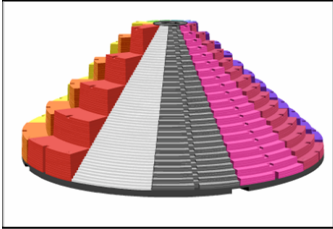


Activity C.9: Equivalency		
<p>Special Note: This lesson can be used to introduce division with remainders. This same exercise could be a whole class activity using the 2D – Elevations worksheet rather than Zillio.</p>		
<p>Learning Objectives:</p> <ol style="list-style-type: none"> <li>1) Develop fluency with multiples.</li> <li>2) Practice writing number sentences.</li> <li>3) Prepare for division with remainders.</li> </ol> <p>Examples of Skills Accomplished:</p> <ol style="list-style-type: none"> <li>1) 27 can equal:             <ol style="list-style-type: none"> <li>a. <math>3 \times 8 + 3</math></li> <li>b. <math>4 \times 6 + 3</math></li> <li>c. <math>5 \times 5 + 2</math></li> <li>d. And so on</li> </ol> </li> </ol>	<p>Setup:</p> <ol style="list-style-type: none"> <li>1) Put staircases in counterclockwise sequence <math>1x \rightarrow 12x</math>.</li> <li>2) Give each student a foam card.</li> <li>3) Give each student a copy of the handout to record his or her answers.</li> </ol>	<p>Maximum Number of Players for Small Group Activities: 4</p> <p>Players Positions: Standing</p> <p>Grey foam logs: In</p> 
<p>Activities:</p> <ol style="list-style-type: none"> <li>1) Students put multiples on Zillio number side up.</li> <li>2) You will work through the first example together but then students may complete this exercise independently.</li> <li>3) Ask students to find the elevation 27 on each staircase in play. Teach them to use their multiplication skills to find the closest multiple that is less than 27 and then stack additional number of tokens <u>blank side up</u> on top of that step to reach the elevation 27. We use tokens blank side up to emphasize the quantity of additional tokens needed.</li> <li>4) See the 2D chart of Zillio on the next page for what the final result of this activity should look like.</li> <li>5) Move the stacked tokens on two adjacent staircases next to each other at the edge of their steps so students can verify the equivalency.</li> </ol>		<p>Hints:</p> <ul style="list-style-type: none"> <li>• You may not want to put multiples on the 2x and 3x staircases to limit number of tokens in play.</li> <li>• multiple to reach the elevation.</li> </ul>

View of elevations = 27. Numbers preceded by + in this chart indicate the quantity of tokens to be stacked on top of the step of the highest multiple less than 27, but instruct students to any token blank side up.

	27	+3	+2	+3	+6	+3	27	7	+5	+3
26		+2	+1	+2	+5	+2		+6	+4	+2
		+1		25	+1	+4	+1		+5	+3
24	24	24		24	+3	24		+4	+2	24
					+2			+3	+1	
22					+1			+2		22
	21				21			+1		
20		20	20					20		
18	18			18			18			
16		16				16				
	15		15							
14					14					
12	12	12		12						12
									11	
10			10					10		
	9						9			
8		8				8				
6	6			6	7					
			5							
4		4								
	3									
2										

27 = 3x9+0    4x6+3    5x5+2    6x4+3    7x3+6    8x3+3    9x3+0    10x2+7    11x2+5    12x2+3

- 6) Ask students to compare their findings on Zillio to the number sentences recorded in the 2nd column on their worksheets. Ask students to place a check mark next to each number sentence if the number sentence is correct.
- 7) Ask one student to be in charge of rotating Zillio when everyone is ready to look at different staircases.
- 8) Now ask students to remove the stacks of tokens (but not the multiples) when everyone is done checking number sentences equivalent to 27.
- 9) Students should now fill out the worksheet by finding and writing number sentences for 38 and 14. Allow them to stack tokens on the staircases if necessary to help them visualize the solutions.

Observe and Assess:

- 1) Whether students are able to calculate the answers without modeling the problems on Zillio or a 2D worksheet.

Group Discussion & Review of Findings:

- 1) Did students notice any patterns? For example when the interim products are equal, the remainder will always be the same. Direct them to look at staircases/ columns whose interim product = 24.
- 2) If you wanted to express the remainder as a fraction of the next group, what would the fraction be? (The numerator would be the remainder, and the denominator would be the group size (staircase)).

Transition to Paper:

- 1) If desired, place a few problems on the board for the class to solve:
  - a. What are number sentences for 23 grouped by:
    - i. 5's
    - ii. 3's
    - iii. 7's
    - iv. And so on

Date

Name

Write Number sentences = 27		Write Number sentences = 38		Write Number sentences = 14	
When Grouped by:	Number Sentence	When Grouped by:	Number Sentence	When Grouped by:	Number Sentence
1's	$1 \times 27 + 0 = 27$	1's		1's	
2's	$2 \times 13 + 1 = 27$	2's		2's	
3's	$3 \times 9 + 0 = 27$	3's		3's	
4's	$4 \times 6 + 3 = 27$	4's		4's	
5's	$5 \times 5 + 2 = 27$	5's		5's	
6's	$6 \times 4 + 3 = 27$	6's		6's	
7's	$7 \times 3 + 6 = 27$	7's		7's	
8's	$8 \times 3 + 3 = 27$	8's		8's	
9's	$9 \times 3 + 0 = 27$	9's		9's	
10's	$10 \times 2 + 7 = 27$	10's		10's	
11's	$11 \times 2 + 5 = 27$	11's		11's	
12's	$12 \times 2 + 3$	12's		12's	

