

# DMT INSTITUTE

Developing Mathematical Thinking Institute (DMTI)



Professional  
Development



Curricular  
Resources



Assessment

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# About the DMTI Targeted Activities

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These DMTI Targeted Activities modules are designed to be played or completed with a partner or in small groups. These supplement the Primary Math Assessment and DMTI curricular materials.

The activities are intended for teachers or caregivers to play or do with children to build necessary math skills, concepts and math language. Each activity can be completed in or played for 10 to 20 minutes. And if there are additional activities in a module, they are built to be more advanced.

# **IMA – Grade 3 - 6**

## **Ratio and Proportion Concepts**

# Ratio and Proportion Concepts

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## What's involved:

- Seeing the relationship between quantities
- Visually growing and shrinking patterns
- Iterating units and partitioning space between numbers

## Why it matters:

- Lays the foundations for algebraic thinking
- Helps students make sense of multiplicative situations
- Building the visual model helps students to see relationships between two units which can make it easier to generalize the relationship

# Ratio and Proportion: Patterns

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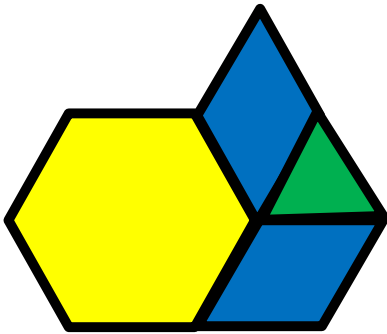
## Materials

- Journal or Paper
- Pattern blocks [DMTI Math Pack]
- Worksheets and Templates [Printout]

# Ratio and Proportion: Patterns

## Activity 1:

In this activity we will determine the quantity of each shape required to compose various iterations of a pattern. We will use pattern blocks to build the repeating pattern, a ratio table to notate quantities, and answer questions related to the relationships created.



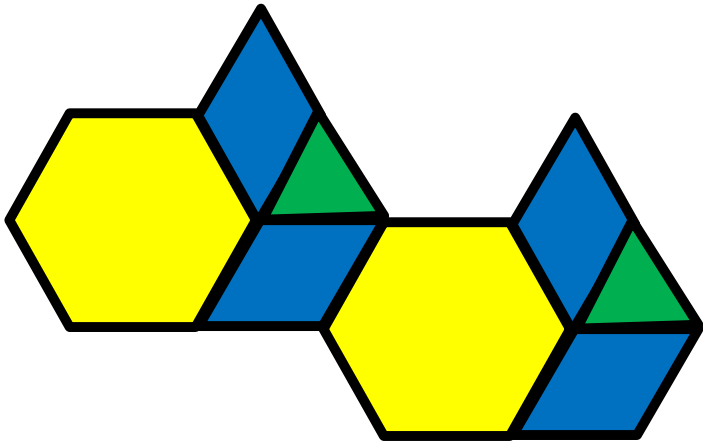
In this shape we see 1 hexagon, 2 rhombi, and 1 triangle. We would notate this is a ratio table like this:

hexagon	1				
rhombi	2				
triangles	1				

Since this is the pattern unit we will repeat, we can call it a composed unit. We must iterate all 4 shaped together.

# Ratio and Proportion: Patterns

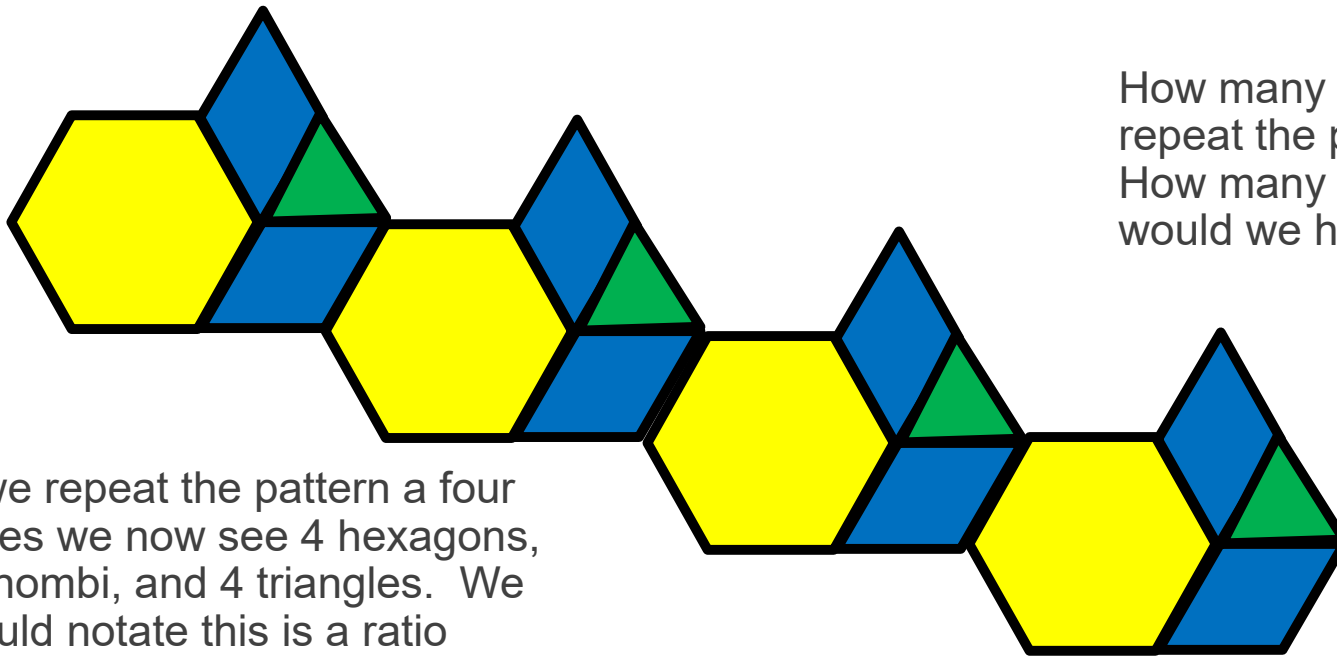
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If we repeat the pattern (composed unit) a second time we now see 2 hexagons, 4 rhombi, and 2 triangles. We would notate this is a ratio table like this:

hexagons	1	2			
rhombi	2	4			
triangles	1	2			

# Ratio and Proportion: Patterns



How many times would we have to repeat the pattern to see 8 rhombi?  
How many hexagons and triangles would we have used?


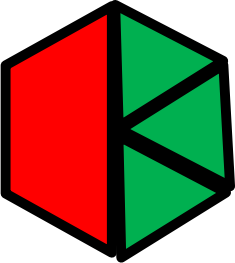
If we repeat the pattern a four times we now see 4 hexagons, 8 rhombi, and 4 triangles. We would notate this is a ratio table like this:

hexagons	1	2	4		
rhombi	2	4	8		
triangles	1	2	4		

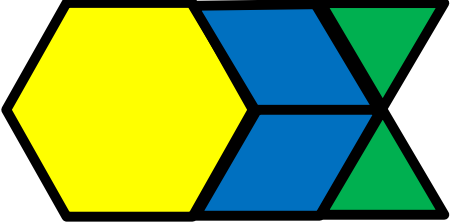
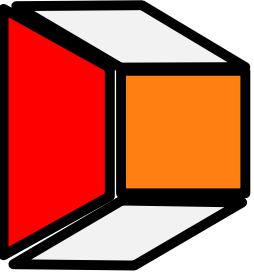
Now complete Worksheet 1 and 2



## Worksheet 1.1

Visual pattern	Complete the ratio table	Questions (you can use the ratio table or blocks to help)												
	<table border="1"> <tr> <td>rhombi</td> <td>1</td> <td>2</td> <td></td> <td></td> <td>10</td> </tr> <tr> <td>triangles</td> <td>2</td> <td></td> <td>8</td> <td>10</td> <td></td> </tr> </table>	rhombi	1	2			10	triangles	2		8	10		<ol style="list-style-type: none"> <li>How many triangles would I need if I used 7 rhombi?</li> <li>How many triangles and rhombi would I need to complete the pattern 8 times?</li> <li>How many rhombi would I need if I used 12 triangles?</li> </ol>
rhombi	1	2			10									
triangles	2		8	10										
	<table border="1"> <tr> <td>trapezoid</td> <td>1</td> <td>2</td> <td></td> <td>6</td> <td></td> </tr> <tr> <td>triangles</td> <td></td> <td></td> <td>12</td> <td></td> <td>24</td> </tr> </table>	trapezoid	1	2		6		triangles			12		24	<ol style="list-style-type: none"> <li>How many triangles would I need if I used 10 trapezoids?</li> <li>How many triangles and trapezoids would I need to complete the pattern 12 times?</li> <li>How many trapezoids would I need if I used 9 triangles?</li> </ol>
trapezoid	1	2		6										
triangles			12		24									

## Worksheet 1.2

Visual pattern	Complete the ratio table	Questions (you can use the ratio table or blocks to help)																		
	<table border="1"> <tr> <td>Hexagon</td> <td>1</td> <td></td> <td></td> <td></td> <td>12</td> </tr> <tr> <td>rhombi</td> <td></td> <td>4</td> <td></td> <td></td> <td></td> </tr> <tr> <td>triangles</td> <td></td> <td></td> <td>8</td> <td>10</td> <td></td> </tr> </table>	Hexagon	1				12	rhombi		4				triangles			8	10		<ol style="list-style-type: none"> <li>How many hexagons and triangles would I need if I used 12 rhombi?</li> <li>How many hexagons, triangles, and rhombi would I need to complete the pattern 8 times?</li> <li>How many hexagons and rhombi would I need if I used 20 triangles?</li> </ol>
Hexagon	1				12															
rhombi		4																		
triangles			8	10																
	<table border="1"> <tr> <td>trapezoid</td> <td></td> <td></td> <td>5</td> <td></td> <td></td> </tr> <tr> <td>rhombi</td> <td>2</td> <td></td> <td></td> <td></td> <td>22</td> </tr> <tr> <td>square</td> <td></td> <td>3</td> <td></td> <td>7</td> <td></td> </tr> </table>	trapezoid			5			rhombi	2				22	square		3		7		<ol style="list-style-type: none"> <li>How many squares and trapezoids would I need if I used 20 rhombi?</li> <li>How many trapezoids, rhombi, and squares would I need to complete the pattern 15 times?</li> <li>How many trapezoids and rhombi would I need if I used 18 squares?</li> </ol>
trapezoid			5																	
rhombi	2				22															
square		3		7																

# Extensions:

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Create your own pattern (composed unit) and matching ratio table.

1. How many \_\_\_ would you need if you used 4 \_\_\_ ?
2. How many \_\_\_ would you need if you used 10 \_\_\_ ?
3. How many \_\_\_ and \_\_\_ (and \_\_\_ ) would you use if you repeated the pattern 6 times?

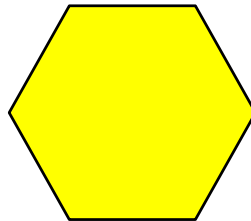
# Template: Pattern Blocks

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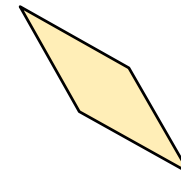
Trapezoid



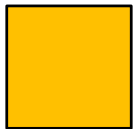
Hexagon



Rhombus



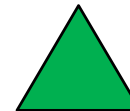
Square



Rhombus



Triangle





“The Developing Mathematical Thinking Institute (DMTI) is dedicated to enhancing students’ learning of mathematics by supporting educators in the implementation of research-based instructional strategies through high-quality professional development, curricular resources and assessments.”

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