Activity B.9: How do Addition and Subtraction Act Like Opposites?

Special Note: This activity can be approached in different ways depending on what skills you want students to practice.

Learning Objectives:

1) Work flexibly with numbers to develop mental math skills.
2) Practice repetitive addition.
3) Pattern recognition.
4) Develop fluency with numbers.

Examples of Skills Accomplished:

1) 7+ 4 = 11; 11+ 4=15
2) 15 – 4 = 11; 11 – 4 = 7

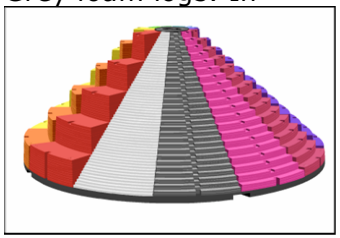
Setup:

1) Staircases can be setup in any order.
2) Using one foam card, randomly select twelve tokens whose value is < 20 and place them number side up on the first step of each staircase in use. If you wish to recreate the example below (see chart) place the following tokens on the first step of each staircase, 1x→12x:
   11, 12, 7, 6, 9, 2, 1, 4, 3, 8, 5
3) Give each student a foam card.
4) Make one copy of a blank 2D worksheet for each student to complete after the lesson.

Maximum Number of Players for Small Group Activities: 4

Players Positions: Seated

Grey foam logs: In



Review:

1) In this activity we are going to use the term variable. Variable means a letter or a symbol that stands for one or more numbers. In this case "n" stands for the number associated with your staircase.

Activities:

1) Assign each student a staircase.
2) Explain that when you placed the tokens on the staircase, you choose the numbers randomly.

Hint:

- Because you have randomly placed the starting numbers on the first step, do not be surprised if the calculated value of some steps would exceed 60. Allow students to stop at that point.

3) Now instruct your students to use repetitive addition skills to climb to the top. Each student should calculate the height of the next step. By adding the variable represented by his/her staircase to the number on the token on the step below.

4) When students have calculated the value of all the steps on their staircase (not to exceed 60), check their work and ask them to correct any errors.

5) Now have the students turn over all tokens on their staircase so that the blank side is up except the token on the topmost (notched) step.

6) Rotate Zillio so that all students are now working on a new staircase.

7) Now have students calculate the value of the step below the topmost step by subtracting the variable from the value on the topmost step. After they have calculated the value, have them turn the token over number side up to see if they are right. Remind them that they must calculate first, then check.

8) See the 2D representation of Zillio, if you chose to use the layout suggestion in the setup.

Partial view of Zillio, for one possible random starting values (given in the setup).

1X	2X	3X	4X	5X	6X	7X	8X	9X	10X	11X	12X
30	39	39		31	33				23		
29											
28	37		31			23					
27		36						22			
26	35										
25				26							
24	33	33	27		27		17				
23											
22	31									19	
21		30				16					
20	29		23	21					13		
19											
18	27	27			21			13			
17											
16	25		19				9				
15		24		16							
14	23					9					
13											
12	21	21	15		15						5
11										8	
10	19			11					3		
9		18						4			
8	17		11				1				
7						2					
6	15	15			9						
5				6							
4	13		7								
3		12									
2	11										
1											

Observe and Assess:

1) Students' repetitive addition skills.

2) Students' subtraction skills.

Group Discussion & Review of Findings:

1) Why were the correct tokens already in place when they performed the subtraction portion of the exercise?

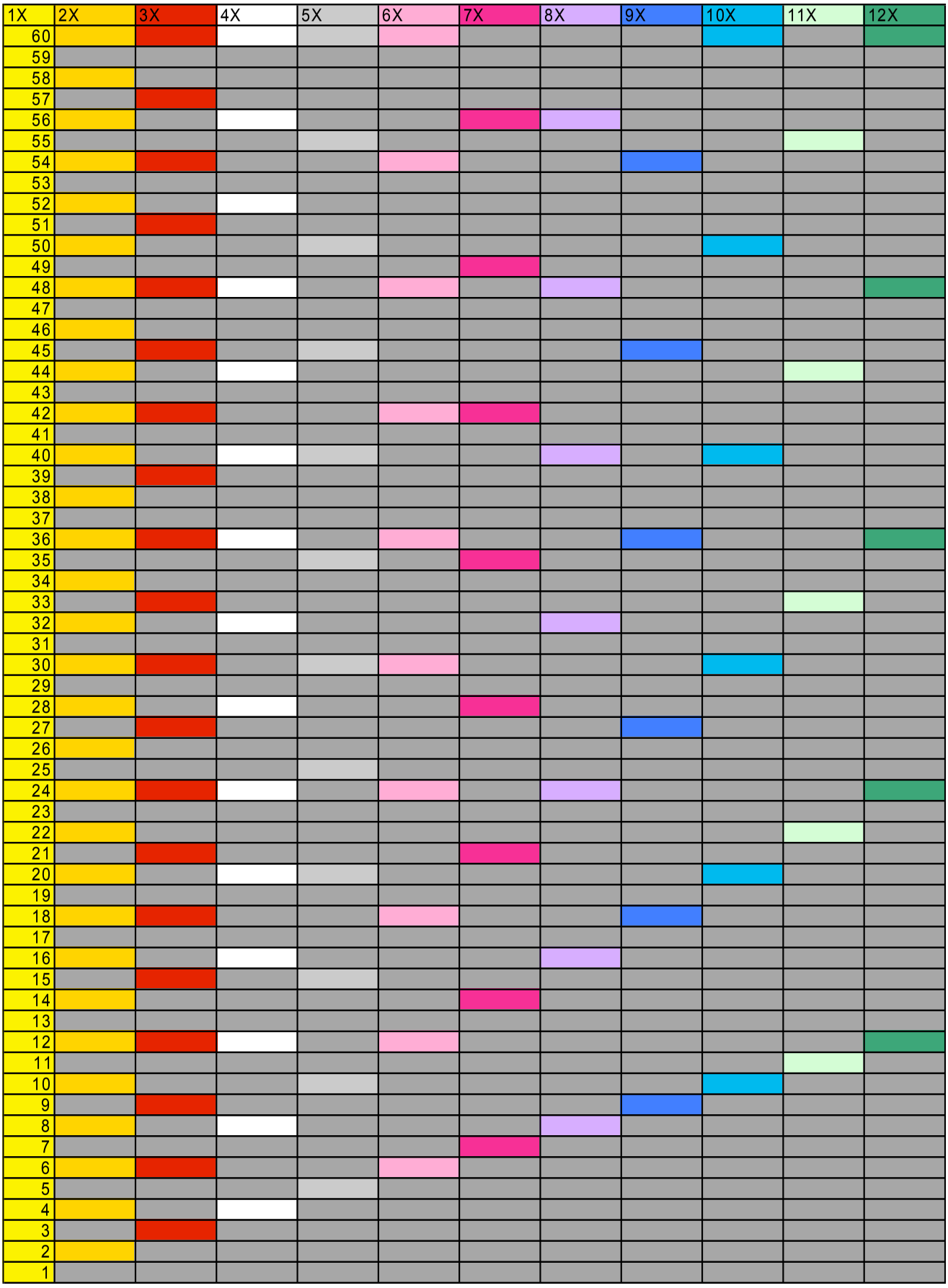
2) Did they notice any patterns on the staircases? You do not need to dwell on patterns at this point because the next lesson will focus on pattern recognition.

Transition to Paper:

1) Give students a 2D worksheet to complete and give them starting positions (numbers between 1 and 15) to write in the first step on each staircase for practice with repetitive addition; or

2) Give students a 2D worksheet to complete and give them starting positions (numbers between 45 and 60) to write in the topmost-notched step for practice with subtraction.

Note: Cut the 2D worksheet in half and enlarge if you children need more space to write.


1X
2X
3X
4X
5X
6X
7X
8X
9X
10X
11X
12X
60
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55
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