# N2.5 Decimal notation and place value

- Read and write whole numbers in figures and words.

- Understand and use decimal notation and place value.

- Count on in steps of 0.1 and 0.01.

## starter

**Vocabulary**
value
digit
zero
nought

**Resources**
mini-whiteboards

Write 87 063 on the board. Ask the class to read the number aloud in words. Discuss the value of different digits.

**Q   What is the value of the digit 6? Of the 8?**

**Q   Why is there a zero or nought in the hundreds column?**

Explain that 'zero' and 'nought' are used interchangeably, and that the zero is used as a place holder.

**Q   What number is 100 more than 87 063? 100 less than 87 063?**

Talk through writing 86 963 in an expanded form. Use this to help correct any errors in pupils' answers.

$$86\,963 = 80\,000 + 6000 + 900 + 60 + 3$$

Now ask pupils to write these numbers in figures on their whiteboards:

- nine thousand three hundred;

- fourteen thousand and six;

- one hundred and twenty thousand and thirty.

Check and correct errors by writing numbers in an expanded form.

Ask a few questions about adding and subtracting small numbers across multiples of 10, 100 and 1000. For example:

**Q   What is three more than one hundred and ninety-eight? Two less than five thousand and one?**

## main activity

**Vocabulary**
decimal place
tenth
hundredth
thousandth

**Resources**
mini-whiteboards
calculators
OHP calculator

Write 63.47 on the board. Ask pupils to read the number aloud in words (sixty-three point four seven). Remind them that the first place after the decimal point is called the first decimal place and is for tenths; the second decimal place is for hundredths. Ask:

**Q   What is the value of the digit 3? Of the 6? Of the 4? Of the 7?**

Stress that the part of the number before the decimal point is the whole-number part and is read in the same way as a whole number. The part after the decimal point is the decimal fraction, and is read digit by digit.

**Q   How would we write 63.47 in expanded form?**

$$63.47 = 60 + 3 + 0.4 + 0.07$$

Read this aloud together, pointing as you go: sixty-three point four seven equals sixty plus three plus four tenths plus seven hundredths.

Write 46.05 on the board. Ask pupils to read the number aloud in words (forty-six point nought five). Say that some people might say forty-six point zero five. Discuss the value of different digits.

**Q  What is the value of the digit 6? Of the 4? Of the 5?**

**Q  Why is there a zero in the tenths column?**

**Q  How would we write and read 46.05 in expanded form?**
(46.05 = 40 + 6 + 0.05)

Reinforce by writing on the board 20.6, 2.06 and 0.206. Ask pupils to read each number aloud. Point out that the third place after the decimal point is for thousandths. Discuss the part played by the zeros in each number, and write and read each of the numbers in expanded form.

Ask pupils to write these numbers in figures on their whiteboards:

- ten point nought three;

- one hundred and six point nought four;

- nought point five nought two.

Check and correct errors by writing the numbers in an expanded form.

Now write on the board a target number such as 68.47, and these numbers:

10    1    0.1    0.01

Point to one of them (e.g. 10) and start the class counting in multiples of that number: for example, ten, twenty, thirty, forty, … Call 'Stop!', point to one of the other numbers (e.g. 0.1, one tenth), and continue counting: forty point one, forty point two, forty point three, … Call 'Stop!', point to one of the other numbers (e.g. 0.01, one hundredth), and continue counting: forty point three one, forty point three two, forty point three three, … Call 'Stop!', point to the last of the four numbers (1), and continue counting: forty-one point three three, forty-two point three three, and so on. Call 'Stop!' again, and remind pupils of the target number.

**Q  What shall we count in to reach the target number: tens, units or ones, tenths or hundredths?**

Choose a pupil to call 'Stop!', and continue counting as suggested by the class. Repeat the question above each time 'Stop!' is called until the target number is reached. If appropriate, extend to thousandths.

Repeat the activity by counting down from a target number to zero.

Ask pupils to enter two hundred and four point seven two into their calculators. Check that all pupils have entered the correct number by demonstrating on the OHP calculator. Then ask:

**Q  What is one tenth more than the number in your display? What do you think the display will show? What keys should you press?**

**Q  What is one hundredth more than the number that is now in your display?**

Make sure that pupils know that to add one tenth they key in + 0.1, and to add one hundredth they key in + 0.01. Read aloud the new number. Then ask:

**Q**  **What is three tenths more than the number now in your display?
What will the display show next?
What is one and two tenths more? Four hundredths more?**

Ask pupils to clear the display and enter twenty point nought six. This time ask:

**Q**  **What is one tenth less than the number in your display? What do you
think the display will show? What keys should you press?**

**Q**  **What is one hundredth less than the number that is now in your display?
Two tenths less? Three hundredths less? One and four tenths less?**

Repeat with:

- nought point nine;

- four thousand and thirty point nought eight.

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| **Resources**<br>mini-whiteboards | Write on the board: 14.99, 7.01, 13.9.<br><br>Point to one of the numbers and ask pupils to read it aloud (e.g. fourteen point nine nine). Point to particular digits. |

**Q**  **What is the value of this digit?**

Invite a pupil to the board to write the number in expanded form. Ask the class to read it aloud (e.g. fourteen and nine tenths and nine hundredths). Then ask them to write on their whiteboards the number that is one tenth more, one tenth less, one hundredth more, one hundredth less.

Repeat with the other two numbers.

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**Remember**

- The decimal point separates the whole number from the decimal fraction.

- Each digit in a decimal number has a value, according to its position.

- The first decimal place is for tenths, the second decimal place is for hundredths, the third decimal place is for thousandths, and so on.

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