

## Describes the operation of multiplying by ten as 'adding a nought'

*Opportunity for: investigating numbers*

### Resources

- Interactive Teaching Program (ITP) – *Number Grid*, or paper copy of 100-square
- Coloured pens
- *Place value chart* (Resource sheet 39)
- Place value (arrow) cards
- Number cards 1–100 (Resource sheets 1, 2, 3, 4, 5, 6 and 7)

### Key vocabulary

how many times?	group
multiply by ten	digit
lots of	row
move one place to the left	

### Teaching activity

**Time** 20 minutes

Explain to the child that they are going to find out more about what happens to the digits of a number when multiplying by ten.

Using the ITP *Number Grid*, display a 100-grid.

With the child, count out loud in ones – highlighting the numbers as you count – until you have counted 'ten lots of one' (i.e. ten).

Repeat this activity with two, three and four (i.e. twenty, thirty, forty).

**? Can you predict which number will be the answer to ten lots of five, six, seven, eight, nine?**

If the child answers correctly, move on.

If the child doesn't understand or answers incorrectly, repeat the highlighting activity with some of these numbers to check the answers and reinforce understanding.

Have pre-prepared numbers 1–9 and 10–90 set out as indicated below, lining up the units, or use the place value chart on Resource sheet 39.

Look together at those pairs of numbers already explored, for example, two and twenty, four and forty.

Remind the child that the numbers in the second row are ten times bigger than those in the first row.

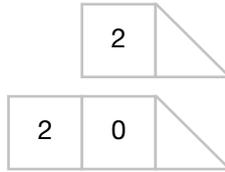
1	2	3	4	5	6	7	8	9
10	20	30	40	50	60	70	80	90

**? What has happened to the '2' digit on this row (pointing to the tens row)?**

If the child answers correctly, move on.

If the child answers incorrectly, repeat with other examples to ensure that they see the pattern and know that the digits always shift one place to the left when a number is multiplied by ten.

Now model with place value cards to reinforce understanding of the rule that when we multiply by ten all the digits move one place to the left. For example, select 2 and 20:



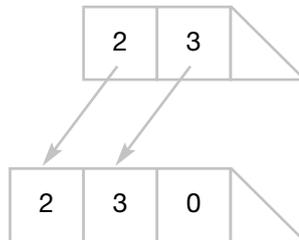
Position the twenty below the two, lining up the arrow heads.

Ask the child to choose a different single-digit number and the number which is ten times bigger, setting them out as shown above.

**? Now that you know a way of multiplying any number by ten, can you tell me the answer to twenty multiplied by ten?**

Ask a range of questions, for example: seventy times ten; nine lots of ten; the answer to thirty multiplied by ten, and so on.

Select a tens and a units place value card, for example 20 and 3. Combine them to make the number 23 and then multiply the number by ten. Emphasise that the digits move one place to the left.



Ask the child to make further two-digit numbers and multiply each by ten, for example  $34 \times 10$ ,  $86 \times 10$ .

At each stage, ask the child to explain what happens to the digits when the number is multiplied by ten.

If the child understands, move on to three-digit numbers.

Repeat the process, asking the child to make a three-digit number and then multiply it by ten, for example  $123 \times 10$ ,  $287 \times 10$ ,  $789 \times 10$ .

Further examples can be carried out at home.

**? What did you enjoy today?**

**? What is very important for us to remember for next time?**

# Spotlight 1

Describes the operation of multiplying ten as 'adding a nought'

*Opportunity for: recognising relationships*

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## Non-musical chairs

**Time** 10–15 minutes

### Resources

- Three chairs
- A4-size number cards 1–9
- Two A4-size 0 cards
- Place value (arrow) cards

### Key vocabulary

- |                            |         |
|----------------------------|---------|
| how many times?            | lots of |
| multiplied by ten          | group   |
| move one place to the left | digit   |

### Teaching activity

'We're going to do an activity with these chairs about multiplying by ten. One chair will be the "units chair" and another will be the "tens chair".'

Ask the child to choose a card from the 1–9 number cards, for example 4.

Then ask them to sit on the 'units chair', displaying their card.

#### ? What happens if we multiply that number by ten?

Reinforce the knowledge that the digits shift one place to the left when we multiply any number by ten.

If the child is unable to answer correctly, use place value cards to reinforce the process.

Ask the child to demonstrate their answer (40) by selecting a 0 card and placing it on the units chair, and then sitting in the correct place, that is, on the tens chair.

#### ? What happens if we multiply the new number by ten?

Again reinforce the knowledge that the digits shift one place to the left when we multiply any number by ten.

#### ? What did you learn today?



Play the game with the whole class, going on multiplying by ten up to a million.

## Spotlight 2

Describes the operation of multiplying ten as ‘adding a nought’

*Opportunity for: making mathematical connections*



### Chairs again

**Time** 10–15 minutes

#### Resources

- Three chairs
- A4-size number cards 1–9
- Two A4-size 0 cards
- Place value (arrow) cards

#### Key vocabulary

- |                            |       |
|----------------------------|-------|
| how many times?            | group |
| multiply by ten            | digit |
| lots of                    | row   |
| move one place to the left |       |

#### Teaching activity

‘Today we’re going to do that activity with the chairs again, so that we can learn more about multiplying by ten. But today we are going to work with two-digit numbers so we will need a “hundreds chair”.’

#### **? Can you remember what a two-digit number is?**

Ask the child to choose two cards from the 1–9 number cards, for example 4 and 2.

Then ask them to put one of the cards on the ‘units chair’ and the other on the ‘tens chair’, for example 4 on the ‘tens chair’ and 2 on the ‘units chair’.

#### **? What two-digit number have you made?**

#### **? What happens if we multiply that number by ten?**

Reinforce the knowledge that the digits shift one place to the left when we multiply any number by ten.

If the child is unable to answer correctly, use place value cards to illustrate the process.

Ask the child to demonstrate their answer (420) by selecting a 0 card and placing it on the ‘units chair’, and moving the 2 to the ‘tens chair’ and the 4 to the ‘hundreds chair’.

#### **? What happens if we multiply another two-digit number, for example seventy-four, by ten?**

Reinforce the knowledge that the digits shift one place to the left when we multiply any number by ten.

#### **? What was the same about multiplying two-digit numbers by ten and what we did last time multiplying one-digit numbers by ten?**

# Spotlight 3

Describes the operation of multiplying ten as 'adding a nought'

*Opportunity for: reasoning; deciding whether answers are reasonable*



## Bingo

**Time** 10–20 minutes

### Resources

- *Bingo! game sheet* (Resource sheet 38)
- Place value (arrow) cards (optional)

### Key vocabulary

- multiplied by ten
- digit
- move one place to the left

### Teaching activity

'We're going to play a **Bingo** game today, so that you will learn more about how the digits move when you multiply by ten.'

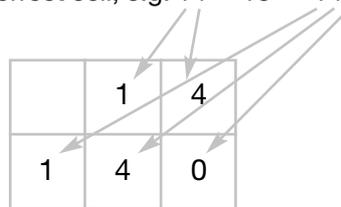
The grids of numbers and a set of recording grids can be found on *Bingo! game sheet* (Resource sheet 38).

First demonstrate the activity, explaining that numbers in the right-hand grid are numbers from the left-hand grid multiplied by ten, but muddled up!

The child should then work either individually or with you.

### How to play

- 1 Select a number from the left-hand grid on the *Bingo! game sheet* and record it in the first row of the recording grid. Ensure that each digit of the number is entered in the correct cell.
2. The player then multiplies their number by ten and checks their answer by finding the match in the right-hand grid. The answer is then recorded in the second row of the recording grid, ensuring that each digit of the number is entered in the correct cell, e.g.  $14 \times 10 = 140$ :



If the child has difficulty, supplement the activity with further examples using place value cards.

3. Correct answers are shaded or crossed out on the right-hand grid. You could challenge the child to get from the left to the right, or make a pattern.

Reinforce the process of digits shifting one place to the left when a number is multiplied by ten.

**? There is something very important that happens to the digits when we multiply by ten. Can you remember what it is?**

## Spotlight 4

Describes the operation of multiplying ten as 'adding a nought'

*Opportunity for: recognising patterns*

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**On the calculator**

**Time** 10–15 minutes

### Resources

- Calculators

### Key vocabulary

- |                  |         |
|------------------|---------|
| multiply by ten  | zero    |
| move to the left | predict |

### Teaching activity

'Today we are going to make some patterns on the calculator by multiplying by ten, a hundred and a thousand.'

**? If you enter 4 on the calculator and multiply it by ten, what do you predict the answer will be?**

Follow on from what the child says. Try several examples of multiplying by ten, talking about the zeros and the number moving to the left.

**? What do you think will happen if we multiply the number by a hundred? What about a thousand?**

Record with the child:

$9 \times 10 = 90$ $9 \times 100 = 900$ $9 \times 1000 = 9000$
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Try several examples and, if you have time, you might want to explore with the child what happens if you key in:

- 9000 and divide by a thousand
- 900 and divide by a hundred
- 90 and divide by ten

If the child is struggling with this, give them much more time and opportunity to explore multiplying and dividing on a calculator, encouraging this to be a task to do at home.

**? What did you enjoy today? Are you getting better at multiplying by ten?**

# Spotlight 5: a learning check

Describes the operation of multiplying ten as 'adding a nought'

*Opportunity for: discussing and explaining*

## Move left

**Time** 15–20 minutes

### Resources

- Two sets of number cards 1–9 (Resource sheet 1)
- Two sets of cards saying  $\times 10$ ,  $\times 100$  and  $\times 1000$  (all the same size)
- Lots of 0 cards
- At least two children
- Large score charts (see below), big enough for the number cards to fit
- Timer
- Calculators to help with scoring

### Check: does the child use key vocabulary?

- how many times?                      group
- multiplying by ten                      digit
- lots of                                      row
- move one place to the left

Score chart					
Total:					

## Teaching activity

'This is a game called **Move left**, and it will help you to get much better at multiplying by ten.'

The game can be played cooperatively in pairs, or children can see who gets the highest score, or you could set a timer so that the child or pair can try to beat their best time.

Place the number cards in one face-down pile and the multiplying cards in another face-down pile.

### How to play

1. Each player or pair takes a number card from the face-down pile, for example 6. This is placed in the first row in the right-hand space on the score chart.
2. Then each player takes a multiplying card from the face-down pile, for example  $\times 100$ .
3. Each player or pair now multiplies their one-digit number by their multiplying card number (in this example,  $6 \times 100$ ). They then move their 6 card to the left and put in two 0 cards in the empty columns.
4. Each player or pair can record their answer, 600 in this case, or just leave their cards on the score card.

5. Then each player takes two number cards and places these in the second row, making a two-digit number. Again, they take a multiplying card and move the two number cards left, putting in 0 cards.
6. Then each player takes three number cards to make a three-digit number and multiplies that by taking another multiplication card.
7. Then they add up their score (using a calculator if necessary).

#### *Variations*

- Play to see who can get the lowest score.
- Play the other way around. Call it 'Move right' and start with the number cards at the right and lots of zeros and have 'divide by' cards, such as  $\div 10$ ,  $\div 100$ ,  $\div 1000$ .

#### *Learning objectives*

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;
- describe the effect on the digits of multiplying a number by ten;
- understand why whole numbers multiplied by ten have a zero in the units position.