

Has difficulty with identifying doubles and adding a small number to itself, for example $2 + 2$, to make twice as many

Opportunity for: reasoning about numbers

Resources

- Dominoes
- Round counters
- Ordinary six-sided dice
- Number cards (Resource sheets 1 and 2)
- + and = cards (Resource sheet 8)

Key vocabulary

- double
- adding a number to itself

Teaching activity

Time 10–15 minutes

Explain to the child that you are going to do an activity with dominoes and it will help them to find out more about doubles.

? Tell me what you think 'a double' means.

Talk about familiar uses of the word 'double', for example a double-decker bus, a double bed, a double-breasted jacket.

Invite the child to lay out the dominoes, face up.

? Can you find any doubles dominoes?

If the child finds this difficult, pick out a couple of doubles and support the counting of the dots, clarifying that each part of the domino has the same number of dots, making a double.

? I've got double three and double two here. Can you find another double?

If the child is struggling, put away most of the dominoes, leaving the doubles and a few others. Find a non-double and explain how the number of dots is different on each part of the domino. Compare this with a double.

? Why is this domino a double? Why is this not a double?

When you have all the doubles, count the dots to clarify that the double two has two dots then another two dots.

If the child is struggling with this, use round counters to lay out the dot patterns, carefully copying the domino pattern and counting how many counters are in each pattern.



'Three added to itself, three add three. Double three is six dots altogether.'

You could put the dominoes in order from double one to double six. You might choose to leave out double zero.

With number cards and + and = cards, and/or with paper and a pen, make some doubling number sentences.

? This domino is two and another two. How shall I write that to make a number sentence?

Encourage the child to tell you what to write.

Double 2 is 4

$2 + 2 = 4$

? Now can you choose a double domino and use these cards to make a number sentence?

Support the child in making the sentences with cards (or with you recording them) for as many of the numbers as you can while the child is able to concentrate. Encourage the child to use the language explaining 'a double is a number added to itself'.

Demonstrate using counters again.

? If I have four counters and then three counters next to them, does that make a double? How could you make it a double? Which of our number sentences goes with that double?

If the child is struggling with the number sentences, model them in a different way, for example with fingers, cubes or bottle tops. 'I've put out four cubes. Now you make that into double four.'

Let the child throw a dice and tell you the number of dots, and then work out the double of that any way they choose.

This might be a good time to ask the child to record what they have done in any way they choose. This can give you an insight into how they are thinking.

? Can you tell me what you were thinking when you drew it that way?

If the child is struggling, you could turn the task into a game where you throw the dice but say the double number wrongly. For example, if you throw a three, put out another four counters and say 'double four is eight', encouraging the child to point out that the dice only showed three dots, so you didn't make a double.

Help the child to say the doubles up to double six, making the number sentences to match.

? What did you learn today?



You could display the doubles sentences for a few days and add some more challenging ones for the whole class, particularly double twenty-five, thirty, fifty and a hundred. Ask who can say what a double is, aiming to get a response such as: 'to double a number you add a number to itself'.

Borrow lots of boxes of dominoes for wet playtimes and plan a class tournament.

Spotlight 1

Has difficulty with identifying doubles and with adding a small number to itself, for example $2 + 2$, to make twice as many

Opportunity for: developing mental images

Double Dudley

Time 10–15 minutes

Resources

- Dice and/or number cards to suit the child (Resource sheets 1 and 2)
- Bag or box
- Cubes or sweets

Key vocabulary

- double
- adding a number to itself

Teaching activity

Explain that today you are going to play a game called **Double Dudley** which will help them to learn more about doubles. Throughout the activity it would be helpful to ask the child about the pictures they have in their mind.

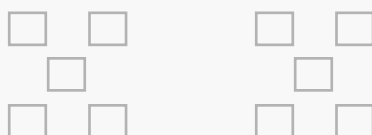
Each player needs to write down the numbers that are possible with the cards/dice they are using, so for cards 4–10 there are seven possible numbers to double.

Possible doubles						
4	5	6	7	8	9	10

How to play

1. The aim of the game is to throw the dice, or take a number card out of a bag (so it isn't possible to see numbers until they are taken out), and say double that number as quickly as possible. (Putting the card back in the bag makes the game last longer and keeps the same degree of chance.)

Support any numbers which the child is unsure of with cubes or sweets, laying out the doubles clearly.



? If you shut your eyes, can you see a picture of five added to another five?


2. At the end of their go, the player ticks the number they doubled. The winner is the first player to tick all their numbers. (So there is a large element of luck.)

Encourage the child to 'see' the picture of the cubes in their head.

? What did you do to work that out?

Variation

- Other doubles to practise include fifteen, eighteen, twenty, twenty-five and fifty.

 When the child is confident with doubling all the numbers fairly quickly, you could invite another child to play. This can be a class game in small groups. You can keep to the same rules at first, but adapt the game as confidence grows so that the winner is the child who says the double first. That child wins a point if they are correct.

Spotlight 2

Has difficulty with identifying doubles and with adding a small number to itself, for example $2 + 2$, to make twice as many

Opportunity for: reasoning about quantities

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Twice as much as Twiggy

Time 10–15 minutes

Resources

- Two pieces of ribbon or string, one half the length of the other
- Scrap paper
- Scissors
- Sticky tape
- Two beakers
- Jug of coloured water

Key vocabulary

about twice as much
about twice as long/high

Teaching activity

If you want to, you can set this activity in the context of twins, Twiggy and Tiny. Twiggy always wants twice as much of everything as Tiny.

‘At the end of the activity I am going to ask you what you learned about “twice as much”.’

? Can you tell me which bit of ribbon/string is twice as long as the other bit? So which bit would Twiggy want?

If the child struggles with that, lay both bits alongside each other and demonstrate how you can fit two of the shorter bits against the longer one.



Support the child by talking about how ‘you need two of the shorter bits to make the same length as the longer bit’, and ‘the longer bit is twice as long as the shorter bit’.

With the two empty beakers, invite the child to put a small amount of water in one beaker for Tiny and about twice as much in the other for Twiggy.

If the child needs more help with ‘twice as much’ quantities, try cutting a short paper strip and ask the child to estimate about how long another strip would have to be to be twice as long.

Put a longer paper strip on a door with sticky tape and ask the child to put their hand about where a strip would come if it was twice as high.

? What did you learn today about ‘twice as much’?

Spotlight 3

Has difficulty with identifying doubles and with adding a small number to itself, for example $2 + 2$, to make twice as many

Opportunity for: developing mental images

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Hungry Horatio

Time 10–15 minutes

Resources

- Cubes, bricks
- Modelling material to make model sausages

Key vocabulary

double
adding a number to itself
about twice as much

Teaching activity

You can set this activity in the context of Hungry Horatio, who always eats twice as much as his brothers and sisters. The activity will be about finding twice as much of several things.

‘Let’s pretend these are sausages. Everyone has three sausages, but Hungry Horatio wants twice as many.’

? What number is twice as much as three?

Support the child by reminding them of doubling. Say that we need three and another three. If we add three to itself we end up with twice as many; that is, six.

If the child needs more help, repeat the activity with cubes – brown ones for buns, white ones for sandwiches, red ones for apples, and so on, using numbers to suit the child.

? If Horatio’s brothers and sisters each have ten cherries, how many will Horatio want?

? Can you show me how you are working that out?

Encourage the child to ‘see’ pictures in their mind and to use the key vocabulary (above).

‘Horatio’s little brother is six today and has six candles. When it is Horatio’s next birthday he will be twice that age.’

? How many candles will Horatio have?

? Can you make a picture of them in your head?

If the child is finding it hard to make pictures in their head, suggest that they make a drawing of what they are doing. Then ask them to close their eyes and try to see the drawing in their head. When children make their own recordings it can give us insight into what they are thinking.

? What can you tell me about the word ‘double’ and the phrase ‘twice as much’?

Spotlight 4

Has difficulty with identifying doubles and with adding a small number to itself, for example $2 + 2$, to make twice as many

Opportunity for: investigating a pattern

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Calculator quits

Time 10–15 minutes

Resources

- Circles of coloured paper or plates
- Cubes, some of them in twos and others in tens 'trains' (or other support for counting on)
- Large clear calculator
- Wipe-clean number line
- 100-square

Key vocabulary

double
adding a number to itself

Teaching activity

'This activity is going to be about doubling numbers and we are going to see if we can make some really big numbers.'

Lay out some of the circles and put two cubes on the first one.

? **What number is double two?**

? **How did you work that out?**

? **Can you write four on that circle?**

If the child struggles with the doubling, remind them of a domino with two dots on each part, making four dots altogether. 'So double two is four. Four is twice as much as two.'

Continue by asking the child to double four, and so on, counting out the cubes in twos and putting the cubes on the plates.



Once the child starts to find the numbers more challenging, use tens 'trains' of cubes (or any other equipment which the child is used to) to aid at least one calculation beyond their usual limit, and also show the 'jump' on a number line.

Try not to rely on the child counting cubes in ones because this can lead to long-term difficulties with larger numbers. Focus on the jump of ten from sixteen to twenty-six, reminding the child about adding ten on a 100-square.



‘Sixteen and another sixteen is thirty-two.’

Once the numbers are as large as you think the child can cope with, the child can ‘quit’ after writing down the last number they could make, for example thirty-two, and they can use a calculator to find the next few doubles. Observe the child very carefully as they use the calculator.

? Can you show me how to find double thirty-two on a calculator?

Focus on needing to add a number to itself to find a double.

(32 + 32 = 64)

? Do you know another way to find twice as much as thirty-two on a calculator?

Don’t worry if they don’t! It might be interesting to see if any come up with thirty-two multiplied by two.



Challenge the class to go on with this doubling chain and display the numbers. Some can start with three and do a doubling chain. This can make an interesting homework challenge for parents to join in.

Spotlight 5: a learning check

Has difficulty with identifying doubles and with adding a small number to itself, for example 2 + 2, to make twice as many

Opportunity for: explaining and discussing

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I can double

Time 10 minutes

Resources

- A range of things to double that haven’t been used in other activities, for example coloured string or knitting wool, different coins, cups and plastic teapot, small toys
- Scissors

Check: does the child use key vocabulary?

- double
- adding a number to itself
- about twice as much/long/high

Teaching activity

‘Look at all these things. I want you to show me how you can double things. Choose something to start with.’

If the child isn’t responding well, choose something like 1p coins, or some things to count.

Let the child explain what they are doubling.

? I’ve got three frogs here. How many frogs would be double three?

? If your brother had four pence and you had double that, how many pence would you have?

Establish that would be eight pence and put out the coins.

? Who had twice as much, you or your brother?

? Can you put out the coins for double nine pence? Double twelve pence?

? **What do you think is the largest number you can double?**

If the child sticks with quite small numbers, suggest doubling fifty, or a hundred, or a thousand, or a million.

? **Can you explain to me what a double is?**

? **Do you have a favourite way of finding a double in your head?**

? **How could you write a number sentence for doubling ten?**

Move on to finding double quantities.

? **Can you cut a bit of wool as long as your hand and another bit about twice as long?**

? **Can you put some water for me in this teacup and put about twice as much for you in that one?**

? **Can you explain to me what you did to find twice as much?**

? **Which bits of our work on doubling do you think you did really well?**

? **Is there anything about doubling that you would like more help with?**



It can be difficult to find doubles of quantities in balance scales, but you can challenge children to find two books that weigh about as much as one larger book, or two objects that balance one larger one. (Take care, though, not to say that large things weigh more. Remember to show children that a small pebble can balance a large piece of polystyrene.)

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;
- identify a double as a number added to itself;
- know some doubles of numbers by heart;
- write a simple doubling number sentence;
- understand how to find double or twice as much of quantities;
- solve practical problems with doubling.