

Add or multiply?

Notes and guidance

In this small step, children explore the fact that the relationship between two numbers can be expressed additively or multiplicatively. For example, the relationship between 3 and 9 can be expressed as an addition ($3 + 6 = 9$) or a multiplication ($3 \times 3 = 9$). Children use this understanding to complete sequences of numbers, deciding whether each relationship is additive or multiplicative.

Children also explore the inverse relationships related to each of these, for example $9 - 6 = 3$ and $9 \div 3 = 3$. Using language such as “3 times the size” and “a third of the size” will support their understanding of multiplicative relationships.

Children will explore these relationships using double number lines and should be encouraged to explore all of the additive and multiplicative links that can be seen.

Things to look out for

- Children may see just additive relationships and not notice the multiplicative relationships.
- Children may not start double number lines from zero.
- When using double number lines, children may focus on the horizontal relationships and not notice the vertical relationships.

Key questions

- How can you describe the relationship between these two numbers using addition/multiplication?
- What is the inverse of addition/multiplication?
- What addition/subtraction/multiplication/division calculations can be written from this information?
- Is the relationship in the sequence additive or multiplicative?
- How do the relationships on the upper number line relate to those on the lower number line?

Possible sentence stems

- _____ \times _____ = _____ and _____ + _____ = _____
- _____ is _____ times the size of _____
- _____ is $\frac{\square}{\square}$ the size of _____

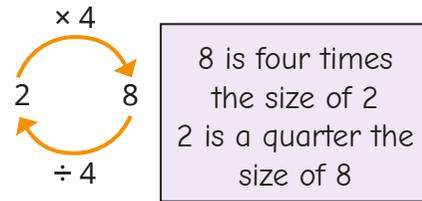
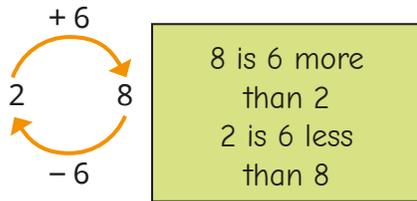
National Curriculum links

- Solve problems involving the relative sizes of two quantities where missing values can be found by using integer multiplication and division facts

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Key learning

- The relationship between 2 and 8 can be described as additive or multiplicative.



Complete the models to show the additive and multiplicative relationships.



Describe the relationships to a partner.

- A sequence starts 3, 6 ...
 - ▶ Explain why the next number could be 9
 - ▶ Explain why the next number could be 12
 - ▶ What could the next number be in these sequences?

5, 10 ...

7, 21 ...

100, 50 ...

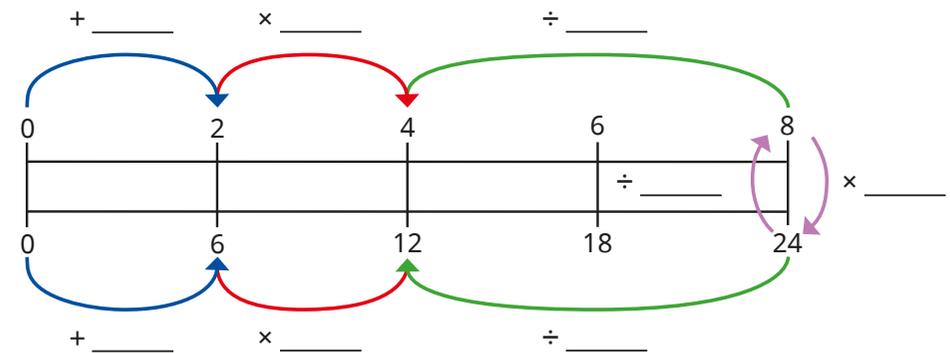
Find two answers for each.

- Complete the sequences.
 - ▶ 4, 8, _____, 32, _____, _____
 - ▶ _____, 14, 21, 28, _____, _____
 - ▶ 1, _____, _____, 27, 81, _____

Are the relationships additive or multiplicative?
Could they be both?

- The double number line shows the relationship between two sets of numbers.

Fill in the missing values to describe the relationships.



What other additive and multiplicative relationships can you see on the double number line?

Add or multiply?

Reasoning and problem solving

6	12	
2	4	8
4	12	20

Each of these sequences can be completed using either addition or multiplication.



Do you agree with Tiny?
Explain your answer.

No

Here are the different options in a pizza shop.

Base	Topping
Thin	Cheese and tomato
Deep pan	Vegetarian feast
	Chicken
	Meat feast

Use both additive and multiplicative reasoning to explain why there are 8 possible combinations of base and topping.

The restaurant introduces a new topping of tuna and sweetcorn.

How many combinations are there now?

How many combinations would there be with 4 base options and 17 topping options?

Did you use additive or multiplicative relationships to work out each answer?

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