

Dr Fog Presents

Developing a doubling - and - addition method of doing multiplication

Year 5 (National Numeracy Strategy)
(Based on DFEE Sample Lessons)



Resources

- None!



Mental Learning Objective

- I can practise my multiplication facts.



Mental Learning Task

- Today you are going to develop the doubling method and multiplication.



Mental Learning Task

- Start by doing some repeated doubling with the class.
- Start with a single-digit number.
- Send it round the class.
- Each person doubling the last answer.
- See how high the class can go.
- When someone gives up, start again.



Mental Learning Objective

- I can practise my multiplication facts.



Main Learning Objective

- I can develop my pencil and paper methods to record, explain and support the multiplication of two-digit numbers.



Key idea

**One way of multiplying
is to use repeated
doubling and addition.**



Main Learning Task

- Today we are going to combine repeated addition and repeated multiplication.



Main Learning Task

- The method is based on two assumptions:-
- Firstly that multiplying by two (or doubling) is relatively easy.
- Everyone knows how to add.



Main Learning Task

$$57 \times 21$$

Get the pupils to help you double 57 repeatedly and write results on the board.



Main Learning Task

57 x 21

$57 \times 1 =$

$57 \times 2 =$

$57 \times 4 =$

$57 \times 8 =$

$57 \times 16 =$

21 lots of 57 is the same as :

16 lots of 57 added to
4 lots of 57 added to
1 lot of 57.

This is because.....

$$21 = 16 + 4 + 1$$

Main Learning Task

57 x 21

$$57 \times 1 =$$

$$57 \times 2 =$$

$$57 \times 4 =$$

$$57 \times 8 =$$

$$57 \times 16 =$$

So I could find out
that 57×21 was the
same as adding

$$57 \times 16 = 912$$

$$57 \times 4 = 228$$

$$57 \times 1 = 57$$

So adding them
together makes 1197

Main Learning Task

- This works for any multiplication.
- It is usually quickest to build up the smaller number and double the larger one.
- So what is 19 lots of 57...



Main Learning Task

What is 19 lots of 57?

$$57 \times 1 = 57$$

$$57 \times 2 = 114$$

$$57 \times 4 = 228$$

$$57 \times 8 = 456$$

$$57 \times 16 = 912$$

Main Learning Task

What about 23 lots of 57

$$57 \times 1 = 57$$

$$57 \times 2 = 114$$

$$57 \times 4 = 228$$

$$57 \times 8 = 456$$

$$57 \times 16 = 912$$

Main Learning Task

What about 36 lots of 48

$$48 \times 1 =$$

$$48 \times 2 =$$

$$48 \times 4 =$$

$$48 \times 8 =$$

$$48 \times 16 =$$

$$48 \times 32 =$$

Main Learning Task

What numbers add to 36?

$$48 \times 1 =$$

$$48 \times 2 =$$

$$48 \times 4 =$$

$$48 \times 8 =$$

$$48 \times 16 =$$

$$48 \times 32 =$$

Main Learning Task

- Are there any simple checks we could do?
- What about looking at the digit each time.
- Is there is a pattern beginning to repeat itself?



Main Learning Task

- We are now going to try to complete some sums by doubling.
- You can tackle these problems in any order.



Main Learning Task

- Simplification:-
- Choose problems where one of the numbers looks fairly easy to double such as

$$9 \times 12$$

$$14 \times 15$$

$$13 \times 11$$



Main Learning Task

- Challenge:-
- Children make up their own two-digit or three-digit problems.



Main Learning Task

• Solve these problems:-

• Simplest: 9×12 14×15 13×11

24×12 36×15 75×36

22×44 32×25 84×73

22×534

35×653



Main Learning Objective

- I can develop my pencil and paper methods to record, explain and support the multiplication of two-digit numbers.



Plenary

- Discuss the doubling - and - addition method with the pupils.
- Did you find this method easy?
- Do you think you could teach it to someone else?
- Would it still work with much larger numbers?



Plenary

- Invite one or two pupils up to the board to show their workings for one of the problems.
- This provides a comparison to the rest of the class.



Review of Key Idea

- One way of multiplying is to use repeated doubling and addition.
- Did you learn how to do this today?



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