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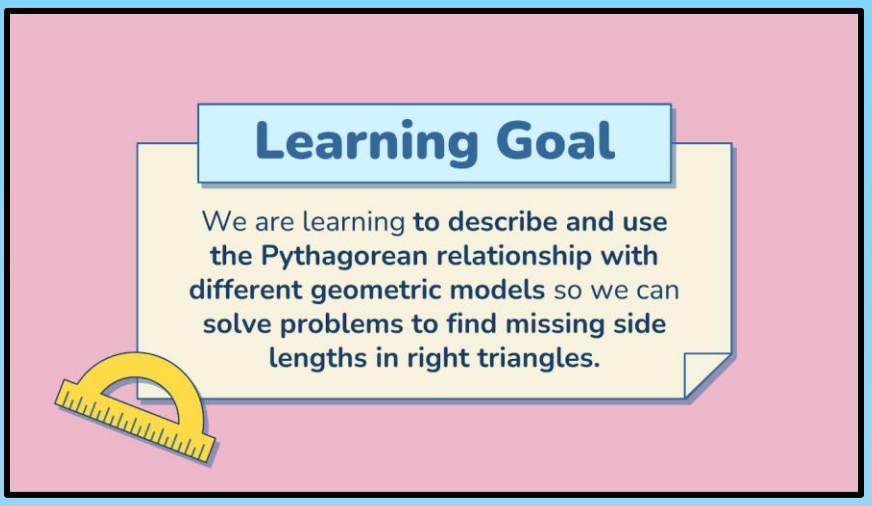
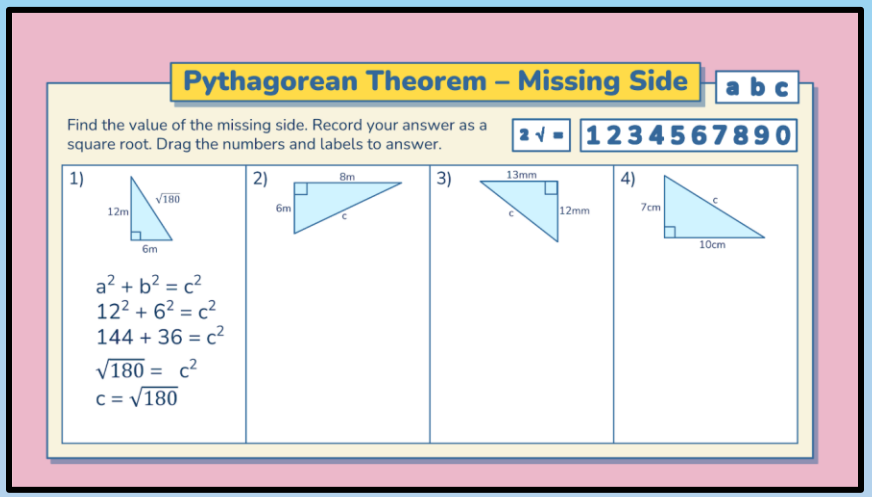
Manitoba Math Curriculum
Shape & Space – Grade 8

3-Part Lesson Format

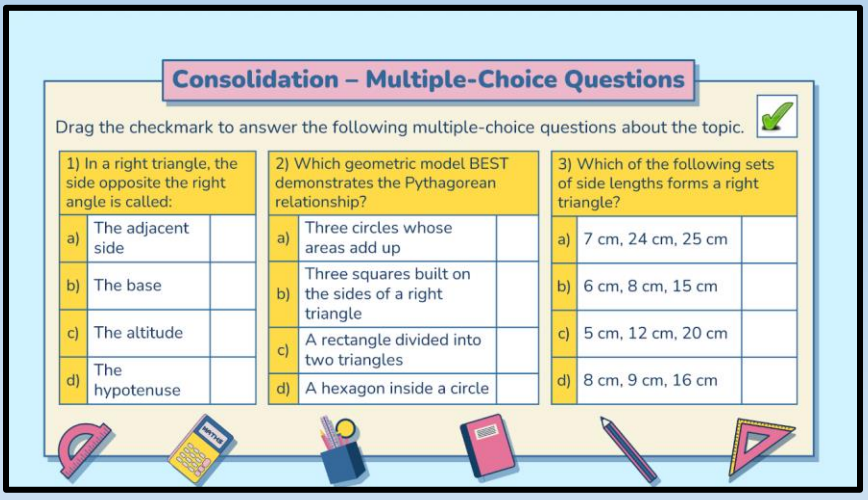
Part 1 – Minds On!
- Learning Goals
- Discussion Questions
- Quotes
- And More!



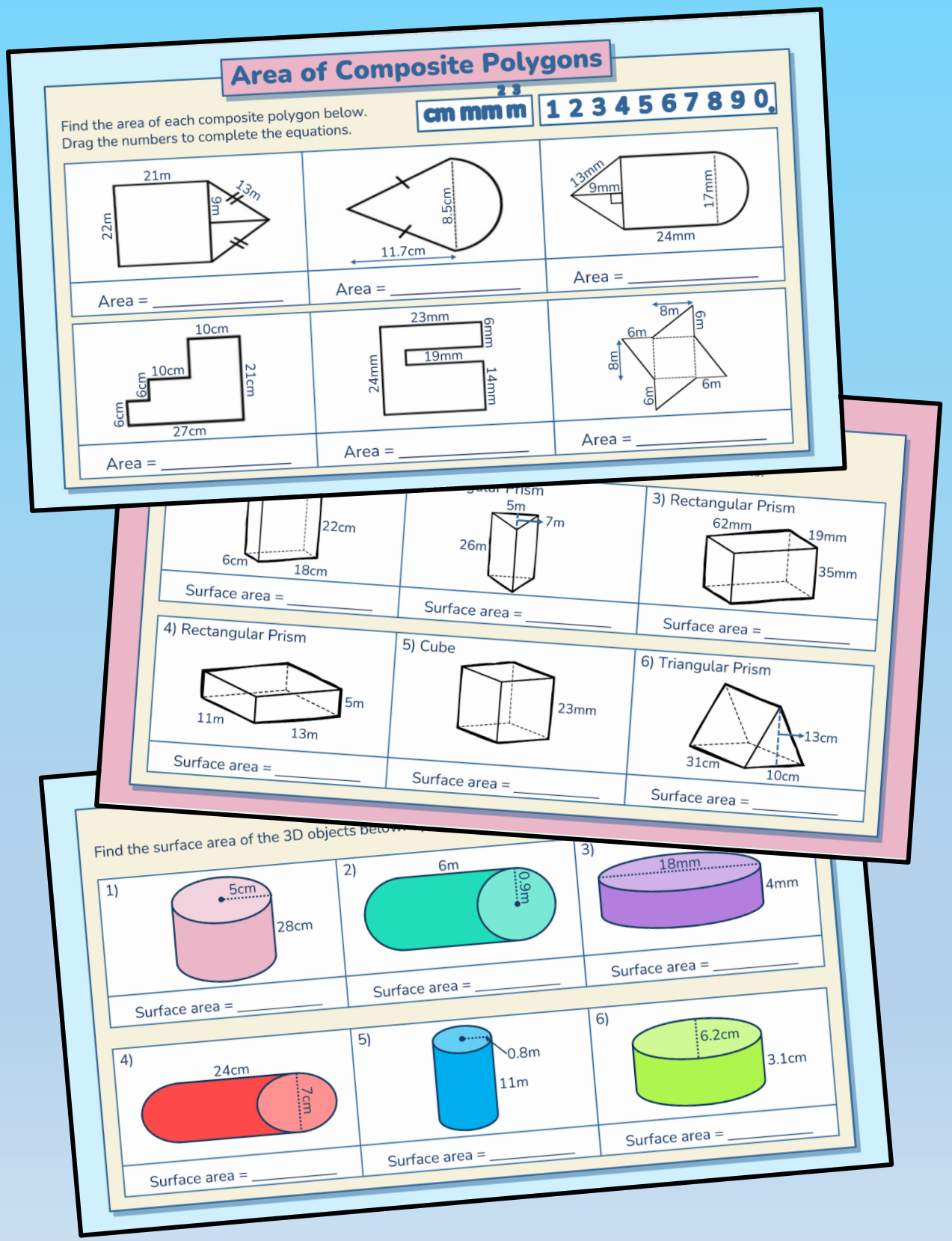


Part 2 – Action!
- Writing
- Matching
- Drag and Drop
- Drawing
- And More!

Part 3 – Consolidation!
- Exit Cards
- Quizzes
- Reflection
- And More!



Manitoba Math Curriculum
Shape & Space – Grade 8



Manitoba Math Curriculum
Shape & Space – Grade 8

Grade 8

SHAPE AND SPACE

Measurement

	Curriculum Expectations	Pages That Cover the Expectations
SS.1	Develop and apply the Pythagorean theorem to solve problems.	3 – 17
S		
SS.3	· right rectangular prisms · right triangular prisms · right cylinders to solve problems.	38 – 62
SS.4	Develop and apply formulas for determining the volume of right prisms and right cylinders.	63 - 74

Name: _____ 3

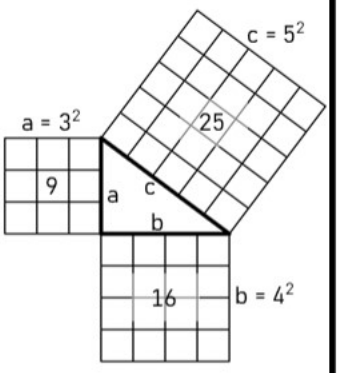
Curriculum Connection
SS.1

Pythagorean Theorem - Intro

The properties of a right triangle can be used to find an unknown side length. The longest side of a right triangle is always opposite the 90° angle and is called the **hypotenuse.**

The formula for calculating the length of the hypotenuse is: $a^2 + b^2 = c^2$

- If side a is 3 units long, then a square on this side has an area of 3^2 or 9.
- If side b is 4 units long, then a square on this side has an area of 4^2 or 16.
- If the square on side c is equal to the combined areas of the squares on sides a and b, then the square on side c must have an area of 25 square units (9 + 16). This means the length of side c must be $\sqrt{25}$ or 5.



Part 1

Label the sides of the right triangles: a, b, and c

1)

2)

4)

Part 2

Evaluate

	Question	Answer
1)	3^2	
2)	8^2	
3)	10^2	
4)	$\sqrt{36}$	

	Question	Answer
5)	$\sqrt{144}$	
6)	$\sqrt{16}$	
7)	7^2	
8)	$\sqrt{81}$	

Part 3

Label the triangles: a, b, c and fill in the blanks to find their values

1)

$a^2 + b^2 = c^2$

___ + ___ = ___

Hypotenuse = _____

2)

$a^2 + b^2 = c^2$

___ + ___ = ___

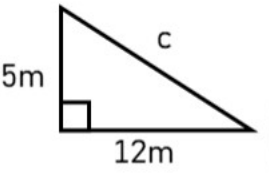
Hypotenuse = _____

Name: _____ 4

Curriculum Connection
SS.1

Pythagorean Theorem - Missing Side

The most common use of the Pythagorean Theorem is to find the value of a side on a right-triangle. We do this by applying our understanding of simplifying algebraic equations. To find the value of the hypotenuse, simply plug the values into the equation.



Solution

$a^2 + b^2 = c^2$
$5^2 + 12^2 = c^2$
$25 + 144 = c^2$
$\sqrt{169} = \sqrt{c^2}$
$13 = c$

Question Find the value of the hypotenuse

1) 7cm

2) 60m c 11m

3) 20mm c 21mm

4) c 35m 12m

5) 45mm 28mm c 16cm

7) 65m c 72m

8) c 84mm 13mm

9) 77cm 36cm c

Name: _____ 7

Curriculum Connection
SS.1

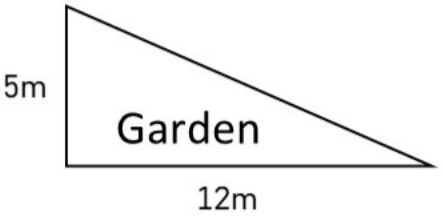
Pythagorean Theorem - Word Problems

Questions Answer the word problems below

1) Find the hypotenuse of a right triangle with a base of 10cm and a height of 6cm.

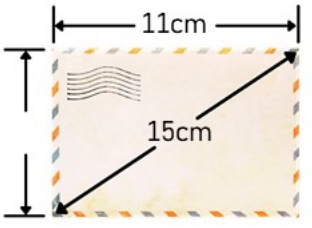
2) Lily [illegible] km south and 3 km east. Calculate how far Lily is away from her [illegible].

3) Julian built a triang[illegible]en u[illegible]imensions below. If he wanted to put a fence around his g[illegible]n, h[illegible]d the fence need to be?



4) Ivy's house is a rectangular shape that is 15m wide by 9m [illegible]s the diagonal of her house (from corner to corner)?

5) An envelope has the dimensions below. What is the height of the envelope?



Name: _____ 10

Curriculum Connection
SS.1

Pythagorean Theorem - Word Problems

Questions Answer the word problems below

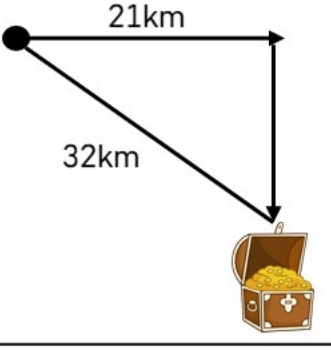
1) Robert has a 4m ladder that he is using to get as high as possible to hang his Christmas lights. He puts the ladder 2 metres away from the wall.

a) Label the dimensions on the diagram

b) How high is the top of the ladder off the ground?

2) Howard has a huge ladder to reach a very tall bookshelf. He needs to climb 9m to find the book he wants. He wants the top of the ladder to be at the height of the book he wants, but how far should he put the ladder away from the bookshelf?

3) A pirate is on a treasure hunting missing. His GSP tells him he is 32km away from the treasure. He decides to travel 21km due east. The GPS now tells him that the treasure is due south from where his boat is. How far south does he need to travel to find the treasure?



Name: _____ 11

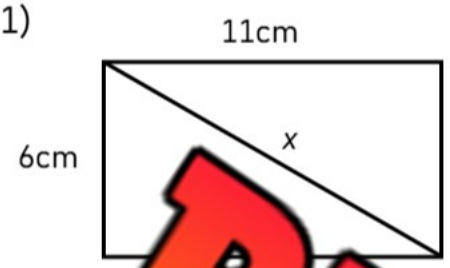
Curriculum Connection
SS.1

Pythagorean Theorem - Missing Side

Questions

Find the value of x.
Round the answer to the nearest tenth or leave as a square root

1)



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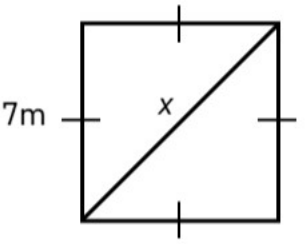

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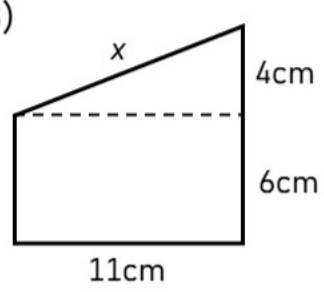
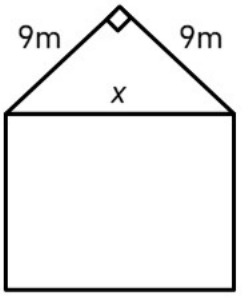


4)

5)



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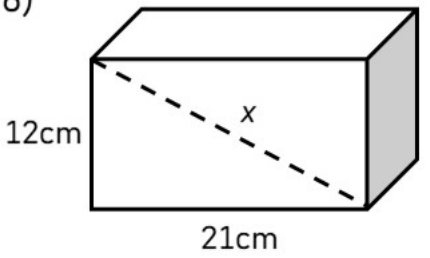


Name: _____ 12

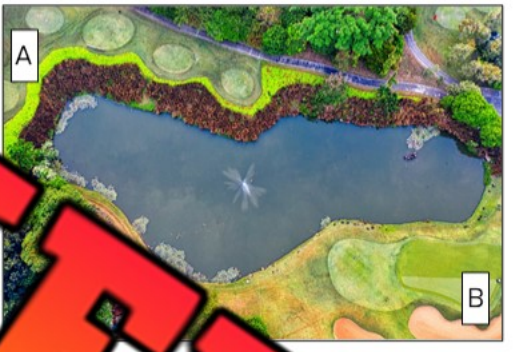
Curriculum Connection
SS.1

Pythagorean Theorem - Word Problems

Questions Answer the word problems below

1) TVs are measured diagonally from corner to corner. Jeffrey wants a 150cm TV. He likes the look of one that has a base of 140cm and a height of 54cm. Is the TV 150cm diagonally?

2) To [illegible] from point A to point B, you need to walk around the pond. To avoid the pond, you walk [illegible] and 4[illegible] east. To the nearest metre, how many metres would you have s[illegible] you could've walked through the pond?



3) A baseball diamond is a square with sides of 30m. [illegible] is the dis[illegible] between first base and third base?

4) The local fire department has been called to a burning building. They need their ladder to reach the 4th floor, which is 22m high. They know that the ladder will need to be at least 12m away from the building. If they brought a 25m ladder, will they reach the fourth floor?

Name: _____ 13

Curriculum Connection
SS.1

Pythagorean Theorem - Word Problems

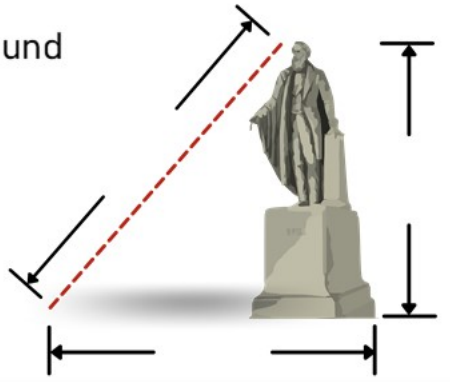
Questions Answer the word problems below

1) Steven brings his hang glider 30m to the top of a mountain. He travels southeast 60m before landing on the ground. How far does he need to walk back to the base of the mountain?

2) A flagpole is [illegible] and casts a shadow of 6m on the ground away from the base of the [illegible] that is [illegible] distance from the top of the flagpole to the end of the shadow?

3) A building casts a shadow on the ground 12 [illegible] from the [illegible] building. The length from the top of the building to the end of the shadow is [illegible]. How tall is the building?

4) A statue is 8m tall and it casts a shadow on the ground that is 6m long. What is the length from the top of the statue to the end of the shadow?

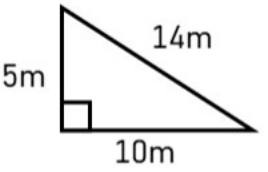


Name: _____ 14

Curriculum Connection
SS.1

Identify Right Triangles - Pythagorean Theorem

We can use the Pythagorean Theorem to find out if a triangle is a right triangle or not. If we have all the measurements of the triangle, we can plug them into the equation. If the equation is true, the triangle is a right triangle and if it is false, it is not.



Solution

$a^2 + b^2 = c^2$

$5^2 + 10^2 = 14^2$

$25 + 100 = 196$

$125 \neq 196$

This equation is false, therefore this is not a right triangle

Question Is the triangle a right triangle?

1) 3cm 9

Yes No

2) 12m 13m 5m

Yes No

3) 3mm 7mm 5mm

Yes No

4) 25m 24m 7m

Yes No

5) 13mm 8mm

Yes No

4cm

Yes No

7) 12m $\sqrt{340m}$ 14m

Yes No

8) 19mm 17mm 5mm

Yes No

9) $\sqrt{406cm}$ 4cm 20cm

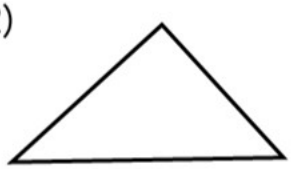
Yes No

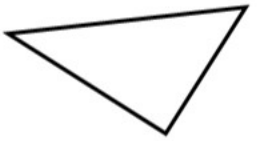
Name: _____ 16

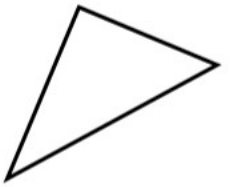
Pythagorean Theorem - Quiz

Part 1 Label the sides of the right triangles: a, b, and c

1) 

2) 

3) 

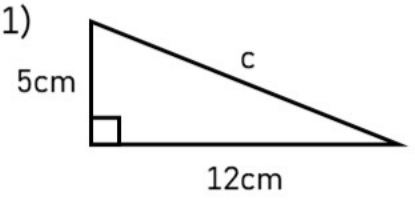
4) 

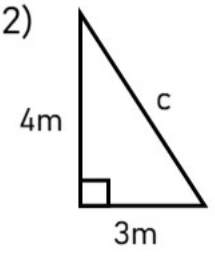
Part 2 [illegible]

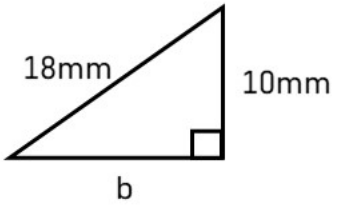
	Question	Answer
1)	7^2	
2)	9^2	
3)	$\sqrt{16}$	

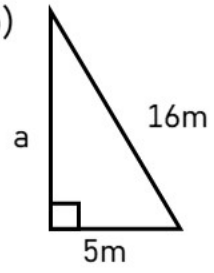
	Question	Answer
4)	$\sqrt{121}$	
5)	$\sqrt{64}$	
	6^2	

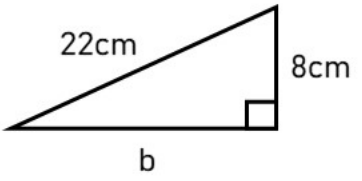
Part 3 Find the value of the [illegible] side length

1) 

2) 

4) 

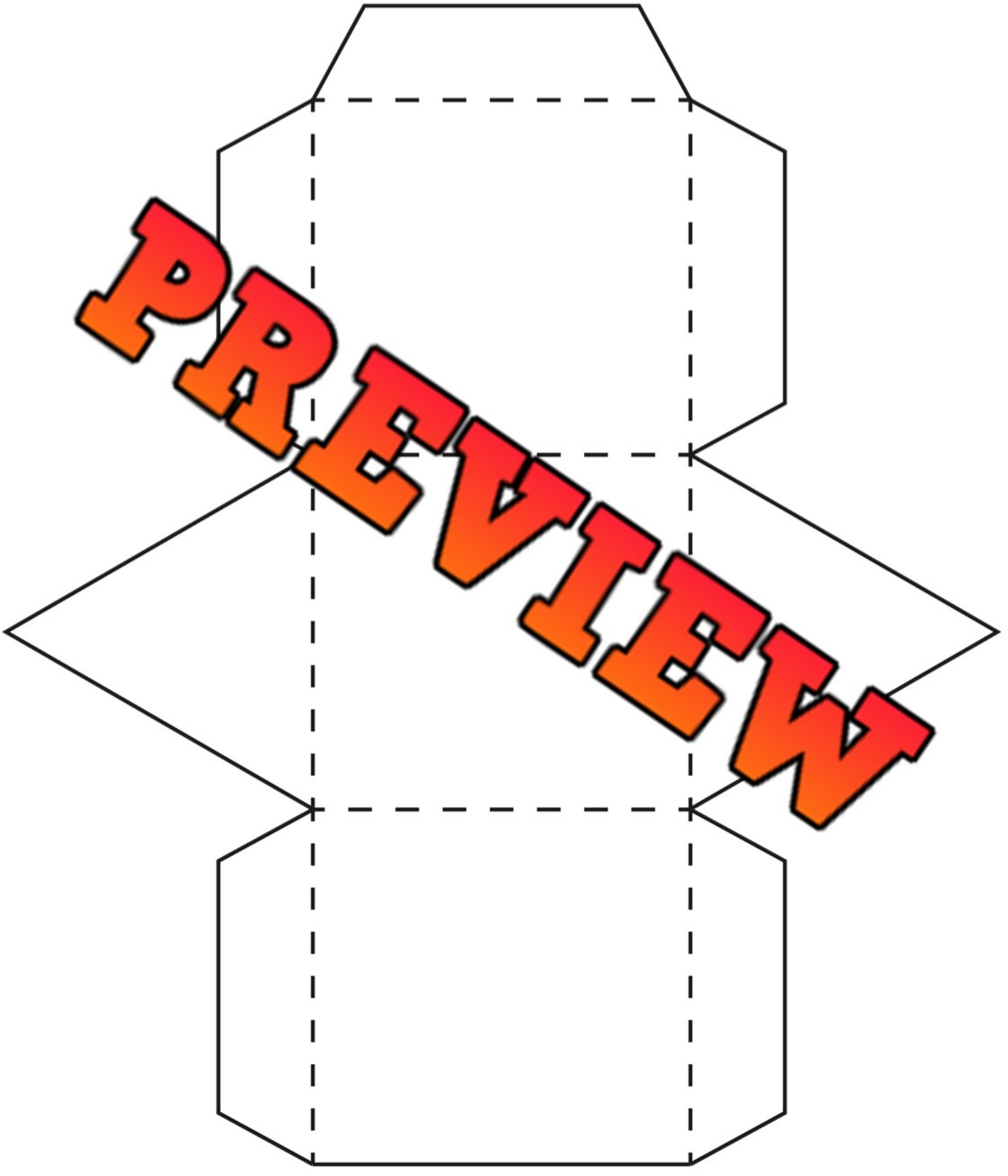
5) 

6) 

Name: _____ 18

Curriculum Connection
SS.2

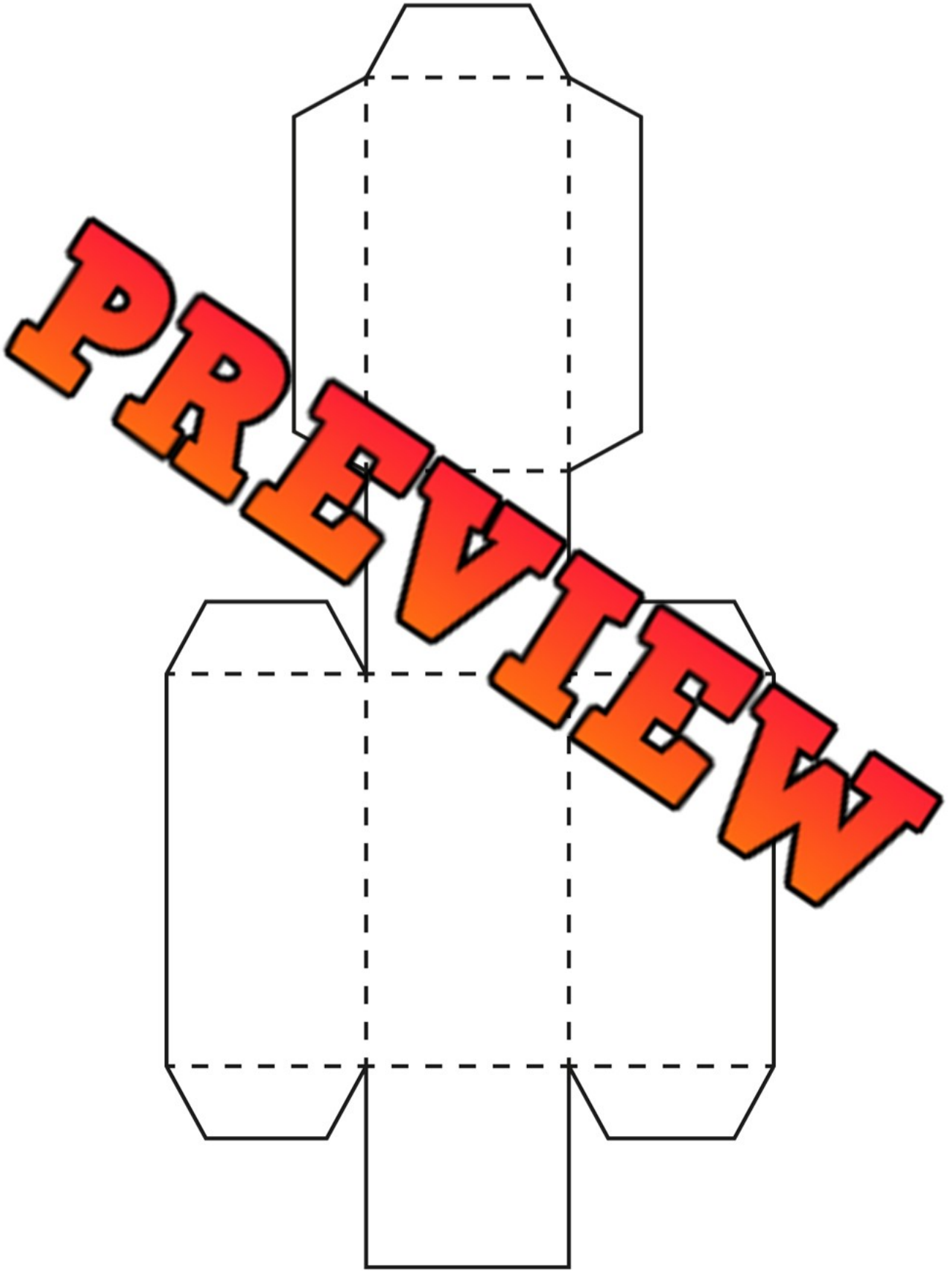
3D Model - Triangle Based Prism Net



Name: _____ 19

Curriculum Connection
SS.2

3D Model - Rectangle Based Prism Net



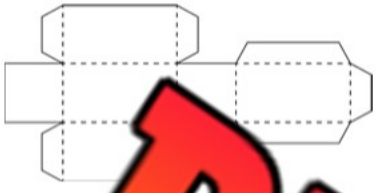
Name: _____ 32

Curriculum Connection
SS.2

Nets Representing 3D Objects

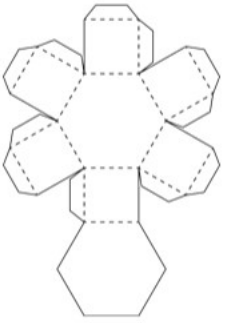
Questions Identify and circle the 3D object formed by each net

1)



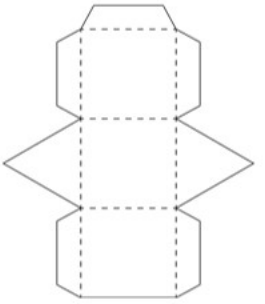
- Rectangular Prism
- Cylinder
- Cube

2)



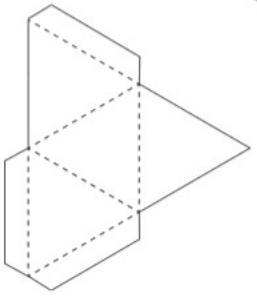
- Rectangular Prism
- Pentagonal Prism
- Triangular Prism

3)



- Rectangular Prism
- Pentagonal Prism
- Triangular Prism

4)

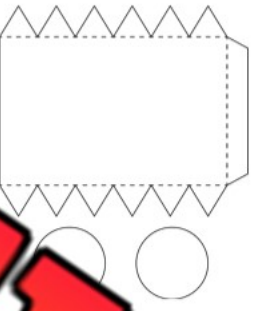


- Rectangular Pyramid
- Pentagonal Pyramid
- Triangular Pyramid

5)

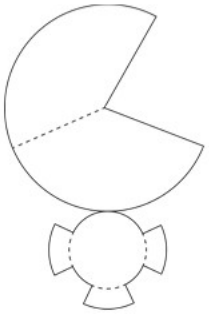
- Rectangular Pyramid
- Square Pyramid
- Triangular Pyramid

6)



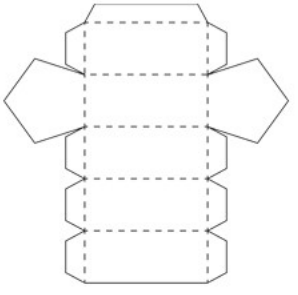
- Rectangular Prism
- Cylinder
- Cone

7)



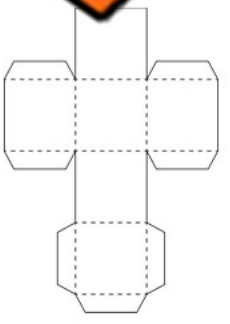
- Rectangular Prism
- Cylinder
- Cone

8)



- Rectangular Prism
- Pentagonal Prism
- Cube

9)



- Rectangular Prism
- Pentagonal Prism
- Cube

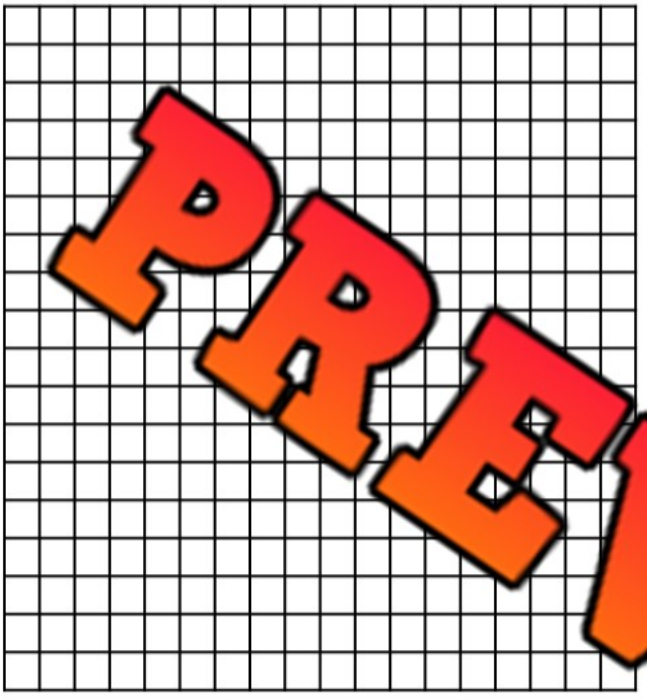
Name: _____ 33

Curriculum Connection
SS.2

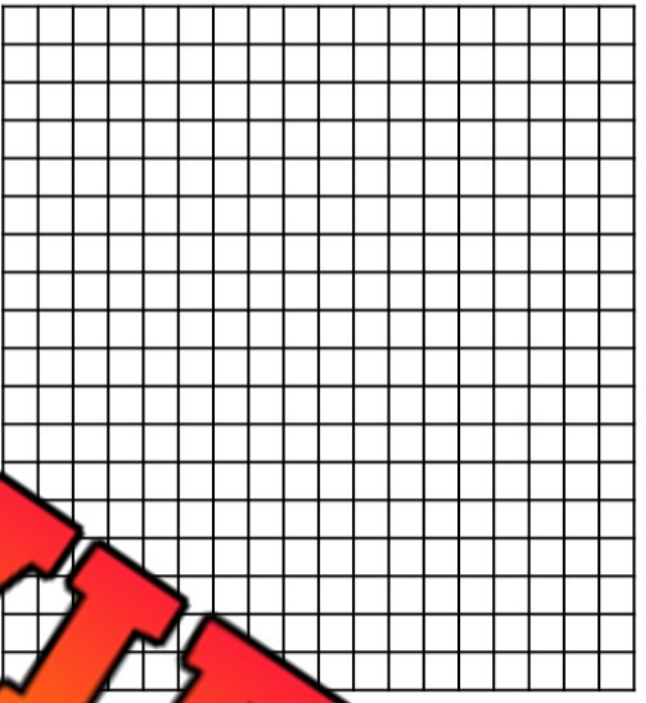
Drawing Nets - 3D Objects

Questions Draw the 3D objects using the grids below

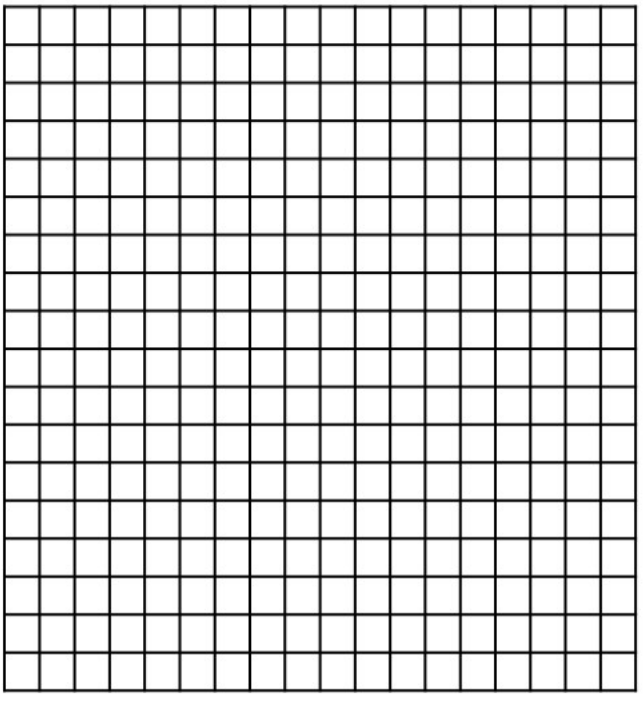
1) Rectangular Prism



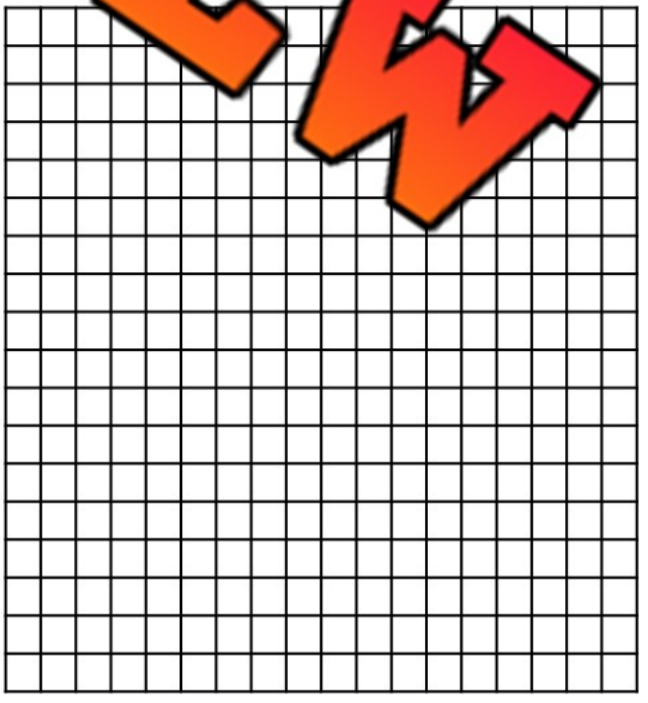
2) Rectangular Prism



3) Triangular Prism



4) [illegible]



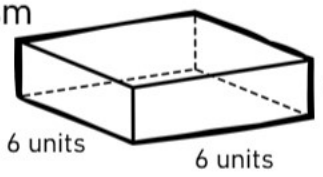
Name: _____ 35

Curriculum Connection
SS.2

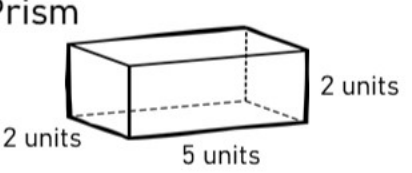
Drawing Nets - 3D Objects

Questions Draw the nets based on the dimensions provided

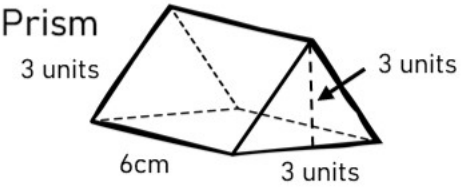
1) Rectangular Prism



2) Rectangular Prism



3) Triangular Prism



4) gu

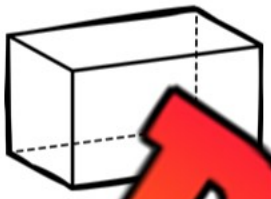
Name: _____ 36

Curriculum Connection
SS.2

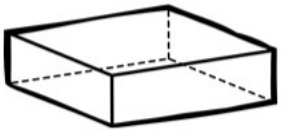
Drawing Nets - 3D Objects

Questions Draw two different nets of the 3D objects

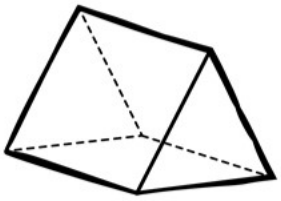
1)



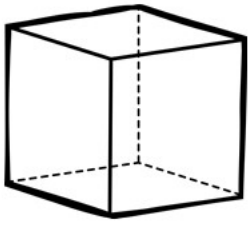
2)



3)



4)



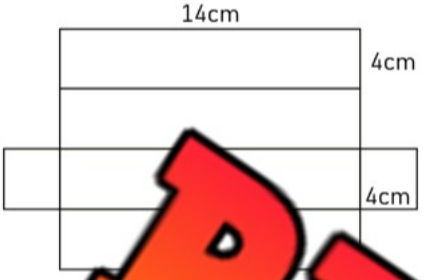
Name: _____ 40

Curriculum Connection
SS.3

Surface Area Using Nets - Rectangular Prisms

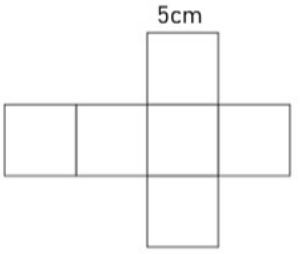
Questions Find the surface area of the 3D objects using the nets below

1)



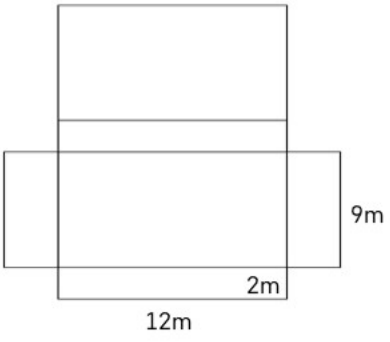
Surface Area: _____

2)



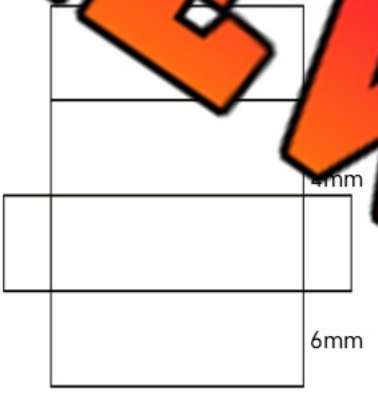
Surface Area: _____

3)



Surface Area: _____

4)



Surface Area: _____

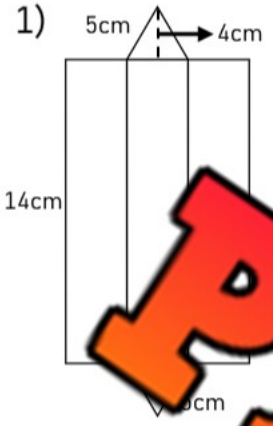
Name: _____ 41

Curriculum Connection
SS.3

Surface Area Using Nets - Triangular Prisms

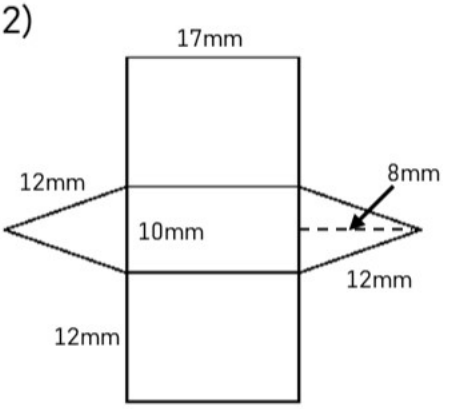
Questions Find the surface area of the 3D objects using the nets below

1)



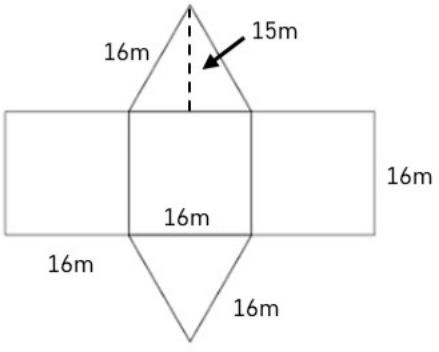
Surface Area: _____

2)



Surface Area: _____

3)



Surface Area: _____

4)

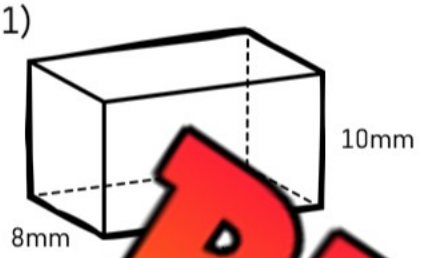
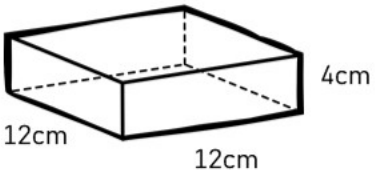
Surface Area: _____

Name: _____ 44

Curriculum Connection
SS.3

Surface Area Using Nets - Rectangular Prisms

Questions Find the surface area of the 3D objects below

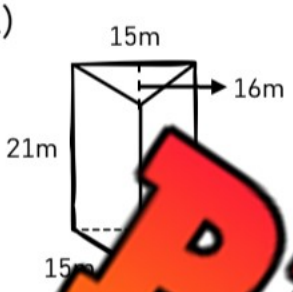
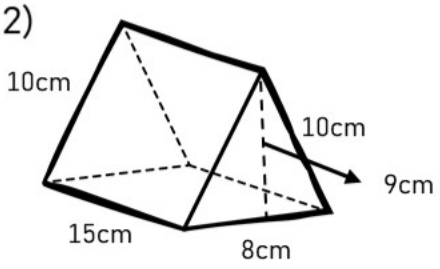
Workspace	Draw the Net
1)  Surface Area: _____	
2)  Surface Area: _____	

Name: _____ 47

Curriculum Connection
SS.3

Surface Area Using Nets - Triangular Prisms

Questions Find the surface area of the 3D objects below

Workspace	Draw the Net
1)  Surface Area: _____	
2)  Surface Area: _____	

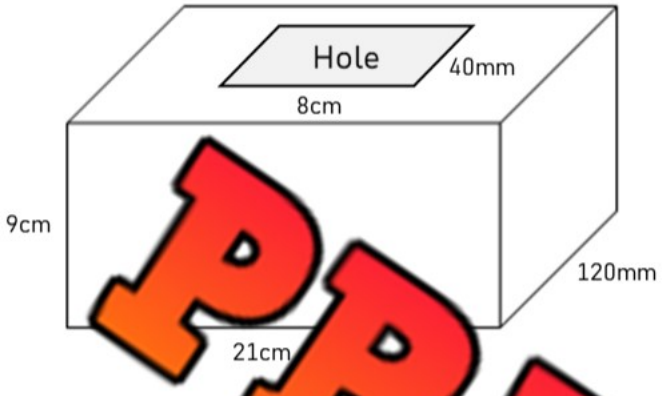
Name: _____ 48

Curriculum Connection
SS.3

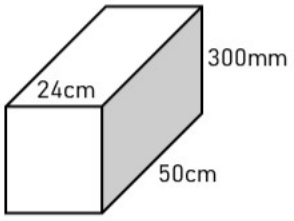
Surface Area - Prism - Word Problems

Questions Solve the word problems below

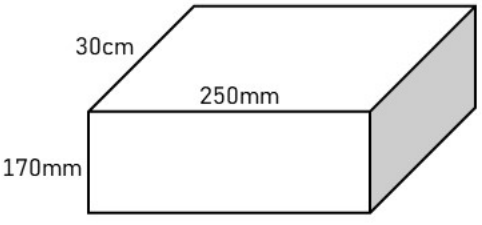
1) Find the surface area of the tissue box below.



2) Edward is pa[illegible]his m[illegible]ox [illegible]nd needs to find the surface area so he can buy the amo[illegible]t [illegible]he ne[illegible]. The mailbox has no door on the front. Find the surface area[illegible]ailb[illegible]the diagram below.



3) Kaitlyn needs to wrap her mom's birthday present. She has enou[illegible]wrapping paper to cover a surface area of 3500cm². Does she have enough paper?



Name: _____ 49

Curriculum Connection
SS.3

Surface Area - Prism - Word Problems

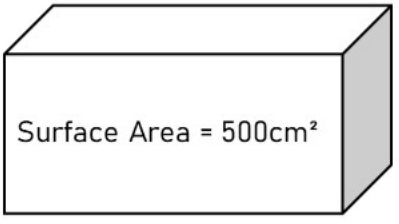
Questions Solve the questions below

Lisa is planning to lay bricks on her outdoor fireplace. Her fireplace is a rectangular prism, and she wants to brick all sides, except the bottom.

a) What is the surface area of the fireplace, excluding the bottom?

b) What is the surface area of the fireplace (including the bottom) in cm?

c) If the surface area of each brick is 500cm², how many bricks will she need to cover her fireplace (excluding the bottom)?



d) If each brick costs $0.79, how much will it cost to cover the fireplace?

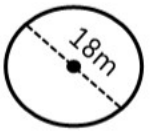
Name: _____ 54

Curriculum Connection
SS.3

Area of a Circle - Diameter

When we know the diameter of a circle, we can divide it by two to get the radius. Once we have the radius, we can use it to calculate the area of a circle using the formula: $a = \pi r^2$

Calculating Area Using Diameter



$a = \pi r^2$
diameter = 18, radius = 9
$a = \pi \times 9 \times 9$
$a = 254.34m^2$

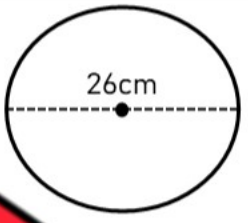
Practice

Calculate the area of the circles using the radius

1)

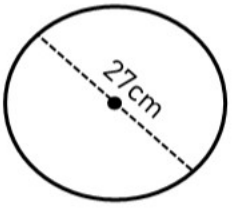
Diameter = _____
Radius = _____
Area = _____

2)



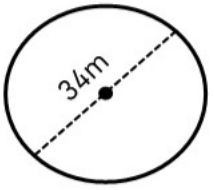
Diameter = _____
Radius = _____
Area = _____

3)



Diameter = _____
Radius = _____
Area = _____

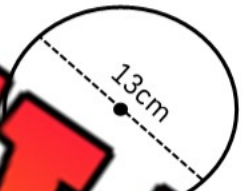
4)



Diameter = _____
Radius = _____
Area = _____

5)

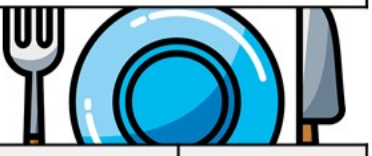
Diameter = _____
Radius = _____
Area = _____



Diam_____
Radius = _____
Area = _____

Word Problems

Solve the problems below



	Questions	Answer
1)	A dinner plate has a diameter of 19cm. What is the area of the plate?	
2)	A circular table is 1.3 metres wide. What is the area of the table in centimetres?	

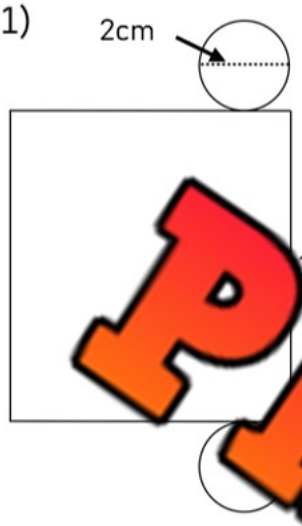
Name: _____ 57

Curriculum Connection
SS.3

Surface Area Using Nets - Cylinders

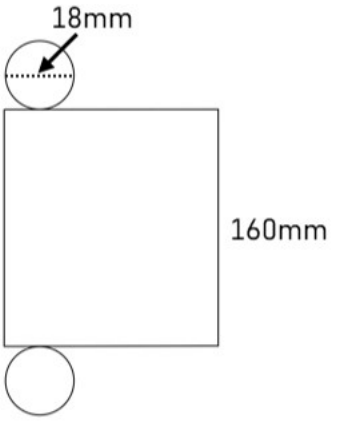
Part 1 — Solve the questions below

1)



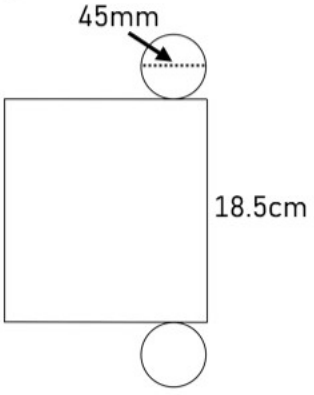
Surface Area: _____

2)



Surface Area: _____

3)

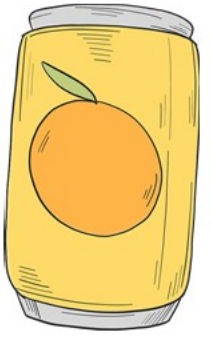


Surface Area: _____

Surface Area: _____

Part 2 — Solve the question below

A can is 13cm tall. The top of the can has a radius of 3cm. Draw the net of the can and calculate the surface area of the can.



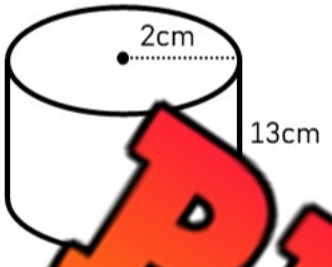
Name: _____ 59

Curriculum Connection
SS.3

Surface Area - Cylinders

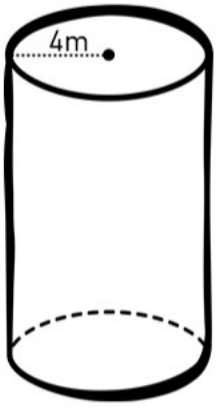
Questions Solve the questions below

1)



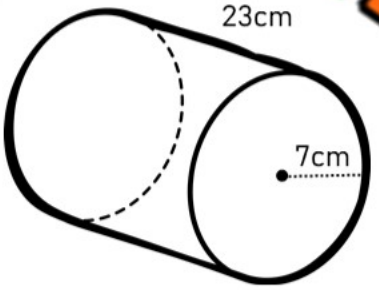
Surface Area: _____

2)



Surface Area: _____

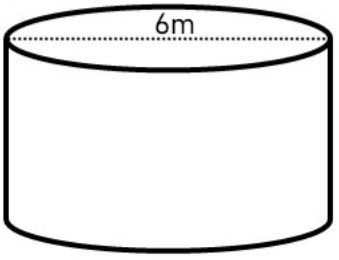
3)



Surface Area: _____

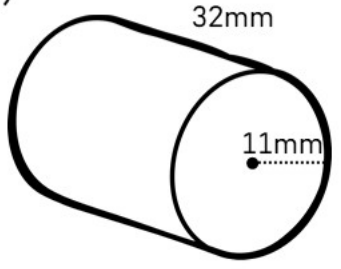
Surface Area: _____

5)



Surface Area: _____

6)



Surface Area: _____

Name: _____ 61

Curriculum Connection
SS.3

Surface Area - Cylinders

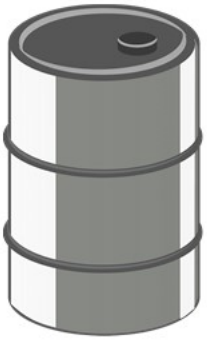
Questions Solve the questions below

1) A can of soup has a diameter of 9cm and a height of 19cm. What is the surface area of the can?

2) A can of tuna has a radius of 7.5cm and a height of [illegible]mm. What is the surface area of the can?

3) A battery is composed of [illegible] cylinders. The main battery cylinder has a radius of [illegible]. The height of the main cylinder is 8cm. The smaller cylinder on top of the battery has a diameter of 8[illegible]nd a height of [illegible]mm.

What is the total surface area of the batt[illegible]



4) A barrel has a diameter of 74cm and a height of 1.62m. What is the surface area of the barrel?

Name: _____ 62

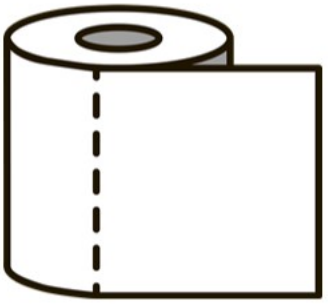
Curriculum Connection
SS.3

Surface Area Using Nets - Cylinders

Questions Solve the questions below

1) A toilet paper roll is 16cm tall with a radius of 6cm. The inside cylinder is a hole. It has a diameter of 3cm.

What is the surface area of the toilet paper roll. Remember to account for the hole.



2) A wheel of brie ches[illegible] tall. [illegible]ce is 9cm long. What is the surface area of the full wheel of [illegible]

3) A pot has no lid on top. The pot is 14cm tall and has a radius of 10[illegible]. What is the surface area of the pot?

Name: _____ 64

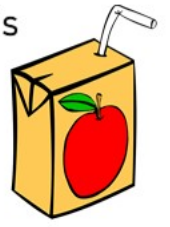
Curriculum Connection
SS.4

Calculating Volume Using the Base

Part 1 Fill in the blanks to investigate the area of the base and the height

	Area of Base	Height	Volume
1)	10 cm^2		80 cm^3
2)	13 mm^2	6 mm	
3)		5 cm	75 cm^3
4)		8 mm	96 mm^3
5)		9 m	
6)	16		144 mm^3
7)			132 km^3
8)	15 m^2		210 m^3

Part 2 Answer the questions b

1)	A box of cereal has a base with a length of … La w… of 9cm. The height of the box is 22cm. What is the …me box? 
2)	A juice box is 9cm wide and 5cm long. The height of the juice box is 12cm. What is the volume of the juice box? 
3)	A railway car is 6.5m long and 2.2m wide. The railway car is 3.1m tall. What is the volume of the railway car? 

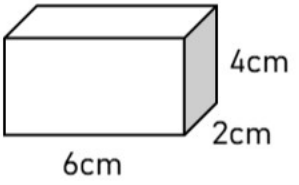
Name: _____ 65

Curriculum Connection
SS.4

Calculating Volume of Rectangular Prisms

Rectangular Prism – Calculating Volume

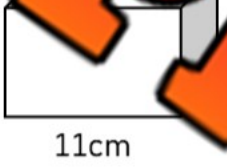
To find the volume of a rectangular prism, multiply the length by the width by the height.



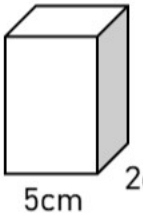
$v = l \times w \times h$
$v = 6cm \times 2cm \times 4cm$
$v = 48cm^3$

Question Calculate the volume of the rectangular prisms

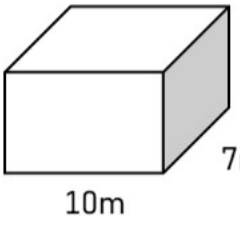
1)



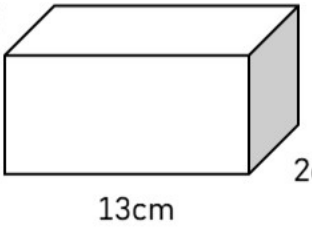
2)



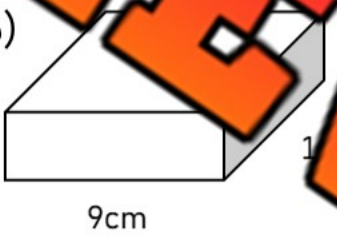
3)



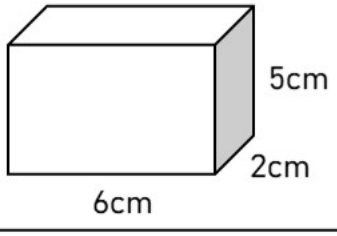
5)



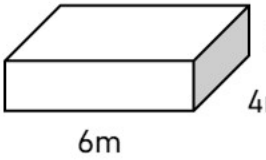
6)



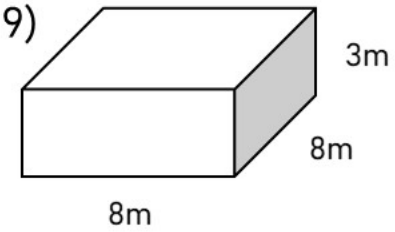
7)



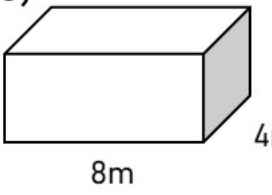
8)



9)



10)



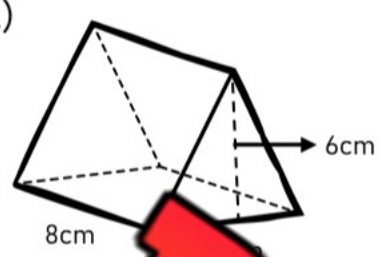
Name: _____ 68

Curriculum Connection
SS.4

Volume - Triangular Prisms

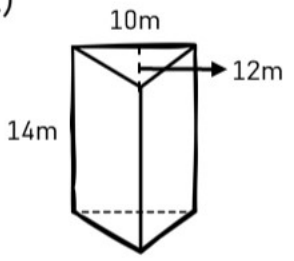
Questions Find the volume of the triangular prisms below

1)



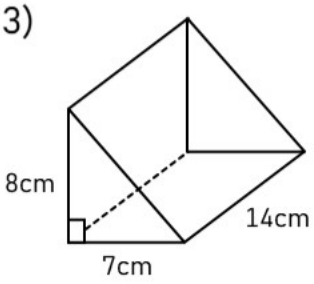
Volume: _____

2)

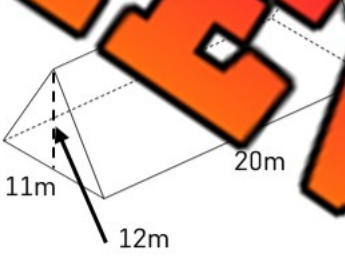


Volume: _____

3)



Volume: _____



Volume: _____

Name: _____ 70

Curriculum Connection
SS.4

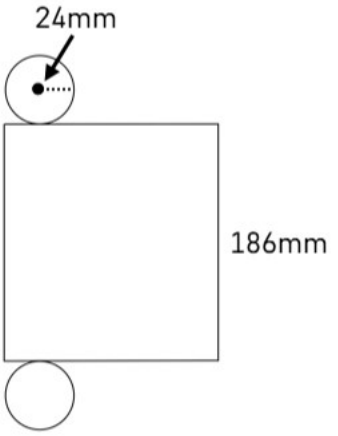
Volume - Cylinders

Part 1 — Solve the questions below

1)

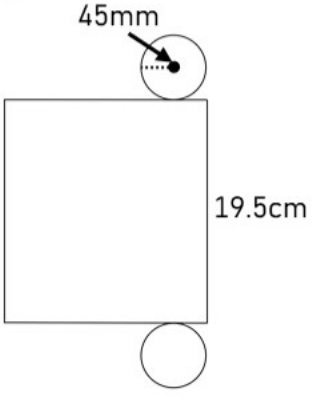
Area of the Base: _____ Volume: _____

2)



Area of the Base: _____ Volume: _____

3)



Area of the Base: _____ Volume: _____

Area of the Base: _____ Volume: _____

Part 2 — Solve the question below

A paint can is 54cm tall and has a diameter of 18cm. What is the volume of the paint can?

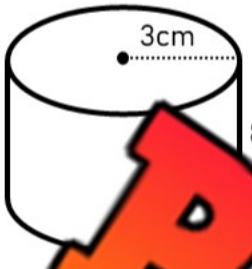
Name: _____ 71

Curriculum Connection
SS.4

Volume - Cylinders

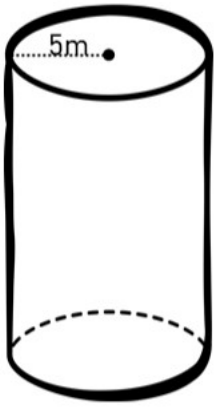
Questions Solve the questions below

1)



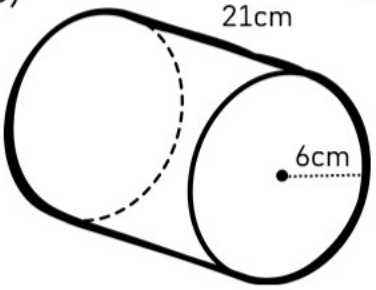
Area of the Bas_ Vol_

2)



Area of the Base: _____ Volume: _____

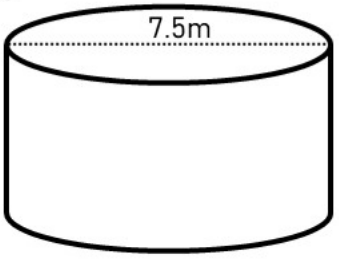
3)



Area of the Base: _____ Volume: _____

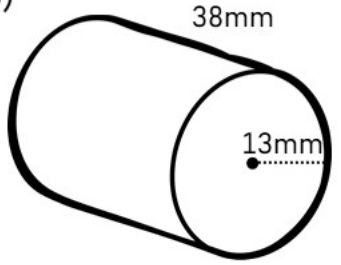
Area of the Base: _____ e: _____

5)



Area of the Base: _____ Volume: _____

6)



Area of the Base: _____ Volume: _____

Name: _____ 73

Curriculum Connection
SS.4

Volume of Cylinders

Part 1 Fill in the blanks to investigate the area of the base and the volume

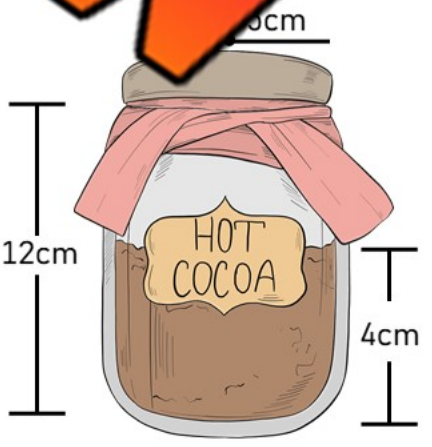
	Area of Base	Height	Volume
1)	8 mm^2	7 mm	
2)	15 cm^2	11 cm	
3)	m^2		114 m^3
4)	11		154 km^3
5)			119 mm^3
6)	18	15 m	
7)	22 km^2		
8)	25 mm^2		175 mm^3

Part 2 Answer the questions b

A hot cocoa jar is 12cm tall. There are only 4 cm left co jar. The radius of the jar is 7cm.

a) What is the volume of cocoa left in the jar?

b) How much more cocoa would be needed to fill the jar?



Name: _____ 74

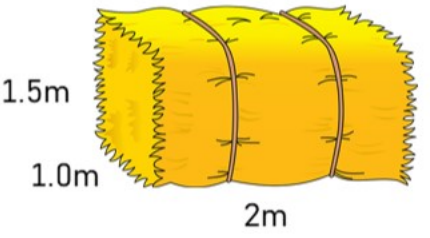
Curriculum Connection
SS.4

Volume of Cylinders

Questions Answer the questions below

1) There are two types of hay bales – one that is in the shape of a cylinder and one that is in the shape of a rectangular prism. The cylinder-shaped hay bale is 300cm tall and 150cm long. The rectangular-shaped hay bale has the following dimensions: 1.5m by 1.0m by 2.0m.

a) Which [illegible] of hay bale contains more hay?



b) Joel thinks that [illegible] cylinder-shaped hay bale out of 3 [illegible]-shaped hay bales. Is he right? Explain.

2) You are planning to make candles to sell. What would the dimensions of the candles be?

a) Draw a picture of one of the candles and label the dimensions.

b) What is the volume of the candle?

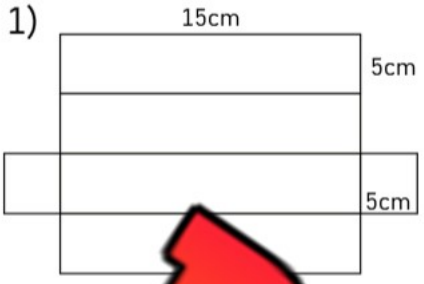
c) For every $10cm^3$, it costs you 30 cents. How much would the candle cost you in total?

Name: _____ 75

Unit Test - Surface Area and Volume

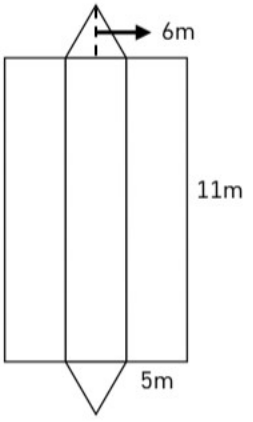
Part 1 Find the surface area of the 3D objects using the nets below

1)



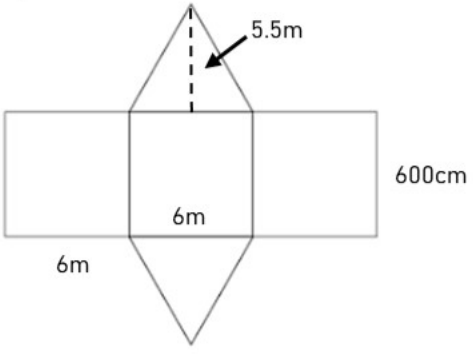
Surface Area: _____

2)



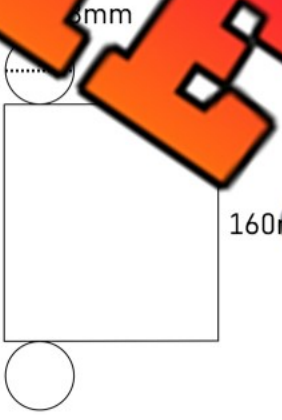
Surface Area: _____

3)



Surface Area: _____

4)



Surface Area: _____

Grade 8

SHAPE AND SPACE
3-D Objects and 2-D Shapes
Transformations

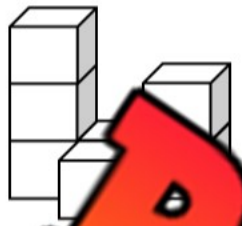
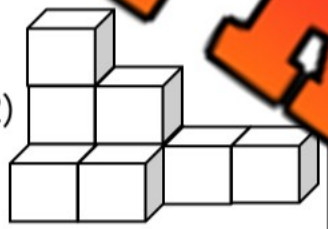
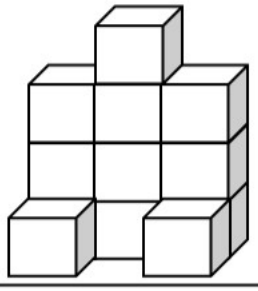
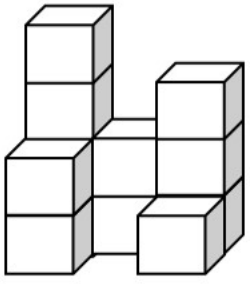
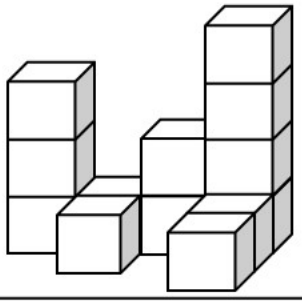
	Curriculum Expectations	Pages That Cover the Expectations
SS.5	Draw and interpret top, front and side views of 3-D objects built from right rectangular prisms	80 – 90
SS.6	Demonstrate an understanding of translation • explaining the properties of shapes that make tessellating possible • creating tessellations • identifying tessellations in the environment	

Name: _____ 80

Curriculum Connection
SS.5

Drawing Top, Front, and Side Views of Objects

Questions Draw the top, front, and side view of the objects below

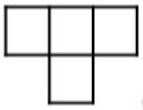
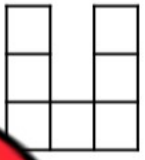
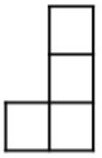
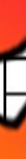
Original Shape	Top View	Front View	Side View
1) 			
2) 			
3) 			
4) 			
5) 			

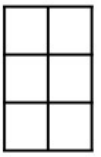
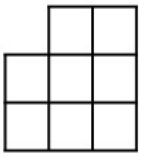
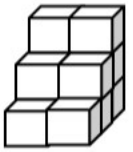
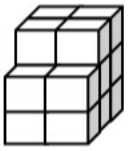
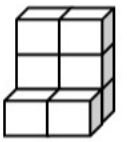
Name: _____ 84

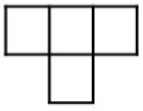
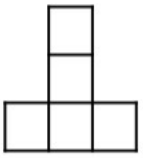
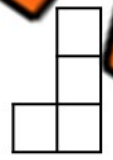
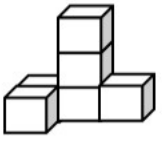
Curriculum Connection
SS.5

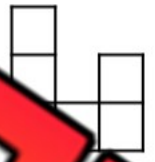
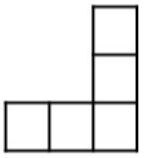
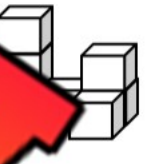
Drawing Top, Front, and Side Views of Objects

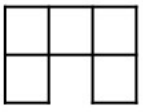
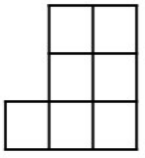
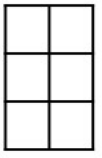
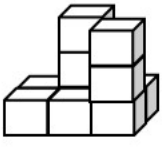
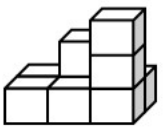
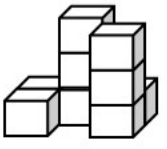
Questions Look at the front, top, and side views and circle the matching 3D object

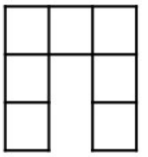
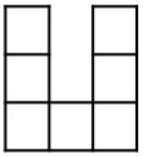
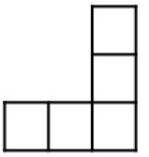
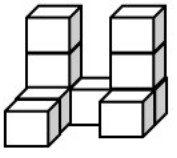
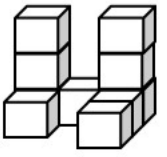
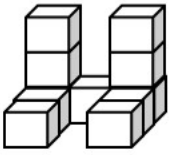
1) Top View	Front View	Side View
		
		

2) Top View	Front View	Side View
		
		

3) Top View	Front View	Side View
		
		

Top View	Front View	Side View
		
		

5) Top View	Front View	Side View
		
		

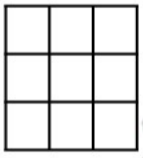
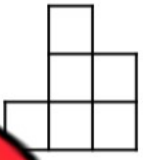
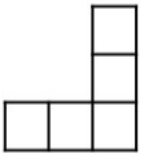
6) Top View	Front View	Side View
		
		

Name: _____ 86

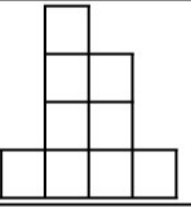
Curriculum Connection
SS.5

Drawing Top, Front, and Side Views of Objects

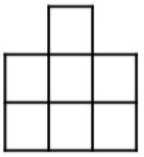
Questions Draw the 3D objects by using the top, front, and side views

Top View	Front View	Side View
		

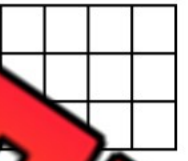
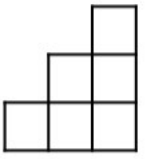
1)

Top View	Front View	Side View
		

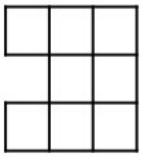
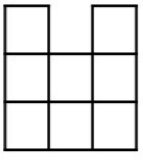
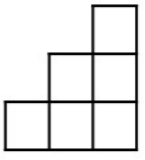
2)

Top View	Front View	Side View
		

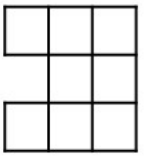
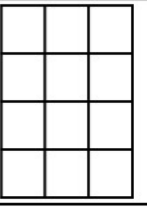
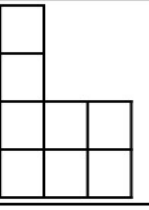
3)

Top View	Front View	Side View
		

4)

Top View	Front View	Side View
		

5)

Top View	Front View	Side View
		

6)

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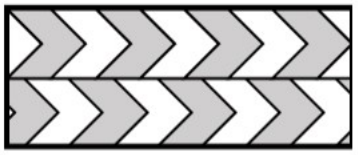
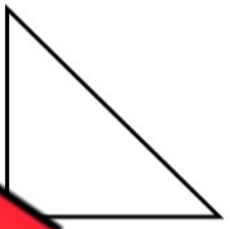
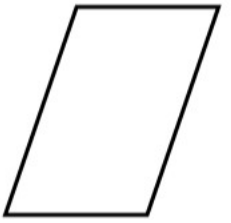
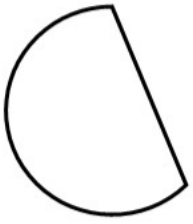
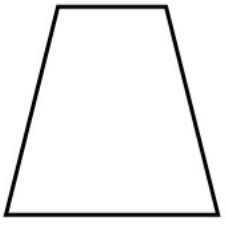
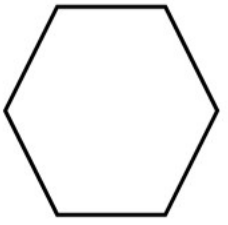
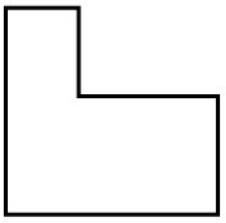
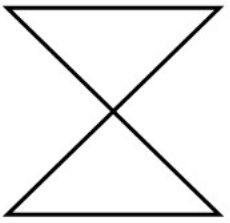
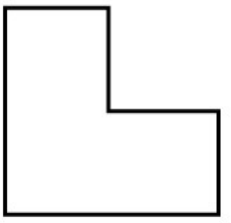
Intro to Tessellations



A **tessellation** is a tiling pattern in which shapes are fitted together with no gaps or overlaps. In the example tessellation, a white and grey chevron are tiled with no gaps and are not overlapping.

Questions Can the shapes below be used by themselves in a tessellation?

		
1) Yes No	2) Yes No	3) Yes No
		
4) Yes No	5) Yes No	6) Yes No
		
7) Yes No	8) Yes No	9) Yes No
		
10) Yes No	11) Yes No	12) Yes No

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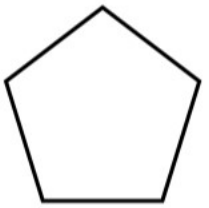
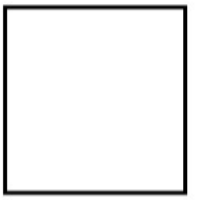
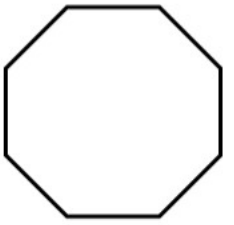
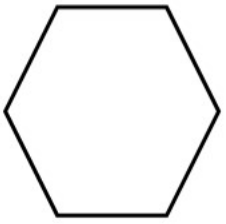
Regular Polygons That Tessellate

A **regular polygon** is a shape that has equal sides and equal angles. There are only 3 regular polygons that can form tessellations by themselves. Other regular polygons can be used together to form a tessellation.

Part 1

Will the regular polygon tessellate?

		
1) Yes No	2) Yes No	3) Yes No
		
4) Yes No	5) Yes No	6) Yes No
		
7) Yes No	8) Yes No	9) Yes No

Part 2

Describe the 3 regular polygons that will tessellate

Regular Polygon	Number of Sides	Angle Measurements	Interior Angle Total
1)			
2)			
3)			

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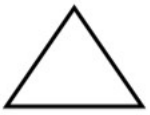
Tessellating with Regular Polygons

Polygons will only tessellate if their interior angles add up to a multiple/factor of 360°. A triangle's interior angles always add up to 180°.

Questions Use the information above to fill in the tables

Terms	Definition – What does the term mean?
Regular P gon	
Interior	
Su ngles	

Regular Polygo	Triang	Sum of Interior Angles of Triangles x 180)	Multiple/Factor of 360° Yes/No
1) 			
2) 			
3) 			
4) 			
5) 			
6) 			
7) 			
8) 			

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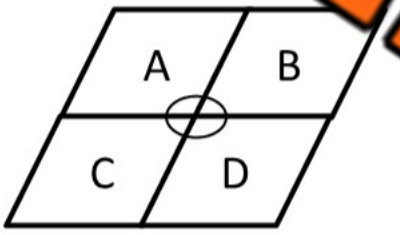
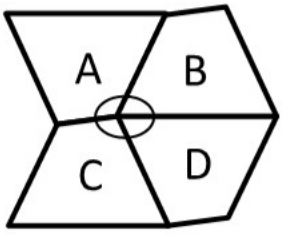
Tessellating with Quadrilaterals

Every quadrilateral can be used to tessellate the plane. This is because a quadrilateral's interior angles always add up to 360°. A regular quadrilateral is easy to tessellate, whereas an irregular quadrilateral is sometimes more challenging to fit together.

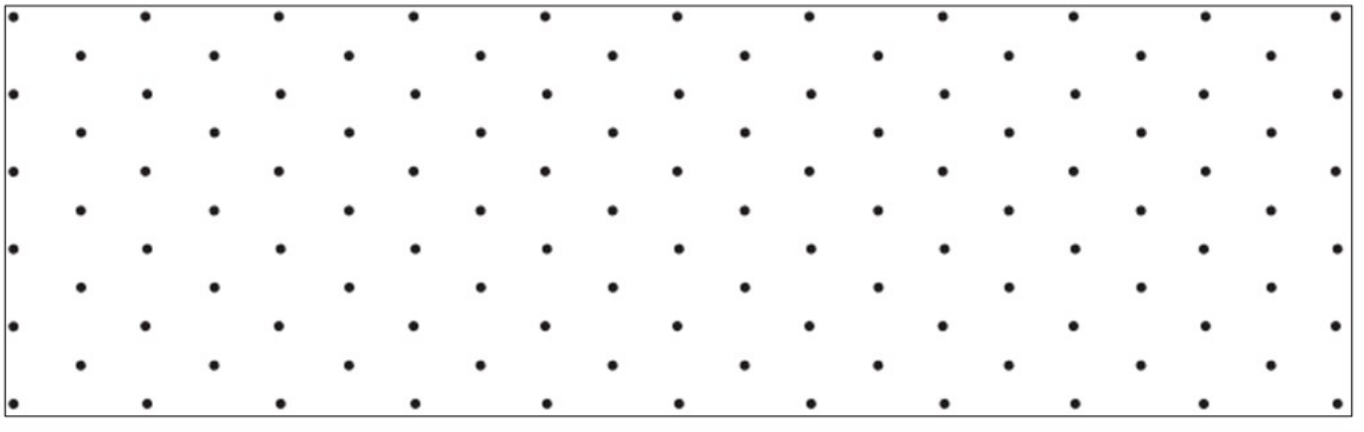
Part 1

Fill in the table below

Tes[illegible]tion	Sum of the Circled Angles	Describe Transformation
		*From Shape A to Shape D*
		*From Shape A to Shape B*
		[illegible] *A to Shape C*

Part 2

Create a tessellation using one or multiple quadrilaterals



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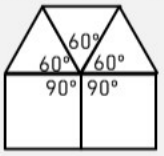
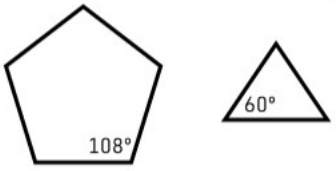
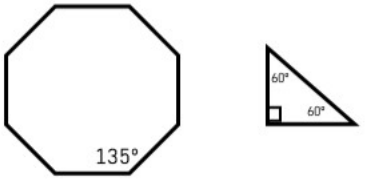
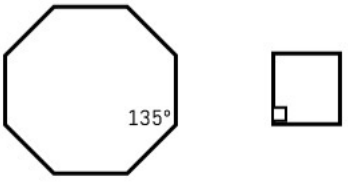
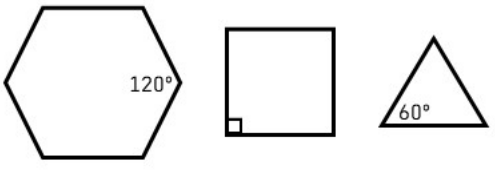
Tessellating with Different Polygons

Tessellations with different polygons are often used in artwork. When artists combine polygons, they need to ensure the vertices have interior angles that add to 360°.



Using 2 squares and 3 triangles have central vertices adding to 360° (60 + 60 + 60 + 90 + 90 = 360°)

Questions Can the polygons be combined to create a tessellation? Explain

	Yes/No	Explanation
1) 		
2) 		
3) 		
4) 		
5) 		

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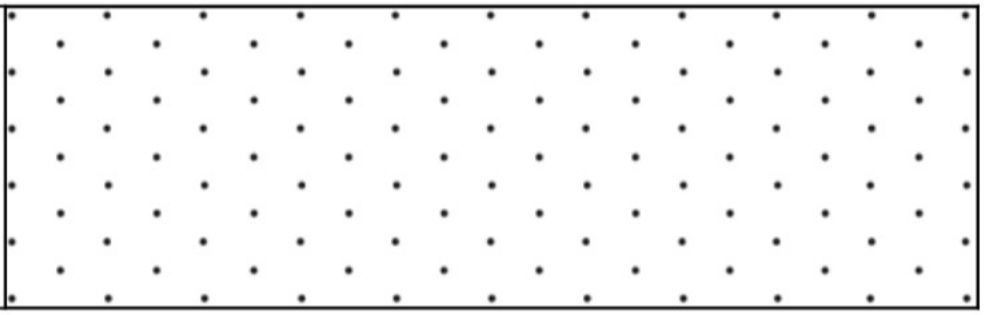
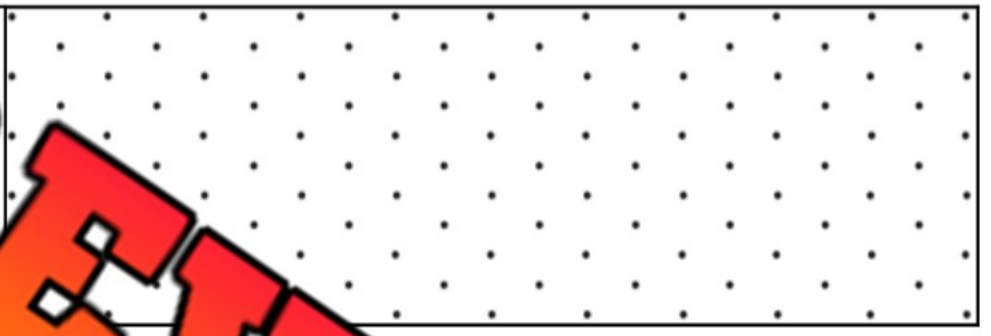
Drawing Tessellations - Combining Polygons

Draw Draw a tessellation using the combination of polygons below

1) Pentagon and Triangle

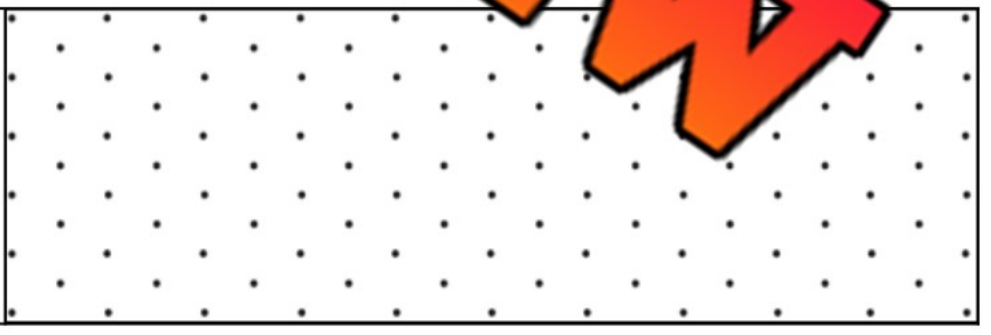


2) Squa

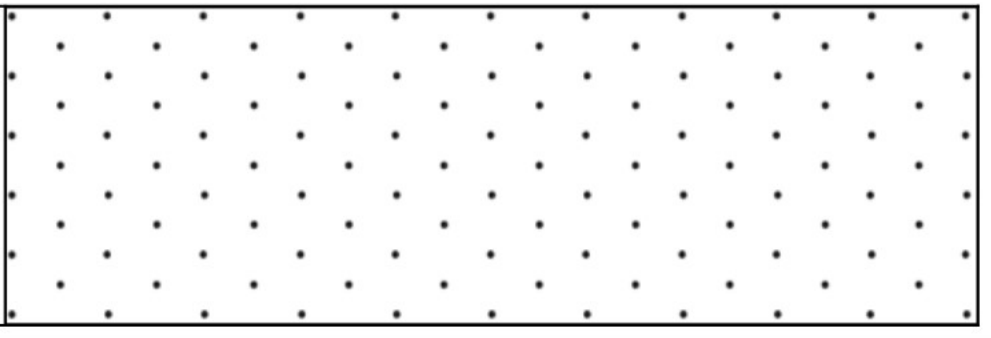


3) Octagon and Quadrilateral

4) Octagon and 2 Triangles



5) Hexagon, Quadrilateral, Triangle



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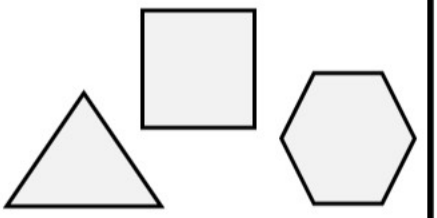
Regular Tessellations

A **regular tessellation** is composed of identically sized and shaped regular polygons. To create a regular tessellation, choose one of the regular polygons and tile them. Add colours afterwards to add to the pattern.



Create Create a regular tessellation below using regular triangles, squares, or hexagons

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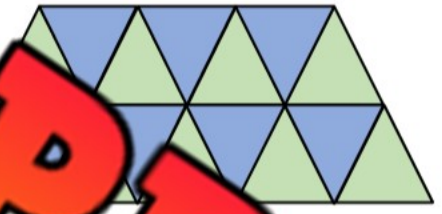
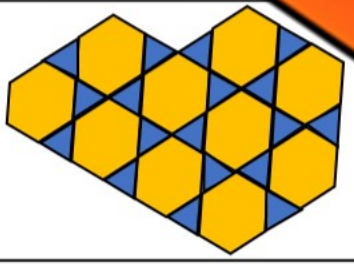
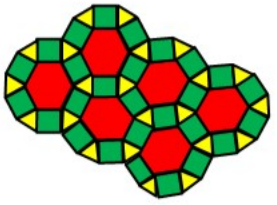
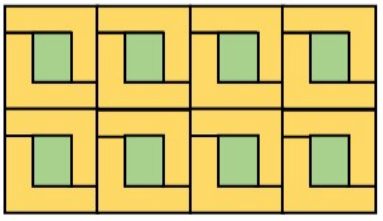
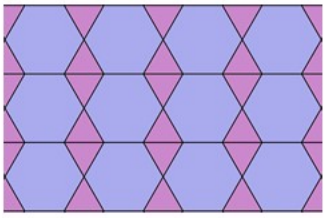
Type of Tessellation

Questions What type of tessellation are the examples below

Tessellation	Type of Tessellation Regular, Semi-Regular, Irregular
1) 	
2) 	
3) 	
4) 	
5) 	
6) 	

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Creating Translation Tessellation

Directions Follow the instructions to create your own translation tessellation

When creating a tessellation, we move a "tile" repeatedly to create a pattern. We can move the tile in 4 different ways – translations, reflections, rotations, and dilations.

A **translation tessellation** is a tessellation that has been created by the translatin ding) of a tile.

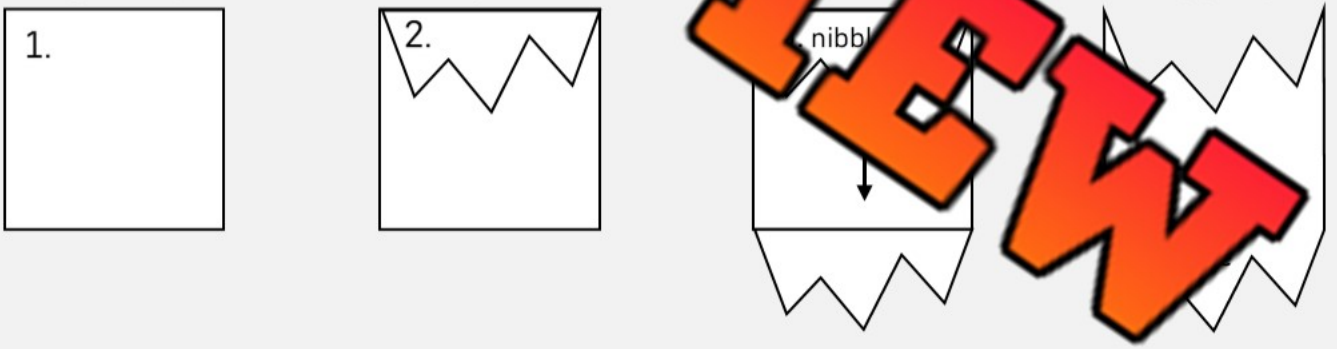
Instructi

1) th strong paper, like cardboard, cardstock or index cards.

2) Create a from one corner of the square to an adjacent corner. Do do not stop halfway.

3) Cut along your pen that two pieces. The piece that you designed is called the

4) Translate (slide) the nibble piece and tape the straight edges together. These two pieces need to fi no overlapping.

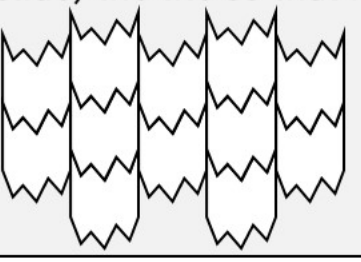


5) Place your tile on one of the four corners. To avoid having gaps, have the corner of the paper align with the original square you started with. The first tile you trace can hang off the edge of the paper.

6) Since this is a translation tessellation, you will translate (slide) the tile so that it fits together like a puzzle.

7) Continue translating the tile until the page is covered.

8) Colour your tessellation in a pattern



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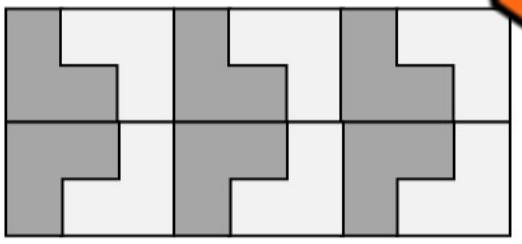
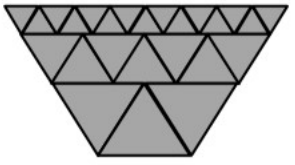
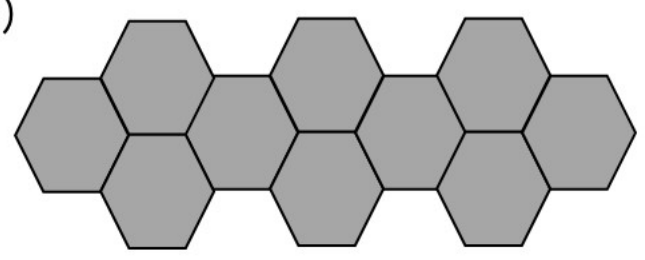
Describing Tessellations

Directions Choose one tile and describe how it is being transformed – rotated, translated, reflected and/or dilated

Tessellation	Description
1) 	
2) 	
3) 	
4) 	
5) 	

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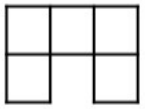
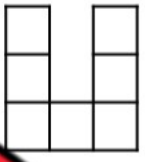
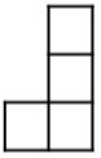
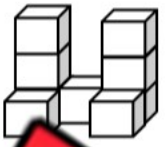
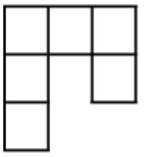
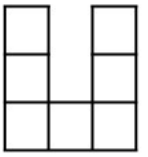
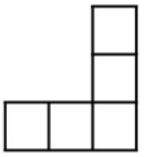
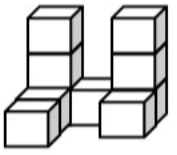
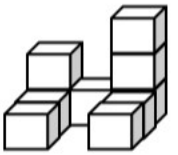
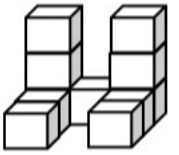
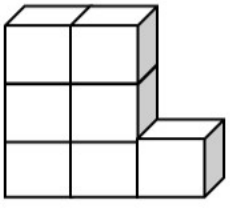
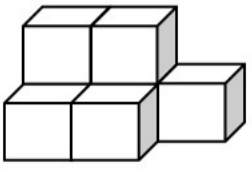
Unit Test - Drawing Shapes and Tessellations

Part 1 Look at the front, top, and side views and circle the matching 3D object

Top View	Front View	Side View
		
		

Top View	Front View	Side View
		
		

Part 2 Dra[illegible] view of the objects below

Original Shape	Top View	Front View	Side View
1) 			
2) 			
3)