Magic multiplication squares

Children complete a magic multiplication square. They then explore factors and multiples to create a new multiplication magic square.

Skills practised:

- Multiplying three numbers choosing appropriate methods
- Finding factors and multiples

Conjecture: *We can use factors and multiples to create a multiplication magic square.*

What to do:

Children work individually or in pairs.

1. Look at this square

1	**12**	**10**
15	**2**	**4**

2. Multiply the numbers along the top row. Write the answer.
3. Multiply the numbers along the second row. Write the answer.
4. This is the magic constant of a multiplication magic square.
   So every row and every column multiply to give this exact same product!
5. Work out the bottom row.
6. Now check all the columns and rows!

Discuss what you notice about the diagonals.

7. Let's try to get a really magic multiplication square! Each row, each column and both diagonals multiply to give the same constant product.
8. Start with this.

12	**1**	**18**
	36	

9. Use these clues to help you create a truly magic multiplication square.
   - The missing numbers are <u>all</u> single-digit numbers.
   - Two of the numbers in the middle row and both the missing numbers in the bottom row are all factors of 12.
   - The remaining number in the middle row is a factor of the number touching its bottom right corner but it is not a factor of the number above it.
10. Check your square is truly magic by multiplying each row, each column AND the numbers along each diagonal.

CHALLENGE: The product in this magic square is itself a cube number. Can you work out its factors to help you find the number cubed?

Aims:

- To use knowledge of number properties and relationships to help with finding missing numbers
- To use mathematical reasoning to solve a logic puzzle

Minimum number of calculations expected

12+

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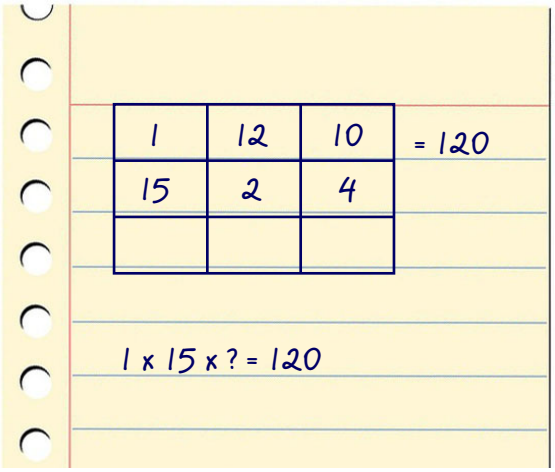
15	2	4



2. Multiply the numbers along the top row. Write the answer.
3. Multiply the numbers along the second row. Write the answer.
   This is the magic constant of a multiplication magic square.
   So every row and every column multiply to give this exact same product!
4. Work out the bottom row.
5. Now check all the columns and rows!

What do you notice about the diagonals?

6. Let's try to get a really magic multiplication square! Each row, each column and both diagonals multiply to give the same constant product.
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9. Check your square is truly magic by multiplying each row, each column AND the numbers along each diagonal.

Challenge

The product in this magic square is itself a cube number. Can you work out its factors to help you find the number cubed?

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