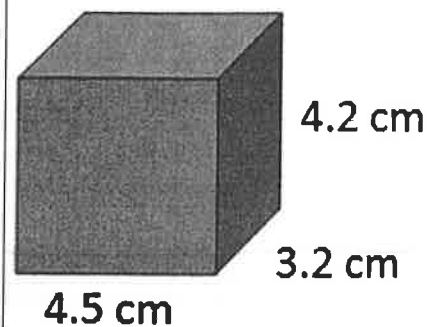
Width/Depth =

Height =

$$\text{_____} \times \text{_____} \times \text{_____}$$

$$\text{_____} \times \text{_____}$$

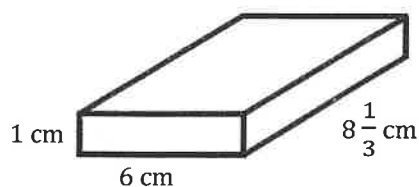
Volume: _____



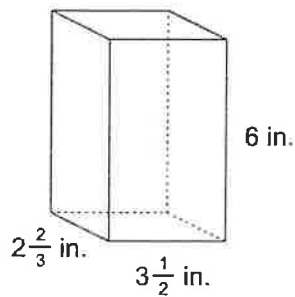
Practice!

Find the volume for each rectangular prism.

1.



2.

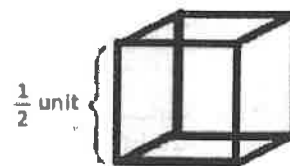


3. Sam is preparing to build an underground pool in his backyard. He has marked off a rectangle that is $12 \frac{1}{2}$ feet long and 9 feet wide. He then must dig out a depth of 5.5 feet. What is the volume of the pool based on these measurements?

4. Amani has a box that is 15 centimeters long and 5 centimeters wide. The volume of the box is 225 cubic centimeters. What is the height of the box?

Think about!

What would be the volume of the following cube?



Volume: _____

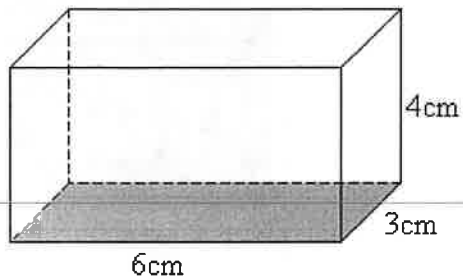
Name: _____

Date: _____

Volume Practice!!

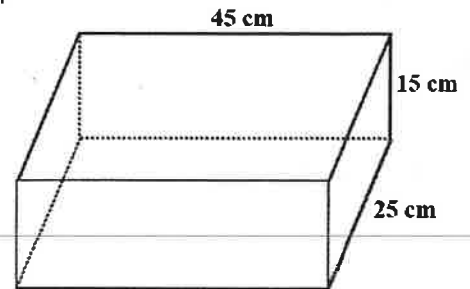
Find the volume of the given figures below.

1.



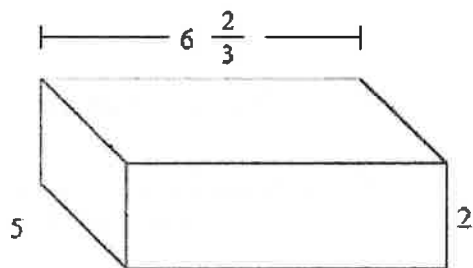
Volume: _____

2.



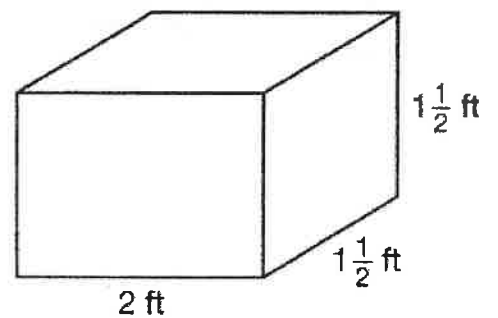
Volume: _____

3.



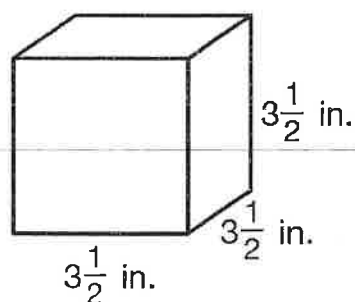
Volume: _____

4.



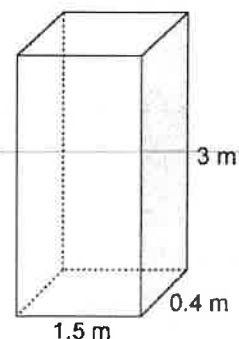
Volume: _____

5.



Volume: _____

6.



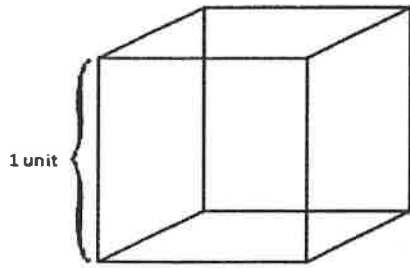
Volume: _____

Volume of w/ Fractional Cubes

Name: _____

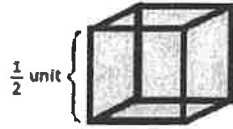
Date: _____

Daily Target: I can find the volume of different rectangular solids.



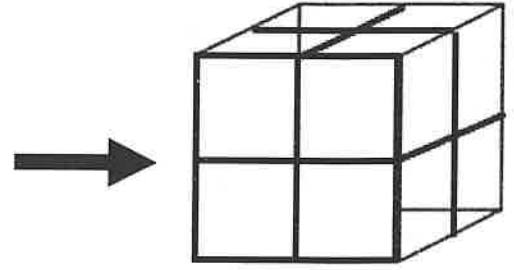
Volume = $b \times h \times d$

Volume = _____



Volume = $b \times h \times d$

Volume = _____



Volume = $b \times h \times d$

Volume = _____

What do you notice about the fractional cube lengths?

Step 1:

Identify the _____, height, and width/depth of the _____ cube mentioned.

Step 2:

Find the _____ of the _____ rectangular prisms that is being filled.

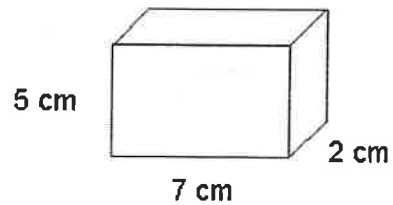
Step 3:

Find the _____ of the fractional (_____) cubes that are filling the rectangular prism.

Step 4:

Take the _____ of the _____ prisms and _____ by the volume of the _____ prism.

How many $\frac{1}{2}$ cm cubes fit in the box?



Volume of w/ Fractional Cubes

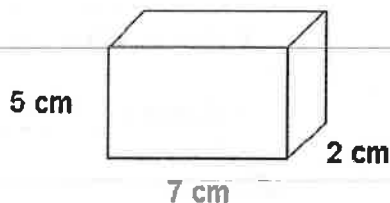
Name: _____

Date: _____

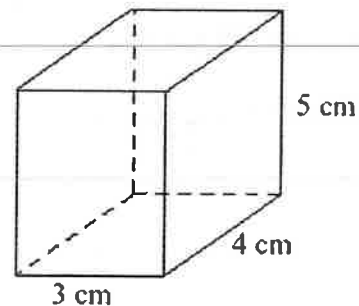
Daily Target: I can find the volume of different rectangular solids.

Practice! – Find the volume of the rectangular prisms with the given fractional cube lengths!

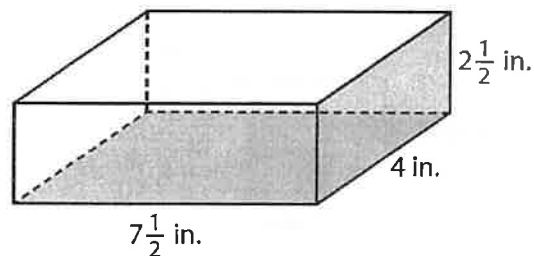
- 1) How many $\frac{1}{4}$ in cubes can fit in the box shown?



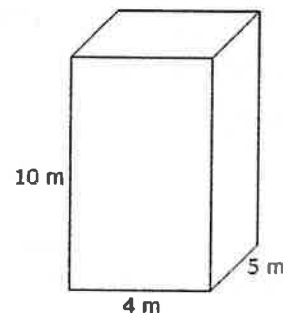
- 4) How many $\frac{1}{2}$ cm blocks can fit in the box shown?



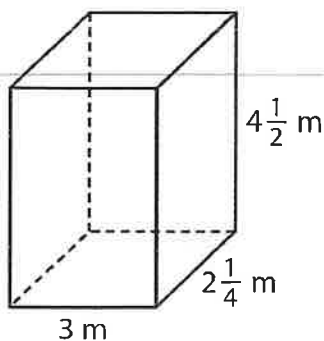
- 2) How many $\frac{1}{2}$ in cubes can fit in the box shown?



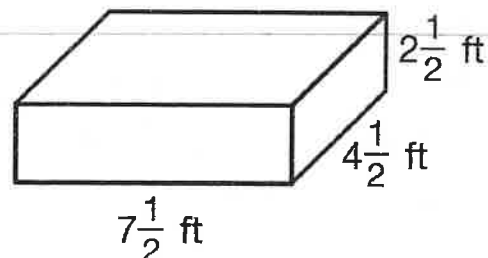
- 5) How many $\frac{1}{4}$ m blocks can fit in the box shown?



- 3) How many $\frac{1}{4}$ m blocks can fit in the box shown?



- 6) How many $\frac{1}{2}$ ft blocks can fit in the box shown?

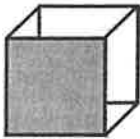
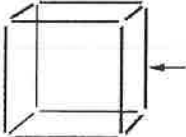
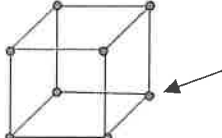
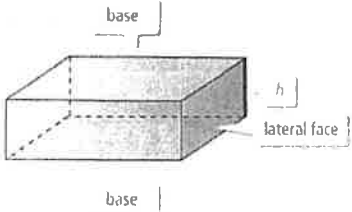
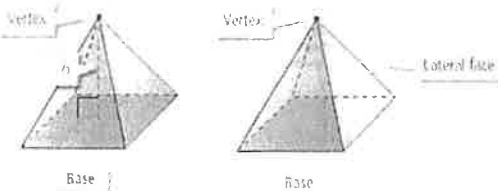


Surface Area

Name: _____

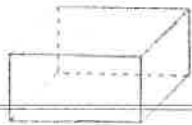
Date: _____

Daily Target: I can find the surface area of different 3 dimensional shapes.

<p>Face</p> 	<p>A _____ of a three-dimensional figure is a _____ surface shaped like a _____.</p>
<p>Edge</p> 	<p>An _____ of a three-dimensional figure is a segment formed by the _____ of two faces.</p>
<p>Vertex</p> 	<p>A _____ of a three-dimensional figure is a point where _____ or more edges meet.</p>
<p>Prism</p> 	<p>A _____ is a three-dimensional figure with two parallel _____ bases joined by faces that are parallelograms. A prism is named by the shape of its _____.</p>
<p>Pyramid</p> 	<p>A _____ is a three dimensional figure that is a polygon and sides that are _____ and meet at the top/_____. A pyramid is _____ by the shape of its base.</p>

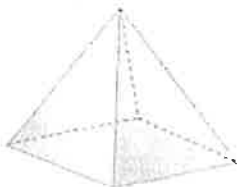
Practice!

Decide whether each statement is true or false.



- The figure is a three-dimensional figure. _____
- The figure has three faces. _____
- The faces are triangles. _____
- The figure has 12 edges. _____
- The figure has six vertices. _____

How many faces, edges, and vertices does the three-dimensional figure have?



Face: _____

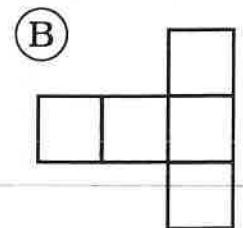
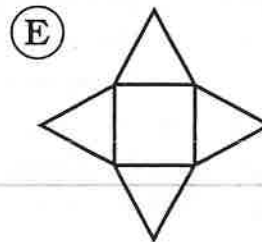
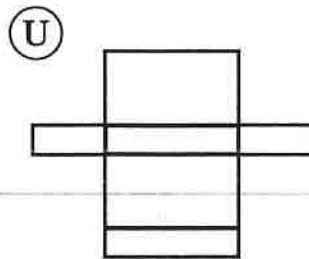
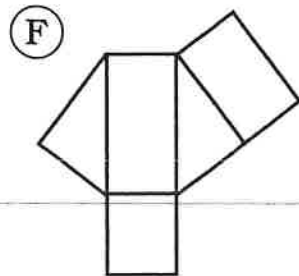
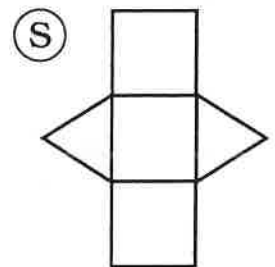
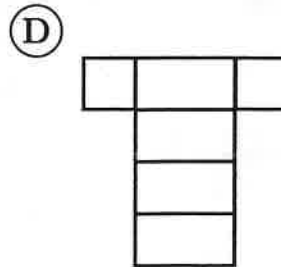
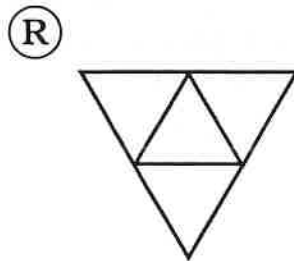
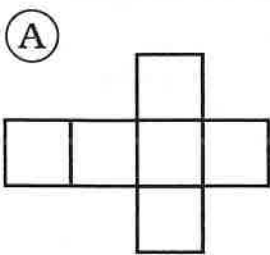
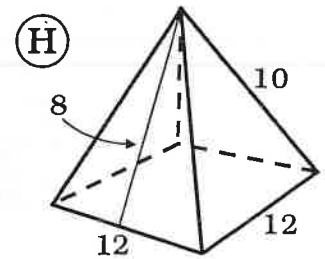
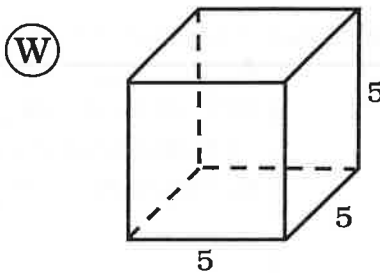
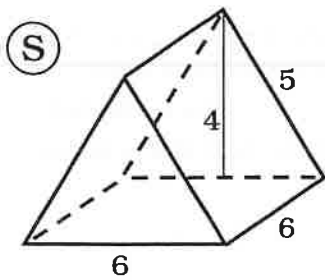
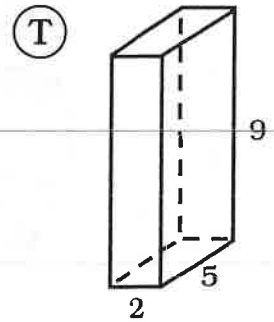
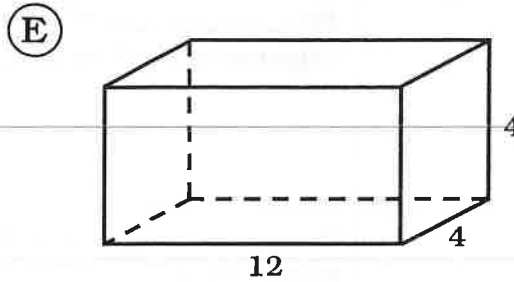
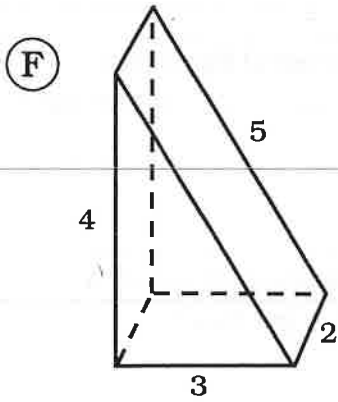
Edges: _____

Vertices: _____

Why Didn't the Teddy Bear Finish His Dinner?

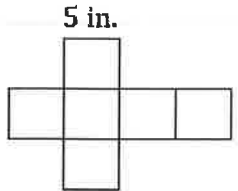


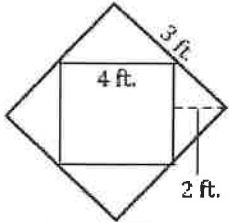
Match each prism with the corresponding net. Write the two letters for the matching shapes at the bottom under the correct surface area. The letters from the top go first.

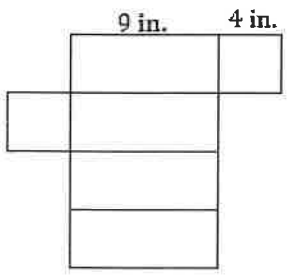


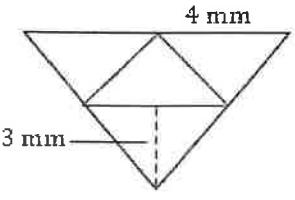
336 units ²	150 units ²	120 units ²	146 units ²	36 units ²	224 units ²

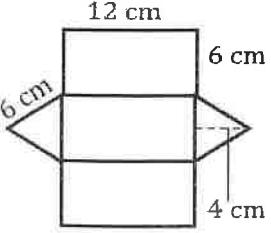
Surface Area	Name: _____	Date: _____
Daily Target: I can find the surface area of different 3 dimensional shapes.		
Surface Area		
The surface area of a solid is the area of its _____, or the _____ of the area of every _____ of the figure.		

Cube: 	Area of a square = $l \times w$
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Square Pyramid: 	Area of a Triangle = $\frac{b \times h}{2}$ Area of a square = $l \times w$
--	---

Rectangular Prism: 	The surface area of a rectangular prism can be found using the formula: Surface area = $2lw + 2h + 2wh$
--	--

Triangular Pyramid: 	Area of a Triangle = $\frac{b \times h}{2}$
---	---

Triangular Prism: 	Area of a rectangle = $l \times w$ Area of a Triangle = $\frac{b \times h}{2}$
---	--

Surface Area Rectangular Prism

Name: _____

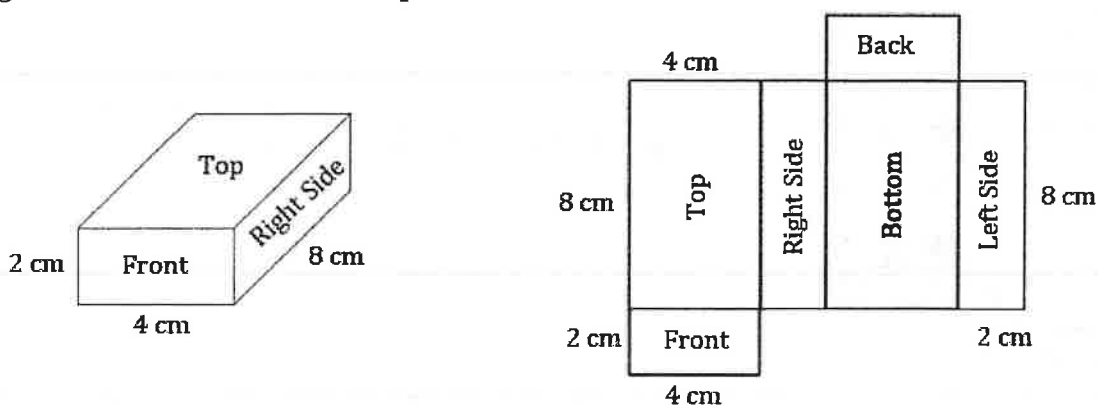
Date: _____

Daily Target: I can find the surface area of different 3 dimensional shapes.

Surface area is the sum of the areas of all the faces of a three-dimensional figure.

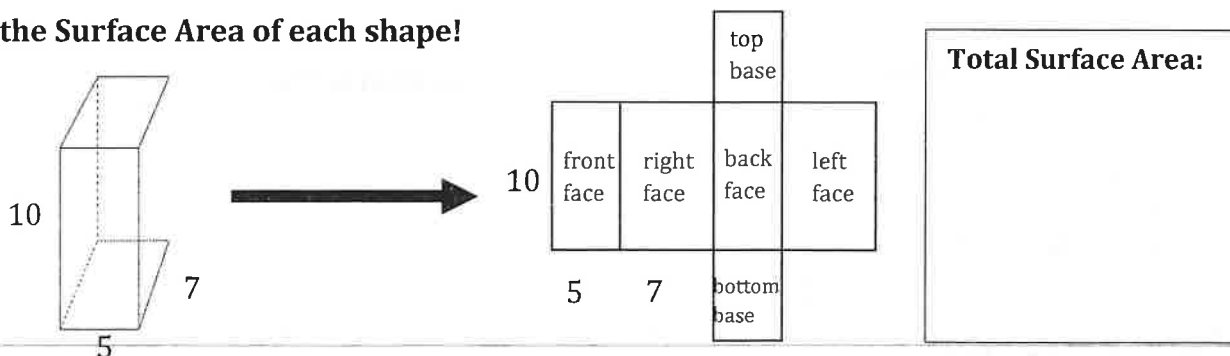
If you unfold a 3D figure and lay it flat, you make a net. A net is a pattern that makes it easy to see all faces of a 3D figure

Use the diagram below to answer the questions!



Find the area of the top face. The bottom face has the same area.
 ↓
 Find the area of the right face. The left face has the same area.
 ↓
 Find the area of the front face. The back face has the same area.
 ↓
 Add the areas of all six faces to find the total surface area.

Practice! Find the Surface Area of each shape!



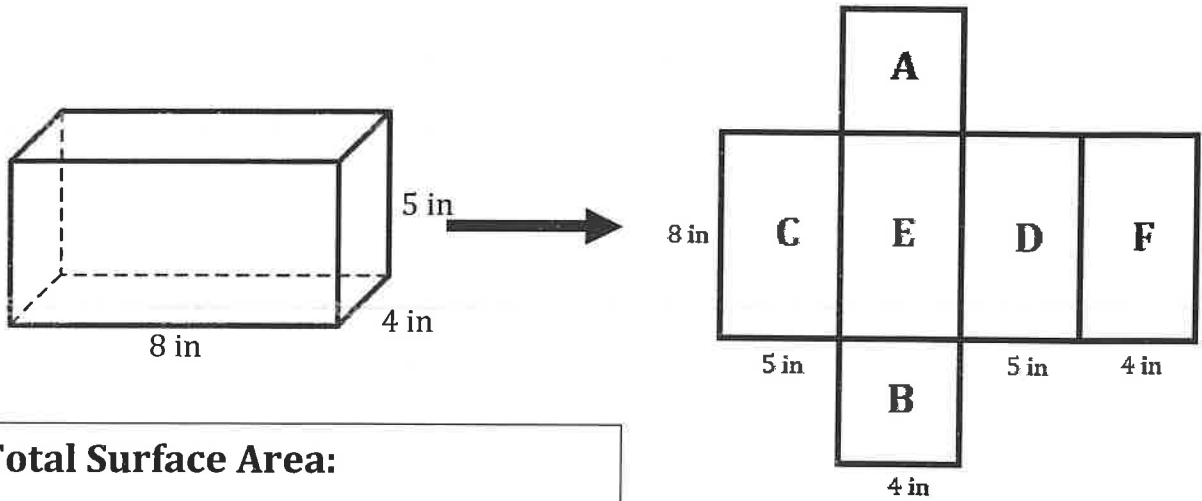
Front Face	Top Face	Left Face
Back Base	Bottom Base	Right Base

Surface Area of Prisms

Name: _____

Date: _____

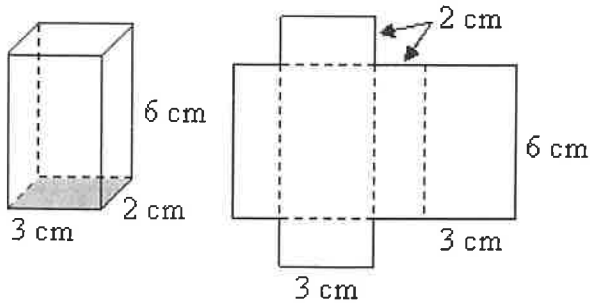
Daily Target: I can find the surface area of different 3 dimensional shapes.



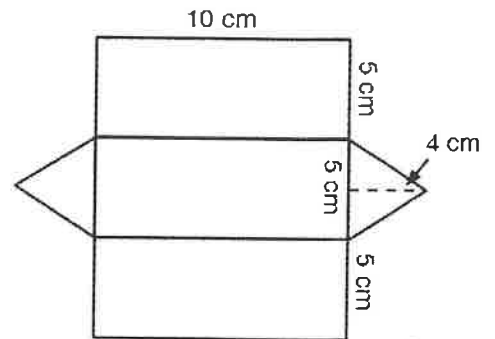
Total Surface Area:	
A (left):	
B (right):	
C (front):	
D (back):	
E (top):	
F (bottom):	

Exit Ticket:

1)



2)



Front =
 Back =
 Left =
 Right =
 Top =
 Bottom =

Triangle =
 Triangle =
 Rectangle =
 Rectangle =
 Rectangle =

Surface Area with Pyramids

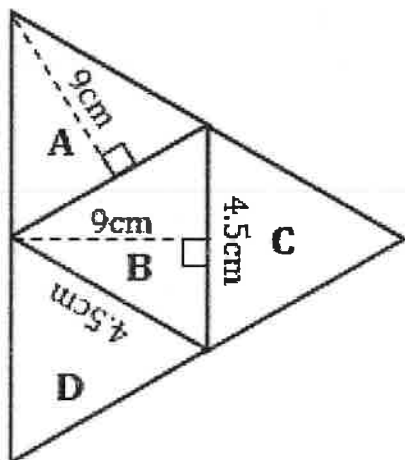
Name: _____

Date: _____

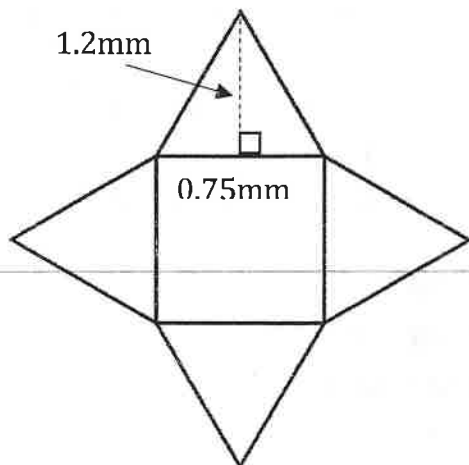
Daily Target: I can find the surface area of different 3 dimensional shapes.

The surface area of a solid is the sum of the area of all its faces.

A pyramid is a 3-D figure with a polygon base and triangular sides that meet at a point. To find the surface area, find the area of each fact and then add the areas together.



Side:	Area:
A (triangle)	
B (triangle)	
C (triangle)	
D (triangle)	
Total surface area =	



Side:	Side:
Square	
Triangle	
Triangle	
Triangle	
Triangle	
Total surface area =	

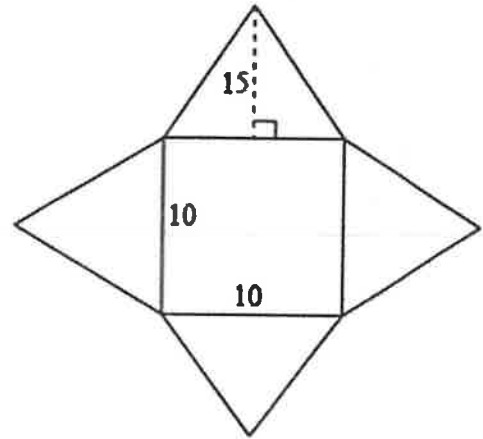
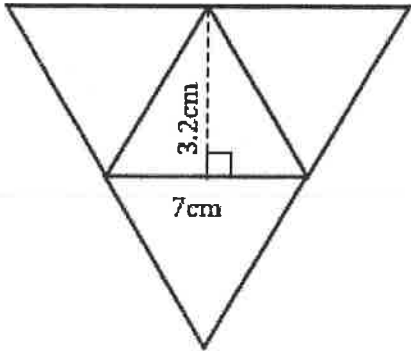
Surface Area with Pyramids

Name: _____

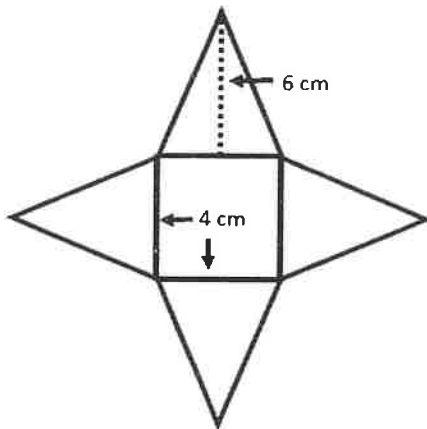
Date: _____

Daily Target: I can find the surface area of different 3 dimensional shapes.

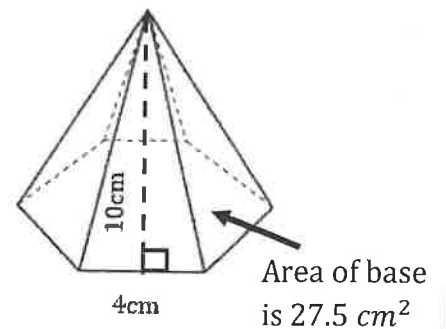
Practice!



Exit Ticket: Find the surface area of the square pyramid



Challenge!



Surface Area without Nets

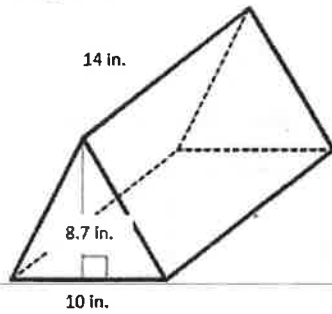
Name: _____

Date: _____

Daily Target: I can find the surface area of different 3 dimensional shapes.

Practice!

1)



Triangle =

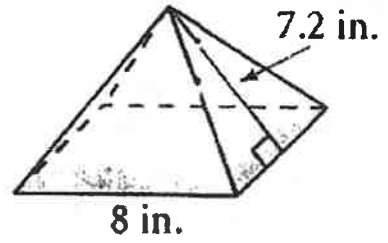
Triangle =

Rectangle =

Rectangle =

Rectangle =

2)



Square =

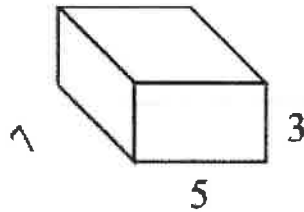
Triangle =

Triangle =

Triangle =

Triangle =

3)



Front =

Back =

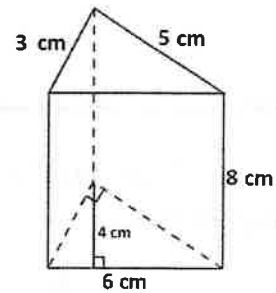
Top =

Bottom =

Left =

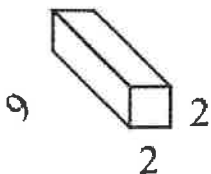
Right =

4)

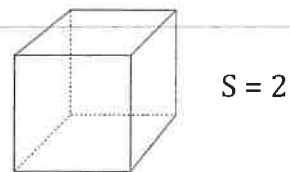


Exit Ticket:

5)



6)



Name: _____

Date: _____

Surface Area Word Problems!!

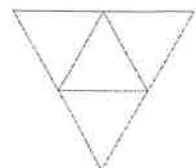
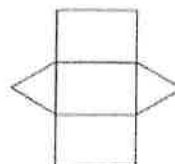
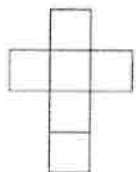
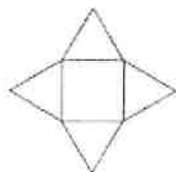
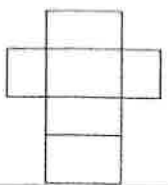
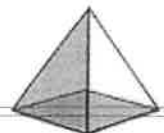
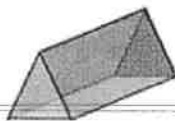
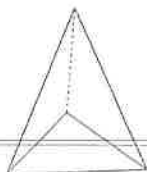
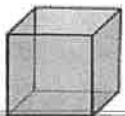
1. Kellogg's is making a cereal box for their new "Chunk Monkey Banana" cereal. If the box is 7 inches long by 3 inches wide, by 12 inches high, how much surface area do they have to make the cereal box? (*hint: start by drawing the 3D figure to help!!* → Front, back, left, right, top, bottom)

2. Ms. Juengel is trying to pack boxes to help her move. She has all cubed-shaped boxes with a side length of 8 inches. How many square inches are her boxes?

3. Ms. Burkhart is placing her cupcakes in a rectangular prism shaped box. If the box is 4 inches long by 5 inches wide by 6 inches tall, what is the surface area of her box?

Nets Practice!

For each 3D shape, name the figure and draw a line to connect it to the correct net.

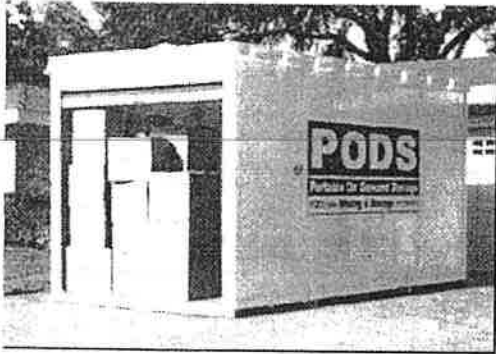


Moving Mayhem!!

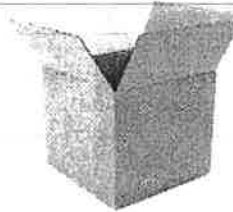
Problem: You found out that you are moving to a new house but you have to pack up everything tonight! You have a POD and you need to find out the **MAXIMUM** number of boxes that you can fit in the POD. Boxes cost **\$2.97** each and the POD costs **\$485.65**. How much will this move cost you?

Group Members: _____

Date: _____ Pd. _____



POD Dimensions
9 feet wide
12 feet long
10 feet tall



BOX Dimensions
2.25 feet wide
2.25 feet long
2.25 feet tall

Work/Drawing Space

Final Response

We found out that the POD can hold a maximum of _____ boxes.
We found that out by ...

The total cost of the move will be \$ _____. We found the cost by ...

