

Scaling

Notes and guidance

In this small step, children develop their understanding of multiplication by focusing on scaling as opposed to repeated addition.

Building on concepts such as “3 times as many”, children use language such as “3 times the size of” when comparing, for example, lengths. It is important that children see this type of multiplication as well as repeated addition, as it will help them in their later study of ratio and scales. They can relate this to their knowledge of place value and understanding that the value of the column directly to the left of another is 10 times the value.

Bar models can be useful to represent the concept. String can be used to illustrate the idea of, for example, “twice as long as” and be related to a bar model representation.

Things to look out for

- Children may not be familiar with models of multiplication other than those involving repeated addition.
- Children who are unfamiliar with the vocabulary may think that “3 times as many” means they need to add another three lots, resulting in a scale factor of 4 instead of 3

Key questions

- What number is 10 times the size of _____?
- What number is _____ times the size of _____?
- What length is _____ times as long as _____?
- What time is _____ times as long as _____?
- Which is the larger object? How many times larger is it?
- How can you show the problem as a bar model?

Possible sentence stems

- _____ is _____ times the length of _____
- _____ multiplied by _____ is equal to _____
- _____ times the size of _____ is _____

National Curriculum links

- Solve problems, including missing number problems, involving multiplication and division, including positive integer scaling problems and correspondence problems in which n objects are connected to m objects

Scaling

Key learning

- Complete the sentences to describe the fruit.

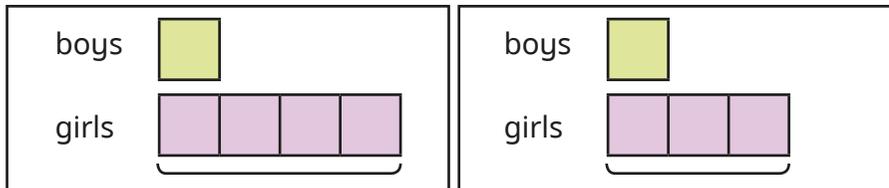


There are _____ bananas.

There are _____ strawberries.

There are _____ times as many strawberries as bananas.

- In a playground, there are 3 times as many girls as boys.



Which bar model shows the number of boys and girls?

Explain your choice.

- Dexter has 2 pencils.

Kim has 5 times as many pencils as Dexter.

How many pencils has Kim got?

- The green ribbon is 6 cm long.

The red ribbon is 3 times as long as the green ribbon.



How long is the red ribbon?

Complete the number sentence.

$$6 \text{ cm} \times \underline{\quad} = \underline{\quad} \text{ cm}$$

- Rosie has a red pencil and a blue pencil.

The red pencil is 2 cm long.

The blue pencil is 4 times as long as the red pencil.

How long is the blue pencil?

- Whitney runs 25 m in 7 seconds.

Filip takes 5 times as long as Whitney to run 25 m.

How long does it take Filip to run 25 m?

Scaling

Reasoning and problem solving

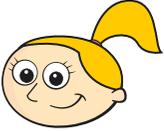
Mo and Eva build towers of cubes. 

Mo's tower



Eva's tower



Mo's tower is 3 times as tall as my tower.  Eva

My tower is 12 times as tall as Eva's tower.  Mo

Who do you agree with?
Explain your answer. 

Eva

Annie has some green and pink counters. 

- There are twice as many green counters as pink counters.
- There are 18 counters altogether.

How many green counters are there?

12

Dani, Amir and Jack are baking. 

- Dani needs 40 g of butter.
- Amir needs 3 times as much butter as Dani.
- Jack needs twice as much butter as Dani.

How much butter do they need altogether?

240 g