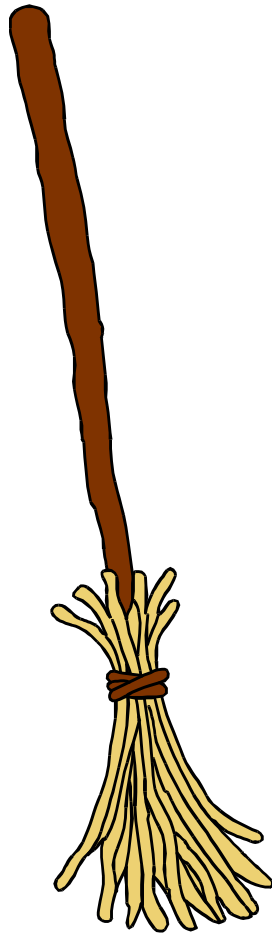


Math Wizards



Grade 3 Geometry and Spatial Sense

Name: _____

Ontario Mathematics Curriculum Grades 1 to 8, 1997
Strand: Geometry and Spatial Sense
Grade: 3

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Developed by T. Tasker

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Overall Expectations:

- investigate the attributes of three-dimensional figures and two-dimensional shapes using concrete materials and drawings
- draw and build three-dimensional objects and models
- explore transformations of geometric figures
- understand key concepts in transformational geometry using concrete materials and drawings
- describe location and movements on a grid
- use language effectively to describe geometric concepts, reasoning, and investigations

Geometry and Spatial Sense

Let's Explore Two-Dimensional Shapes



As a class, let's read the Greedy Triangle by Marilyn Burns and Illustrated by Gordon Silveria.

While reading the Greedy Triangle, you will be asked at certain times to make shapes with your geoband on your geoboard. Let's review some of the rules of the geoboard:

- 1) Do NOT fling them
- 2) Do NOT flick them
- 3) Do NOT throw them
- 4) When the geoboard is not in use, place it on the floor in front of you.
- 5) IF any of the rules are broken, the geoband and geoboard will be taken away. NO second chances

Back at our desks, let's fill out the chart below:

Shape	Name	# of edges	# of sides
	triangle		
	square		
	rhombus		
	rectangle		

	parallelogram		
	pentagon		
	hexagon		
	heptagon		
	octagon		
	nonagon		

Grade 3 GSactivity001 covers:

G10: explore and identify two-dimensional shapes using concrete materials and drawings (eg. rhombus, parallelogram)

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Geometry and Spatial Sense

Let's Do a 2-D Shape Survey



Benjamin Broom has given a task to Merlin. Benjamin wants to know how many two-dimensional shapes can be found around the school. However, Merlin is busy getting out of some sticky business and needs your help. Work in small groups and pick a SECTION of the school to gather your data. Be sure to approve your section with your teacher. REMEMBER TO ALWAYS USE whisper voices!

Let's make a tally chart.

Category	Tally

Let's make a graph of the results.

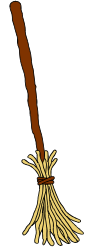


	1	2	3	4	5	6	7	8	9	10	11	12	13	14

What have we learned from this graph?

Geometry and Spatial Sense

Our Shape Book



Merlin is still having trouble learning his shapes! Benjamin Broom thinks that if we make a picture book for Merlin it would help him remember.

Materials:

- 1) Flip Book
- 2) Pencil
- 3) Colouring Utensils
- 4) Ruler

Steps:

- 1) Write the title “My Shape Book” on the first page. Decorate it with lots of colourful shapes.
- 2) On the second page, write “Vocabulary” (make sure that you can still see the word when the first page is down). On this page, draw a square and label the edges and vertices.
- 3) On the third page, pick a shape (any shape) and write the name on the flap. Inside draw the shape, describe it (how many edges, how many vertices) and draw where we see the shape in the world around us.
- 4) Repeat step three for the next THREE pages, so that you have picked FOUR different shapes, in total, to illustrate in your shape book.

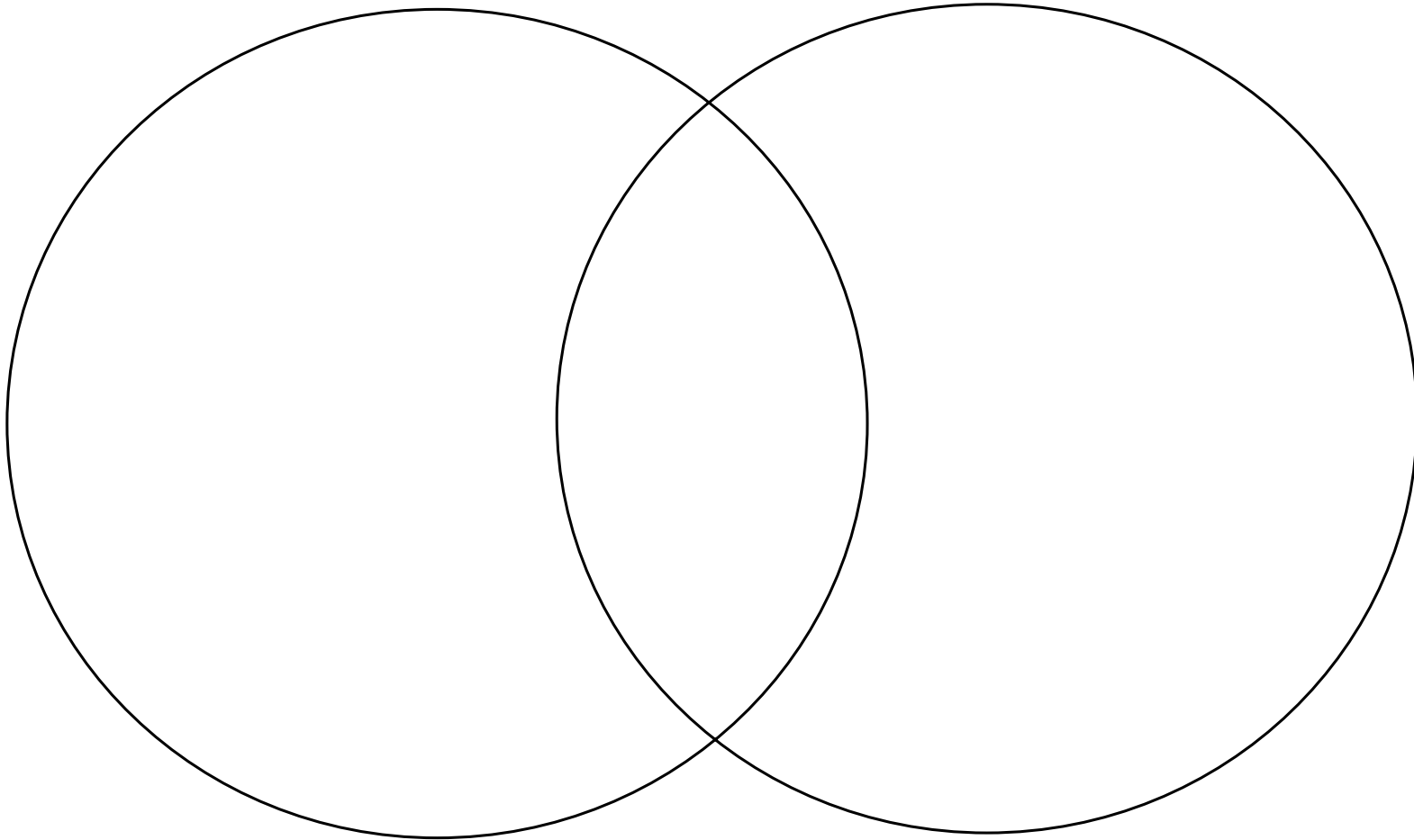
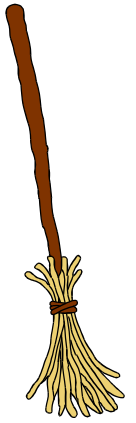
Grade 3 GSactivity003 covers:

G10: explore and identify two-dimensional shapes using concrete materials and drawings (eg. rhombus, parallelogram)

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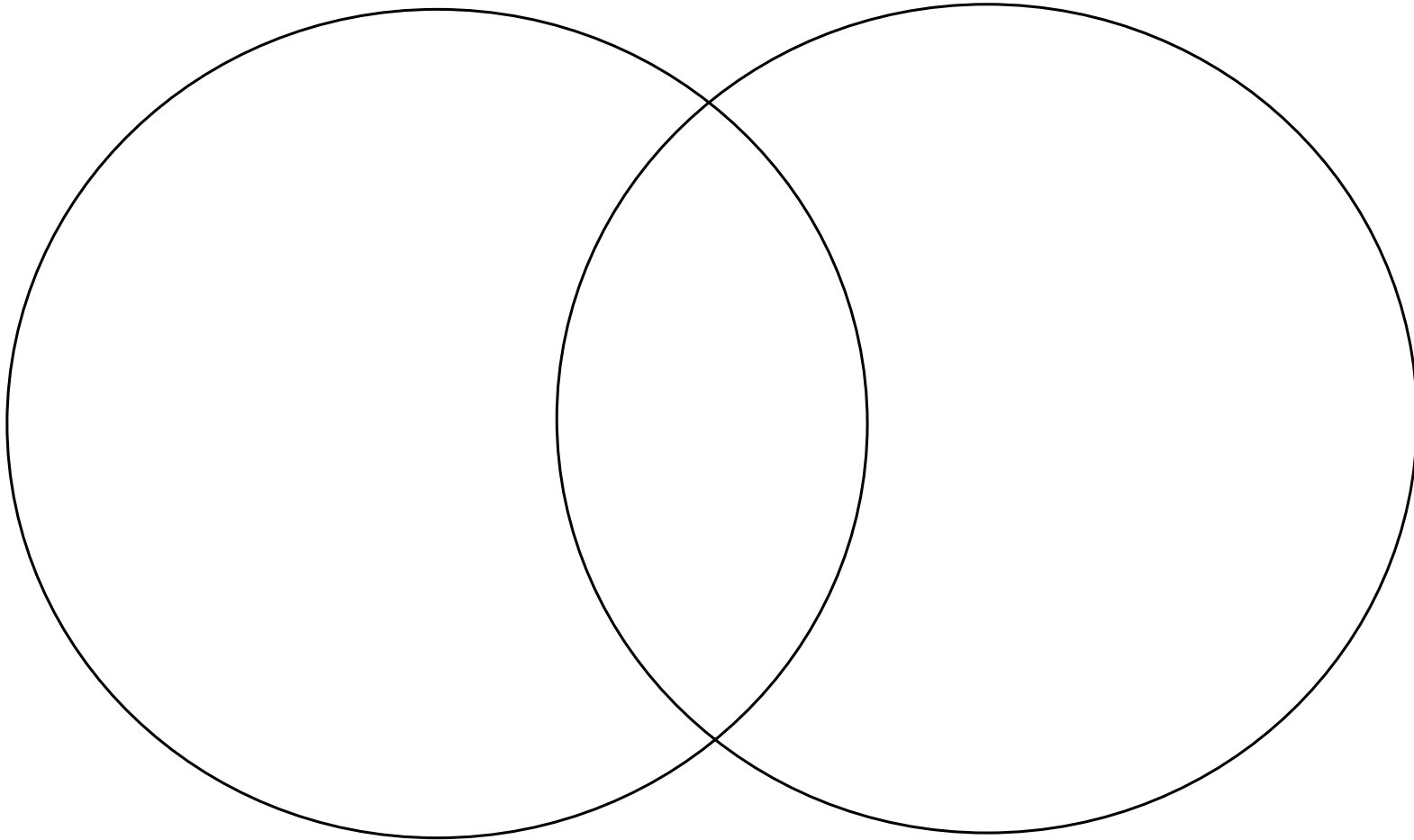
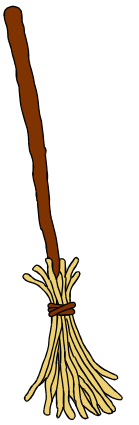
Geometry and Spatial Sense

Let's Sort Two-Dimensional Shapes into a Venn Diagram



Geometry and Spatial Sense

Let's Sort Two-Dimensional Shapes into a Venn Diagram



Geometry and Spatial Sense

Exploring Symmetry in 2-Dimensional Shapes



Follow Benjamin Broom's Steps:

- 1) VERY carefully cut out the photocopied shapes.
- 2) Using paper folding, find the lines of symmetry and the number of lines each shape has.

Name	Shape	# of lines of symmetry

Grade 3 GSactivity006 covers:

G12: explore the concept of lines of symmetry in two-dimensional shapes (eg. discover that squares have four lines of symmetry)

G13: determine lines of symmetry for two-dimensional shapes using paper folding and reflections in a transparent mirror (eg. Mira)

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Mira, Mira, On The Wall

Merlin tried to create the Canadian flag using a spell, unfortunately he could only make half of the flag appear. Using a Mira, complete the rest of the flag.



Grade 3 GSactivity007 covers:

G12: explore the concept of lines of symmetry in two-dimensional shapes (eg. discover that squares have four lines of symmetry)

G13: determine lines of symmetry of two-dimensional shapes using paper folding and reflections in a transparent mirror (eg. Mira)

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Geometry and Spatial Sense

Shape Scene



As a class, let's read The Wing on A Flea by Ed Emberley.

We see lots of shapes in our neighbourhood. Merlin went to see your neighbourhood but got lost on the way. Benjamin Broom suggests we make a picture for Merlin of our neighbourhood. Make a picture of your neighbourhood using shapes like Ed Emberley.

- Materials:
- 1) A variety of paper
 - 2) Scissors
 - 3) Glue

After you have finished, explain how you made your picture:

Geometry and Spatial Sense

Tangram Puzzle



Benjamin Broom has a challenge for you. In your group, take these shapes and COOPERATIVELY work together to make them into a square. Good luck and may the shapes be with you.

WHEN TIME'S UP - Answer these questions:

1) Was your group successful in making a square? _____

2) WHY or WHY not?

3) Explain the steps you followed in your group:

Grade 3 GSactivity009 covers:

G8:explain the process they followed in making a structure or a picture from three-dimensional figures or two dimensional shapes

G11:solve two-dimensional geometric puzzles (eg. Pattern blocks, tangram)

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Grandfather Tang's Story



As a class, let's read Grandfather Tang's Story by Ann Tombert and Illustrated by Robert Andrew Parker.

Cut out your own set of tangrams. Like Grandfather Tang, create animals or you may want to create other objects. Glue your favourite tangram creation below:

Explain how you created this tangram object:

Grade 3 GSactivity010 covers:

G8: explain the process they followed in making a structure or a picture from three-dimensional figures or two-dimensional shapes

G11: solve two-dimensional geometric puzzles (eg. pattern blocks, tangram)

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Geometry and Spatial Sense

Congruent Shapes



Let's write the definition of congruent:

At the carpet, let's find congruent two-dimensional shapes.

Draw a picture of congruent shapes:

Geometry and Spatial Sense

Make a Three-Dimensional Shape



Using paper, cut out two-dimensional shapes. Use these two-dimensional shapes to make a three-dimensional shape.

Draw what you made here:

Explain how you made it:

Geometry and Spatial Sense

Naming Prisms and Pyramids



3-dimensional figure	Name

Grade 3 GSactivity013 covers:

G7: describe and name prisms and pyramids by the shape of their base (eg. square-based pyramid)

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Making Three-Dimensional Shapes



Benjamin Broom has sent us several 3-dimensional nets. When these nets are cut out and folded they will make a three-dimensional shape. As we make them, let's fill out the chart below:

Prediction	Actual Name	# of vertices	# of edges	# of faces

Let's draw some of the shapes here:

Geometry and Spatial Sense

Similarities and Differences in Prisms



What is the same in all prisms?

What is different?

Prisms are similar but they are given different names. How do we name these prisms?

Draw and label your favourite prism here:

Geometry and Spatial Sense

Congruent Shapes



Let's write the definition of congruent:

At the carpet, let's find congruent three-dimensional figures.

Draw a picture of congruent shapes:

Geometry and Spatial Sense

Let's Do a 3-D Shape Survey



Benjamin Broom has given a task to Merlin. Benjamin wants to know how many THREE-dimensional figures can be found around the school. However, Merlin is busy getting out of some sticky business and needs your help. Work in small groups and pick a SECTION of the school to gather your data. Be sure to approve your section with your teacher. REMEMBER TO ALWAYS USE whisper voices!

Let's make a tally chart.

Category	Tally

Let's make a graph of the results.

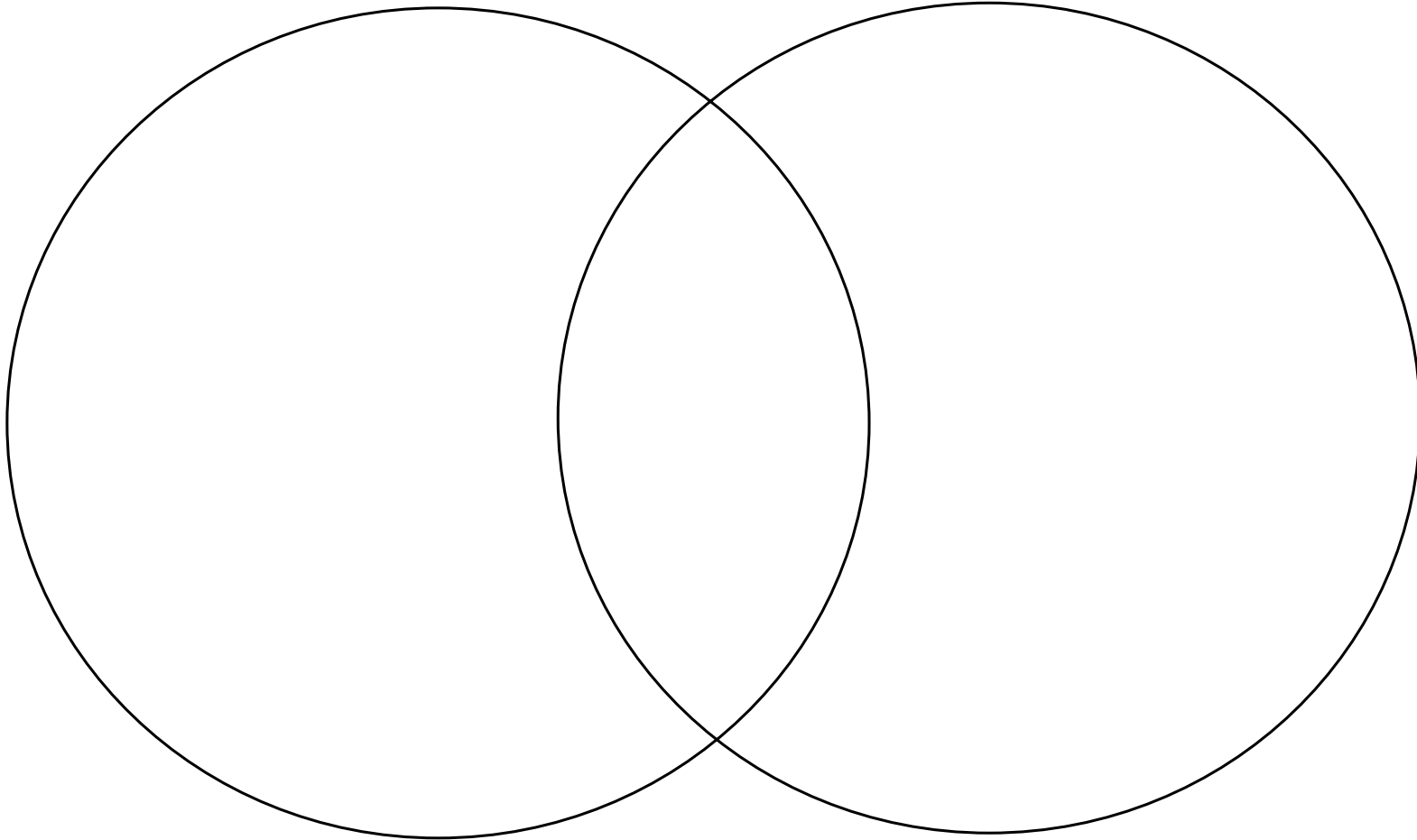
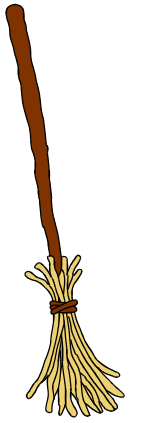


	1	2	3	4	5	6	7	8	9	10	11	12	13	14

What have we learned from this graph?

Geometry and Spatial Sense

Let's Sort Three-Dimensional Shapes into a Venn Diagram



Geometry and Spatial Sense

Building with Three-Dimensional Figures



Build a structure using three-dimensional figures. Draw your structure in the box below (use your best drawing techniques).

List the shapes that you used (remember your commas):

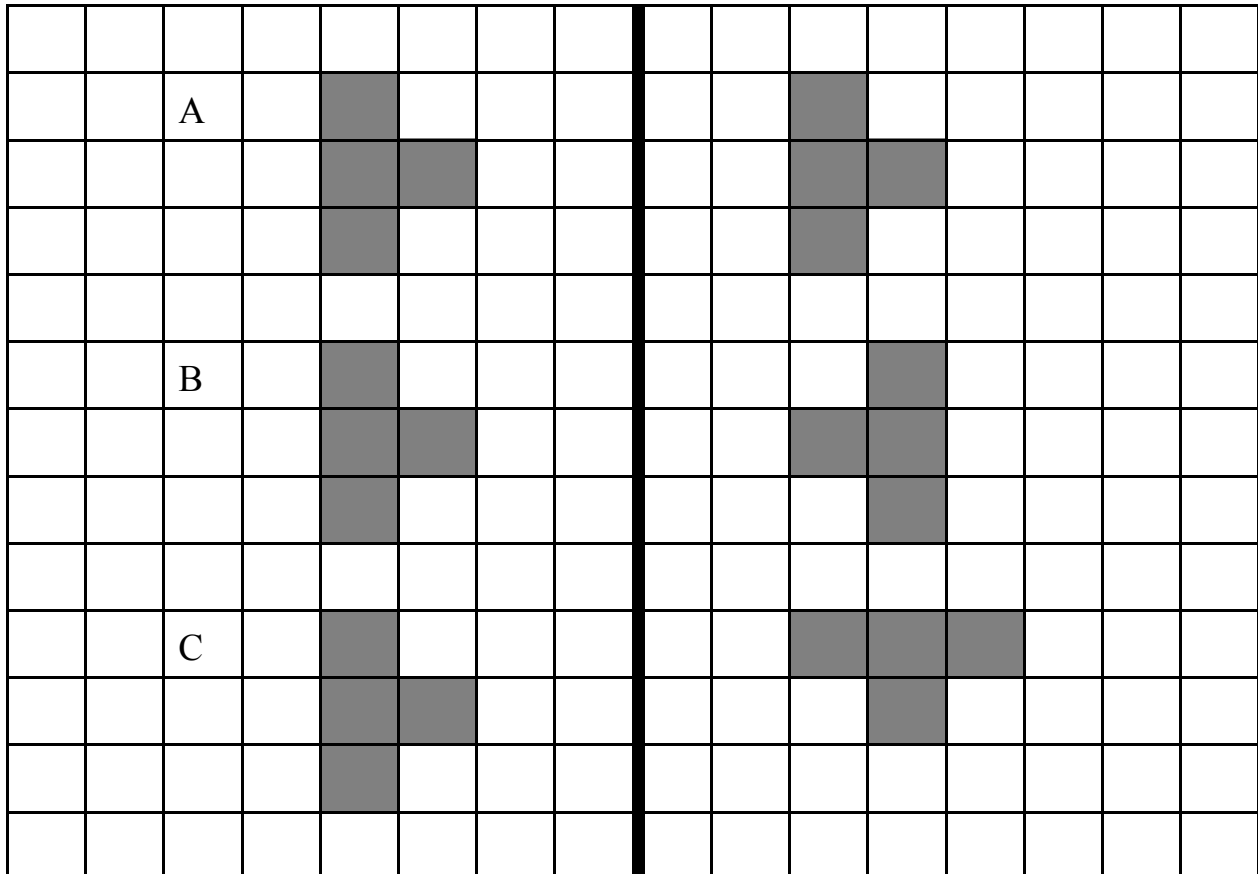
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The Shape Tricks



Benjamin Broom has drawn a darker line in the middle of the chart paper below. What do we call the darker line in the middle? _____.

A long time ago, Merlin was part of a circus called The Shape Bros. Circus Company. The shapes in the circus did AMAZING tricks, but Merlin lost his list of all the tricks. Let's help Merlin create a new list of tricks.

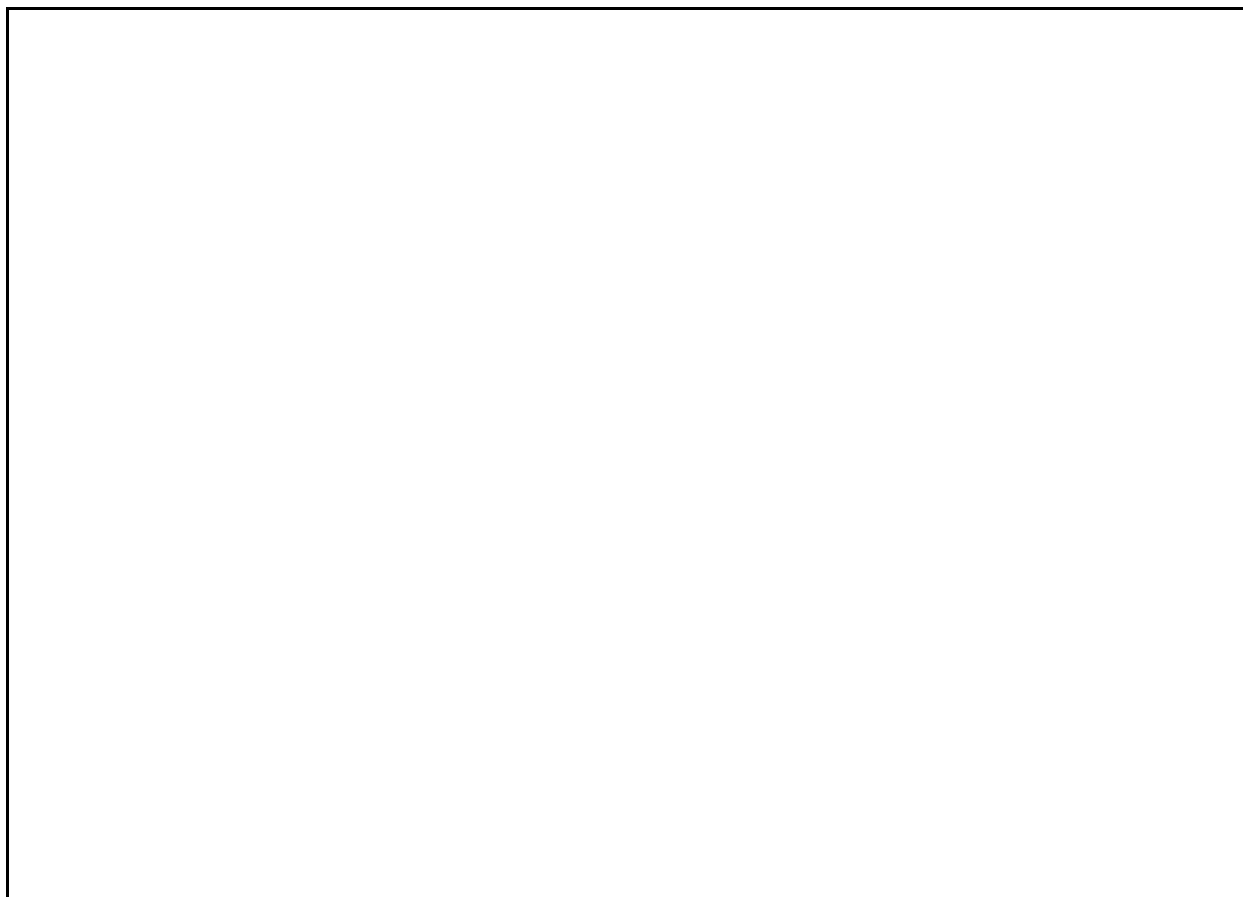
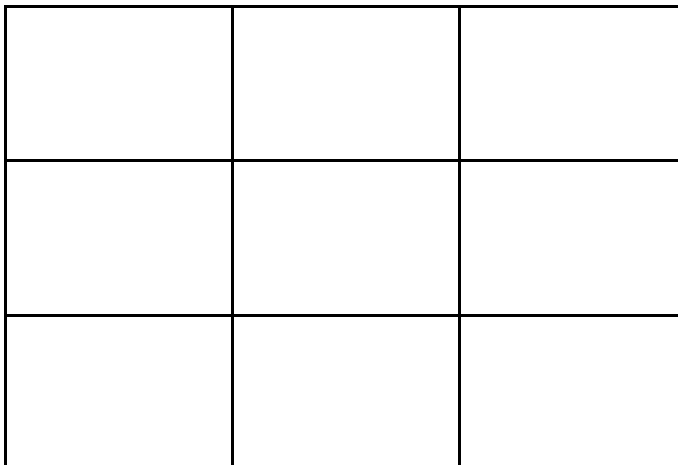


At the circus they have to keep their tricks secret so they call them transformations. They also have special secret symbols so no one else can read or steal their routines. Let's fill out this chart to make sure we understand the special symbols.

	A	B	C
Transformations (the trick)			
Secret symbol			

Merlin has a Problem!

How many different sized squares can you find in this diagram?



Grade 3 GSactivity021 covers:

G14: identify transformations, such as flips, slides, and turns (reflections, translations and rotations), using concrete materials and drawings.

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Geometry and Spatial Sense Choreographer



Merlin had a circus accident and broke his arm! It's up to you to choreograph a new routine for your decagon manipulative for this evening's performance! The routine requires at least three flips, three turns and three slides, in a random and creative order.

1					2					3				
4					5					6				
7					8					9				
10					11					12				

Grade 3 GSactivity022 covers:

G14: identify transformations, such as flips, slides, and turns (reflections, translations, and rotations), using concrete materials and drawings

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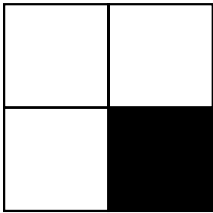
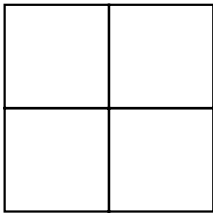
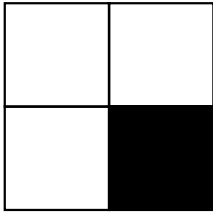
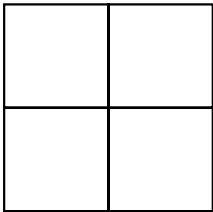
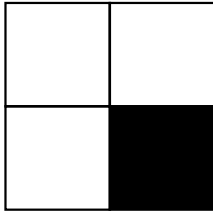
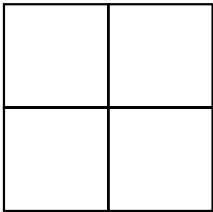
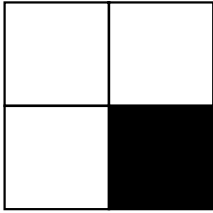
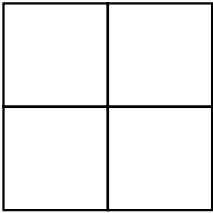
Geometry and Spatial Sense

Turns



Cut out the transformational geometry manipulatives, fold them in half and glue the two halves together. Use the manipulatives to practice the various turns below.

Let's practice doing turns!

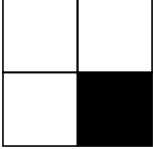
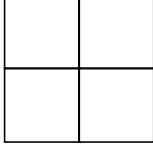
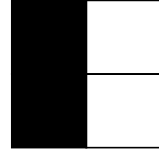
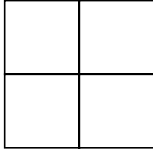
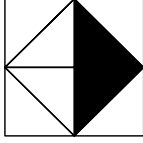
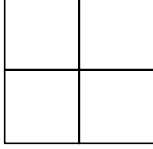
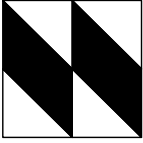
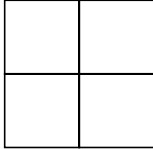

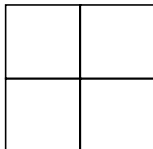
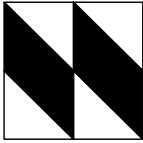
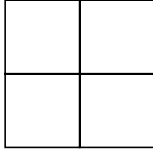
START	ROTATE	FINISH
	1/4 Turn	
	1/2 Turn	
	3/4 Turn	
	Full Turn	

Geometry and Spatial Sense

Turns, Flips and Slides, Oh My!



Practice your turns, flips and slides altogether using your transformational geometry manipulatives.

START	TRANSFORMATIONS	FINISH
	<ol style="list-style-type: none"> 1) Slide 2) 1/4 turn 3) Flip Right 	
	<ol style="list-style-type: none"> 1) 3/4 turn 	
	<ol style="list-style-type: none"> 1) Flip Left 2) Slide 	
	<ol style="list-style-type: none"> 1) 1/2 Turn 2) Flip Left 3) 1/4 Turn 	
	<ol style="list-style-type: none"> 1) Flip Right 2) Slide 	
	<ol style="list-style-type: none"> 1) 1/2 Turn 2) Flip Right 	

Grade 3 GSactivity024 covers:

G15:perform rotations using concrete materials (eg. quarter turn, half turn, three-quarter turn)

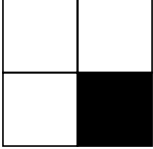
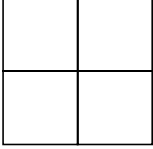
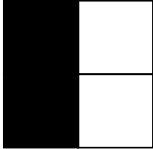
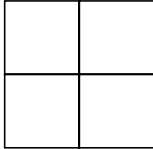
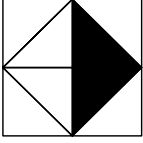
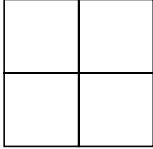
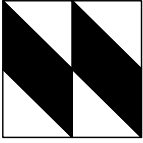
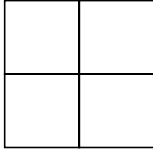

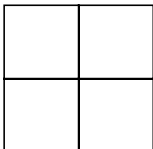
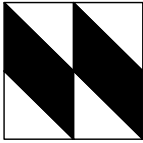
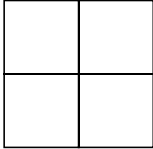
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Geometry and Spatial Sense

More Transformations



Practice your turns, flips and slides altogether using your transformational geometry manipulatives.

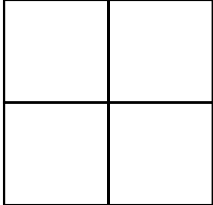
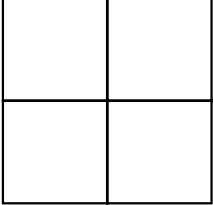
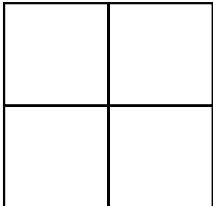
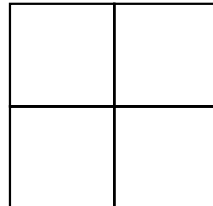
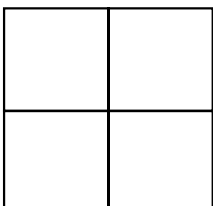
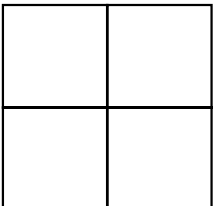
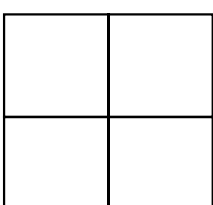
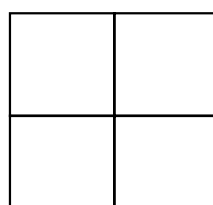
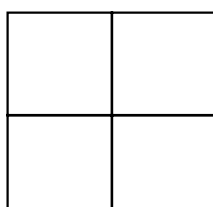
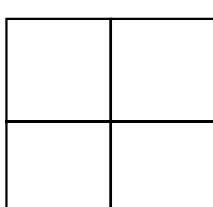
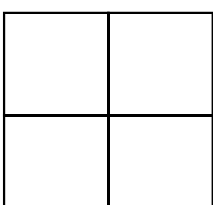
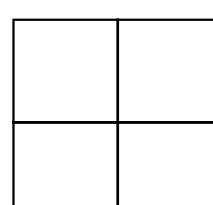
START	TRANSFORMATIONS	FINISH
	1) Flip Left 2) Slide	
	1) $\frac{1}{2}$ Turn 2) Flip Left 3) $\frac{1}{4}$ Turn	
	1) Slide 2) $\frac{1}{4}$ turn 3) Flip Right	
	1) $\frac{3}{4}$ turn	
	1) $\frac{1}{2}$ Turn 2) Flip Right	
	1) Flip Right 2) Slide	

Geometry and Spatial Sense

Your Turns

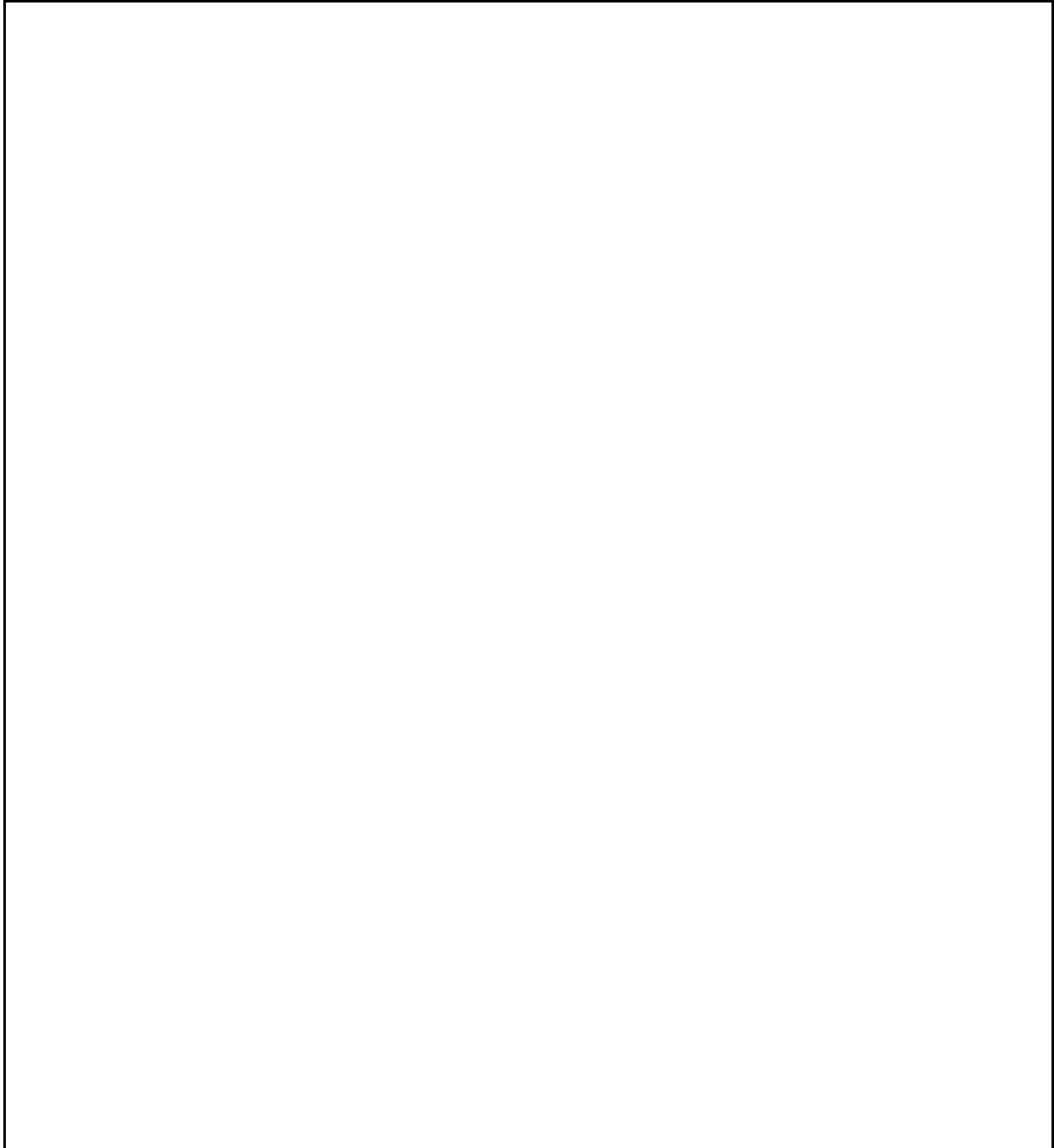
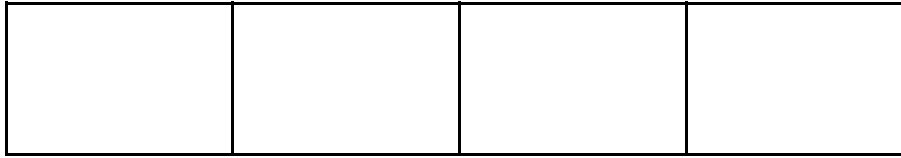


Make up your own transformational routines using turns, flips and slides.

START	ROTATE	FINISH
		
		
		
		
		
		

Merlin has a Problem!

How many rectangles of different sizes can you find in this figure?



Grade 3 GSactivity026 covers:

G15: perform rotations using concrete materials (eg. quarter turn, half turn, three-quarter turn)

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Geometry and Spatial Sense

Math Camp








































































































Last summer, Merlin went to math summer camp. He had so much fun! One of his assignments was to draw a map of the camp. Each square has a special symbol to represent something on the camp grounds. To read what each symbol means you need to look at the legend below:

Legend:

	Forest		Lake		Beach
	Field		Walkways		Boat House
	Buildings				

The buildings have math symbols on them. Those math symbols are the buildings' names. Merlin stayed in the circle building. The coordinates of the circle building are B2. Coordinate is a fancy word to describe where something is on a map. With coordinates the letter comes first and the number comes second.

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
1					÷				×						
2															
3									!		+			1/3	
4		a								=				2/3	
5			Ú											?	
6															
7															
8															

One day Merlin lost his map and he couldn't find anything without it. Help Merlin by providing him with directions of how to get to certain buildings from others by following the paths.

Start	Coordinates	How	Finish	Coordinates
!			■	
1/3			↑	
■			×	
÷			\$	
Ú			●	
×			2/3	
%			Ú	

Grade 3 GSactivity027 covers:

G16: describe how to get from one point to another on a grid (eg. two squares right followed by one square up)

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Geometry and Spatial Sense

Design Your Own Math Camp



The school of Math Wizards is going to build a new Math Camp and they're having a contest for the best grid. Design your math camp and enter it into the contest!

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
1															
2															
3															
4															
5															
6															
7															
8															
9															
10															
11															
12															
13															
14															
15															

Legend:

Grade 3 GSactivity028 covers:

G16: describe how to get from one point to another on a grid (eg. two squares right followed by one square up)

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Geometry and Spatial Sense

Directions at Your Math Camp



Provide directions to and from various buildings at your math camp:

Start	Coordinates	How	Coordinates	Finish

Give the perimeter and area of some buildings and places at your math camp:

Object	Perimeter	Area

Grade 3 GSactivity029 covers:

G16: describe how to get from one point to another on a grid (eg. two squares right followed by one square up)

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Geometry and Spatial Sense

Mapping Our World



As a class, let's read Mapping Penny's World by Loreen Leedy.

In groups of about 4 or 5, you will be creating a 3-D map of an area of your choice. This area could be real or made up. This will take several days.

TASK ONE: On a piece of large chart paper (with grid lines) plan out your map.

TASK TWO: On a large piece of poster board (this could be several pieces taped together), create your 3-D map using a variety of recycled materials, paint, markers, junk from the junk box, glue, tape and whatever else is handy.

TASK THREE: Give a presentation of your 3-D map describing all of the geometry components.

	Level 1	Level 2	Level 3	Level 4
Communication of Geometric Concepts	- The group was unable to describe the geometric concepts used to create their map - Limited geometric vocabulary was used	- The group used and described simple geometric concepts to create their map - Simple geometric vocabulary was used	- The group described the geometric concepts used to create their map - Geometric vocabulary was used	- The group described sophisticated geometric concepts in detail to create their map - Geometric vocabulary was used proficiently
3-D Map	- Simple geometric figures and shapes were used to make a basic map that lacked detail	- Simple geometric figures and shapes were used to make a basic map with some detail	- Geometric shapes and figures were effectively used to create an interesting map	- Creative ways of using a variety of geometric shapes and figures was used to create a unique map
Overall Appearance	Needs Improvement	Satisfactory	Good	Excellent