#### Year 6, Unit 9, Week I, Lesson 3

# Order of operations (2)

# National Curriculum attainment target

• Use knowledge of the order of operations to carry out calculations involving the four operations

# Lesson objective

• Use knowledge of the order of operations to carry out calculations involving the four operations

#### Previous related lesson

Unit 5, Week 1, Lesson 3 **Prerequisites for learning** Pupils need to: • calculate mentally with all operations **Vocabulary** brackets, orders, BODMAS

#### Future related lessons

Unit 11, Week 1, Lesson 1; Unit 11, Week 1, Lesson 2 Success criteria

Pupils can:

- read the calculation
- apply the BODMAS rule



Connect Year 6, Unit 9,

Week 1

# Getting Started

- Choose an activity from Number Addition and subtraction.
- Choose a game or activity from *Fluency in Number Facts:* Y5/Y6 Addition and subtraction.

### Teach

#### Resources

#### mini whiteboard, pen and eraser (per child)



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- Display: Slide 1. Say: Work out this calculation with your partner.
- Ask some pairs to share their suggestions and explain why they worked it out in that order. If different answers have been found, write these on the board.
- Say: Remember that multiplication and division are always worked out first before addition and subtraction. Write  $x \div$  then + on the board.
- Ask pairs to work out the calculation using this rule, if they have not already done this.
- Say: When this rule is applied to the calculation the correct answer is 203.  $30 \times 6$  is the first operation you must work out.
- Work through the calculation as a class if this is appropriate.
- Display: Slide 2. Say: Some calculations with more than one operation may include brackets. Brackets come before multiplication and division. They are a way of showing what needs to be calculated first.
- Record the calculations on the board as you work them out. Say: **Starting with the calculation in brackets, four plus two equals six.**
- Say: We also know that multiplication and division are done before addition and subtraction so we must do the multiplication next, followed by the subtraction.
- Display: Slide 3. Say: As with all calculations that you do, it is important to estimate the answer before you carry out the calculation. First you should round the numbers and then think about the order in which you are going to do the calculations.
- Say: **Discuss with your partner how you will estimate the answer.** Ask some pairs to share their ideas. [(100 50) = 50; divide by 10; then subtract 5 from 550 to give 545]
- Say: Now let's work through the calculation. Following the BODMAS rule, work out the calculation in the brackets first. Write the calculations on the board as you work through the calculation.
- Say: The next step is the division part of the calculation and then the subtraction.
- Say: Finally we need to check this answer against our estimate. 565 is close to 545 so we can see that we have not made a mistake with our powers of ten.
- Display: Slide 4. Say: Use the BODMAS rule to work out this calculation. Work through the calculation as a class, starting with an estimate and then recording the steps. Children can check their order and working out as you do this.

# 5

- Display: Slide 5. Say: This is the mnemonic to remember what BODMAS means. Reveal what the letters stand for, one by one.
- Say: O for 'orders' is the only part we have not covered so far. Squaring a number is an example of an order. So if a calculation included 4 to the power of 2, this would be worked out before any of the operations which were not in brackets. We will look at calculations involving orders another time.
- Display: Slide 6. Say: Use the BODMAS rule to work out this calculation.
- Work through the calculation as a class, writing the steps as you do. Establish that the subtraction in brackets is worked out first, then the division and finally the addition.
- Display: Slide 7. Say: Use the BODMAS rule to work out this calculation. This time there are two sets of brackets which you must work out before the multiplication.
- Ask children to compare their working out and answer with a partner, then work through it as a class.

# Individualised Learning

Refer to Activity 3 from the Learning activities on page 359.

8

Pupil Book 6C – Page 8: Order of Operations (2) Progress Guide 6 – Support, Year 6, Unit 9, Week 1, Lesson 3: BODMAS rules!

# Plenary

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Resources
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mini whiteboard, pen and eraser (per child)

- Ask the class to get into groups of six and number themselves one to six. If the class does not divide exactly into groups of six, create some groups of five and have one fewer operation and number; and/or get a pair of children to join a group of six and be an extra set of brackets.
- Display: Slide 8. Read the list to the class and ask each child to write on their whiteboard the list item that corresponds with their given number.
- Say: As a group arrange yourselves into a calculation with brackets, ready for the rest of the class to work out. Work out the answer yourselves first.
- Choose a group to come to the front of the class and show their calculation to the class. Ask children to work it out. The group then tells them if they are correct.
- Repeat with different groups.

#### Homework Guide 6

Year 6, Unit 9, Week 1, Lesson 3: Add in brackets Resources: paper clip and pencil – for the spinner (per child)

# **Overcoming Barriers**

• Children will find this challenging if they are not confident using all four operations mentally and with written methods. Use calculations with only two operations to provide them with focussed practice.