

Has difficulty relating multiplying by two to known facts about doubles; records double four as $4 + 4$

Opportunity for: developing mathematical language

Resources

- Interlocking cubes
- Number cards (Resource sheet 1)
- *Doubling cards* (except 'is not') (Resource sheet 33)

Key vocabulary

double	match
multiply by two	double the length
tower	equals

Teaching activity

Time 15–20 minutes

Explain to the child that this activity is going to help them to learn that when they double a number or quantity, it is the same as multiplying by two.

Show the child a tower built of four cubes, all the same colour. Lay the tower on the table. Ask them to find the matching digit card.



Lay a tower of eight cubes, made of two colours, next to the first one. Ask them to find the matching digit card.



Pick up the first tower and place it alongside the second to illustrate that there are two lots of four.

? How many short towers do you need to make the long tower?

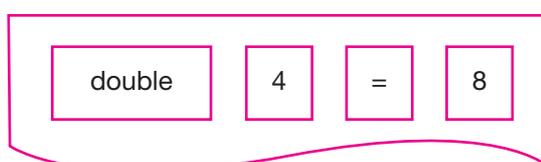
Check whether the child articulates this as 'two' and not 'one more'.

If the child has not identified the multiplying factor as two, but is focused on adding on, repeat the activity, drawing around the short tower twice to model the equivalence of two short towers to make the longer one. Remove the cubes, leaving the drawing and show that the longer tower matches the drawing.



Repeat using short towers of two and three cubes.

Place the 4 and 8 number cards with space between and around them so that the child can choose appropriate vocabulary cards to describe the operation. Lay all the vocabulary cards face up on the table. Ask the child to choose cards to make correct number sentences. Record these as they are created, for example:



? Where do you put the '× 2' (i.e. 'multiplied by 2') and '=' cards to make a number sentence?

$$4 \times 2 = 8$$

If the child is unable to locate the correct positions for the vocabulary cards, ask them to read out the number sentence they think they have created, giving them the opportunity to correct themselves. If they cannot correct themselves, return to the models and lay them on the table to make a picture number sentence.

$$\square \square \square \square \times 2 = \square \square \square \square \square \square \square \square$$

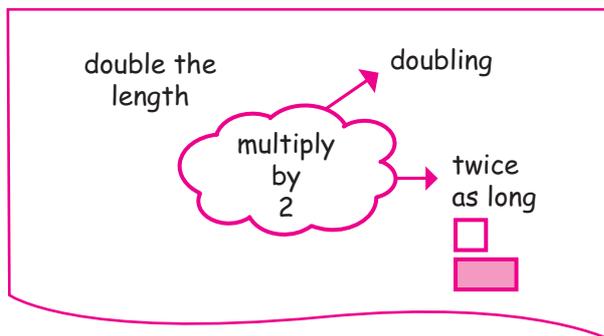
Ask the child to draw a new card from the pack of number cards and make a tower that matches it, and one that is double the length. They also need to choose the number cards to match the two lengths made.

? With your new numbers and your vocabulary cards, make all the number sentences you can for your new towers.

Support the child in recording each number sentence they make.

Repeat the activity with other numbers.

? Have you learnt anything about doubling today that we could write down?



Spotlight 1

Has difficulty relating multiplying by two to known facts about doubles; records double four as $4 + 4$

Opportunity for: estimating and making connections



Money bags

Time 15–20 minutes

Resources

- Two money bags/purses
- Selection of real coins, at least two of each denomination
- 0–40 number line

Key vocabulary

- | | |
|-----------------|--------|
| double | twice |
| multiply by two | equals |

Teaching activity

Explain to the child that this activity is going to help them to learn that when they double a number or quantity, it is the same as multiplying by two.

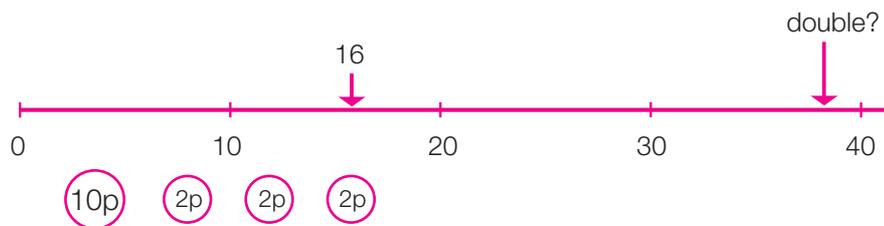
Ask the child to close their eyes and choose four coins from the collection. With eyes open they should then find out the total value of the selected coins. Ask them to put their chosen coins in a money bag/purse.

If the child cannot total the coins, offer a number line to support counting up the coins.

Ask the child to identify the total represented on the number line.



? Mark on the line where you think double the total would be. This is your estimate.



Show on the number line how the original was added to the same amount to make double the amount.

Ask the child to take the coins out of the bag and lay them on the table.

? How can you work out how close your estimate is?

Support the child in matching each of the coins on the table with a same value coin from the original collection.

? What is double the amount of the coins you put in the money bag?

? Where is the double amount on the number line?

Ask the child to put double the amount of money in the money bag/purse.

? How many times the original amount of money is in the money bag/purse now?

Help the child to articulate double the amount in the money bag as:

‘Twice [*the original sum of money*].’

‘[*The original sum of money*] multiplied by two.’

‘We have two lots of each of the coins. We multiplied the coins by two.’

? What did you learn about doubling today? What could we add to your concept map?

Spotlight 2

Has difficulty relating multiplying by two to known facts about doubles; records double four as $4 + 4$

Opportunity for: reasoning about measures



On the line

Time 10–20 minutes

Resources

- Two 0–30 number lines
- Number cards 0–9 (Resource sheet 1)

Key vocabulary

- | | |
|-----------------|-------------------|
| double | match |
| multiply by two | double the length |
| tower | equals |

Teaching activity

Explain to the child that this activity is going to help them to learn that when they double a number or quantity, it is the same as multiplying by two. Ask the child to select a number card and mark the number which they have chosen on one of the number lines.

Indicate the distance along the number line defined by the chosen number card, using the distance between thumb and first finger.

? What is double the distance along the line?

? What is twice the distance along the line?

? Is there another way of asking this question?

Help the child to show double by using the distance between thumb and finger twice. Make marks on a number line to show the original distance and double the distance. Make the comparison between the two.

If the child is not clear about the connections between doubling, finding twice as much multiplying by two, take one of the number lines. Choose a digit. Fold the line at the marked point defined by the chosen digit and mark the position of double the original length:



continued

Place a corresponding number line underneath and identify the point at which the edge of the original line finishes.

- ? What is double the distance along the line?**
- ? What is twice the distance along the line?**
- ? What is another way of asking this question?**

Repeat the activity by getting the child to use different starting digit cards and show where:

- twice the number;
- double the number;
- the number multiplied by two;

will be on the number line, by folding and marking the position of the doubled number.

? Is there anything we could add to your concept map about doubling and multiplying by two?

Spotlight 3

Has difficulty relating multiplying by two to known facts about doubles; records double four as $4 + 4$

Opportunity for: exploring mathematical language

.....

Double drinks

Time 10–20 minutes

Resources

- Jug of coloured water
- Measuring cylinder or straight-sided clear containers
- Empty cups (of the same type and size)
- Marker pen to write on glass
- *Doubling cards* (Resource sheet 33)

Key vocabulary

- | | |
|---------------------|-------------|
| double | two lots of |
| multiply by two | not |
| double the quantity | twice |

Teaching activity

Explain to the child that this activity is going to help them to learn that when they double a number or quantity, it is the same as multiplying by two.

Fill two cups with coloured water and pour each one individually into a measuring cylinder.

? Where do you think the liquid will reach if you pour in double two cups?

Support the child in using their fingers to estimate the new height of the coloured water, and mark it on the side of the cylinder with a pen.

? How did you choose where to put the mark?

Ask the child to pour in some more coloured water to double the amount in the measuring cylinder.

Place the vocabulary cards face down on the table and ask the child to turn over a card.

? Tell me what we have just done. Try to make sure you use the word(s) on the card you've chosen.

Encourage the child to turn over another card and explain using the new word as part of their explanation.

Repeat the activity using different numbers of cups of coloured water each time.

? Did you learn anything new today that we can add to your concept map?

Spotlight 4

Has difficulty relating multiplying by two to known facts about doubles; records double four as 4 + 4

Opportunity for: solving real-life problems



Plenty of time

Time 10–20 minutes

Resources

- Teaching clock (analogue)
- Activity cards (Resource sheet 34)
- Mini whiteboard and pen

Key vocabulary

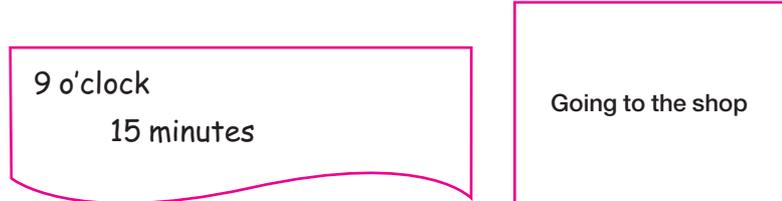
- | | |
|-----------------|-------------------|
| double | match |
| multiply by two | double the length |
| tower | equals |

Teaching activity

Explain to the child that this activity is going to help them to learn that when they double a number or quantity, it is the same as multiplying by two.

Ask the child to choose a card from the activity card pack. According to the activity selected, decide upon a suitable start time (on the hour, half-hour or quarter-hour) and a suitable length of time for the activity (in multiples of a quarter-hour).

Write the start time and the length of the activity on the whiteboard for reference alongside the selected activity card, for example:



Support the child in showing the start time on the clock. Ask the child to watch as you move the hand to the finish time.

Explain that Tim always takes a long time: always double the time his brothers and sisters take (we could say ‘he takes twice as long’). Ask the child to show how long Tim would take by turning the hands of the clock.

? What time will Tim finish [insert relevant activity]?

If the child finds this too challenging, use examples that start and finish on the hour.

Repeat using other activity cards, or get the child to choose activities (and start times and durations, if appropriate).

? Can you give me a sentence that includes ‘twice as long’?

Spotlight 5

Has difficulty relating multiplying by two to known facts about doubles; records double four as $4 + 4$

Opportunity for: explaining and discussing

Double it

Time 15–20 minutes

Resources

- Card strips of different lengths, for example 3 cm, 6 cm, 2 cm, 4 cm, 8 cm, 5 cm, 10 cm (two or three of each)
- *Doubling cards* (Resource sheet 33)
- Number cards (Resource sheets 1 and 2)
- *Dotty cards* (Resource sheet 9)
- Cubes
- At least one other child

Check: does the child use key vocabulary?

- | | |
|-----------------|-------------------|
| double | double the length |
| multiply by two | equals |
| tower | is not twice |
| match | |

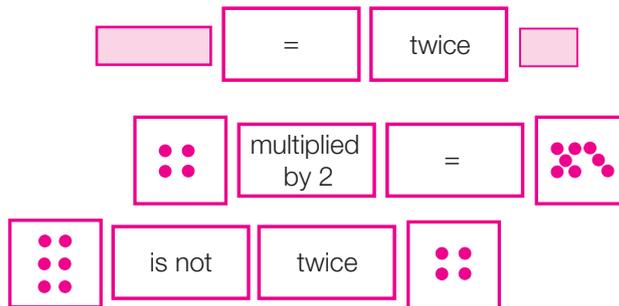
Teaching activity

‘We are going to play a game, **Double it**, today. It is about doubling being the same as multiplying by two.’

Put the card strips, cubes, dotty cards and number cards face up on one side of the table, and the vocabulary cards on the other side. The game is intended for cooperating pairs, but children could race each other.

How to play

1. Players take a vocabulary card which they think they can make a sentence with, for example, ‘multiplied by 2’.
2. They then select a card strip, dotty card, cube ‘train’, or number card to make a ‘picture’ number sentence, for example:



Continue the activity, checking the players’ understanding by asking them to explain their picture sentences.

Variations

- Use only number cards and try some larger numbers.
- Race to make three sentences in 5 minutes.

Learning outcomes

By the end of this set of activities children should be able to:

- tackle related learning tasks with increased motivation and confidence;
- use and understand connected mathematical vocabulary;
- make the link between doubling and multiplying by two;
- record number sentences using double or multiply by two interchangeably.