Unit 8 **Five daily lessons**

Counting, properties of numbers and reasoning about numbers

Year 1
Summer term

Unit Objectives

Year 1

Describe and extend number sequences: **count on and back in ones from any small number, and in tens from and back to zero;** count on in twos from zero, and begin to recognise odd or even numbers to about 20 as every other number; begin to count on in steps of 3 from zero; recognise and extend number sequences with differences of 1, 2 or 3. Investigate a general statement about familiar numbers by finding examples that satisfy it. Explain methods and reasoning orally.	Pages 2, 4, 6 Page 64 Page 64

Link Objectives

Reception

Recite the number names in order, continuing the count forwards or backwards from a given number.
Count in tens.
Count in twos.
Talk about, recognise and recreate simple patterns: for example simple repeating or symmetrical patterns from different cultures.

Year 2

Describe and extend number sequences:
count on or back in ones or tens, starting from any two-digit number;
count in hundreds from and back to zero;
count on in twos from and back to zero and **recognise odd and even numbers to at least 30;**
count on in steps of 3, 4 or 5 to at least 30, from and back to zero, then from and back to any given small number.
Investigate a general statement about familiar numbers or shapes by finding examples that satisfy it.
Explain how a problem was solved orally, and where appropriate in writing.

(Key objectives in bold)

Primary
National Strategy

This Unit Plan is designed to guide your teaching.
You will need to adapt it to meet the needs of your class.

Resources needed to teach this unit:

?? Resource sheet 8.1
?? Resource sheet 8.2
?? Resource sheet 8.3
?? Whiteboards
?? Bag or box
?? 0–90 number cards
?? Hand puppet
?? Large 0–30 number line
?? 0–20 number line
?? Coathanger
?? Pegs
?? Cloth
?? Sets of 1-9 digit cards
?? Large dice
?? Purse
?? Envelopes and postcards
?? Mega money (large coins)
?? Flat shapes
?? Hundred square
?? Bead string

Also see the table of Problem Solving Strategies.

department for
education and skills

Planning sheet	Day One	Unit 8 *Counting, properties of numbers and reasoning about numbers*	Term: *Summer*	Year Group: *1*

Oral and Mental

Objectives and Vocabulary	Teaching Activities
Count on and back in ones from any small number, and in tens from and back to zero. VOCABULARY count on count back ones tens RESOURCES Cards showing multiples of 10 Bag or box Hand puppet	Sit the children in a circle, count around the circle in ones starting at 1. Repeat, this time starting at 6. **Q** Who will say 11? **Q** What number will Ella say? Count around the circle to check. Repeat starting with different children and starting numbers. Use a puppet to practise counting back: Puppet says: 30, 29, 28. Children respond with 27, 26, 25. Repeat. Flash both hands at the children to show different multiples of 10, encouraging children to count in tens to keep track. Ask a child to stand up and select a tens number from a bag. Ask the rest of the class to identify the number selected by counting flashes of hands.

Main Teaching

Objectives and Vocabulary	Teaching Activities
Begin to count on in steps of 3 from zero. VOCABULARY pattern threes count on RESOURCES Resource sheet 8.1 Large 0–30 number line	Use Resource sheet 8.1 to make up ten Tripus (imaginary creatures with three legs). Introduce the Tripus to the class, explain that the word tri means three; can they think of any other words that start with tri? **Q** How many wheels does a tricycle have? **Q** How many sides does a triangle have? **Q** How many legs does a tripod have? Stick two of the creatures on a whiteboard. **Q** How many legs can you see? Encourage children to count legs by whispering 1, 2 and saying 3 more loudly then whispering 4, 5 and saying 6 out loud. Say that you will write the numbers they say in a loud voice on the board underneath the creatures. Add a third creature and repeat the process. Repeat until all ten creatures are on the board and the numbers 3, 6, 9, 12, 15, 18, 21, 24, 27 and 30 are written on the board. Count in threes from 3, pointing to the numbers on the board. Take down the creatures and then give them out to ten children, ask four children to come up to the front. **Q** How many legs can you see? Let's count in threes to find out: 3, 6, 9, 12. Repeat for different numbers of creatures. Encourage children who are finding this difficult to use the whispering and saying out loud strategy used earlier. Ask the children to draw sets of the three-legged creatures in their books and record the number of legs in each set.

Plenary

Teaching Activities/Focus Questions

?? Display a 0–30 number line, and say that you are going to count in threes along the number line.

Q Which numbers do you think we will say?

Q Will we say the number 2? 10?

Count in threes to 12, marking the jumps on the number line and circling the numbers that they land on.

Ask for a volunteer to circle the next number. Repeat.

?? Use the number line to count in threes from zero to 30.

Q Imagine three Tripus, how many legs can you see?

Q Now imagine five, how many legs can you see?

By the end of the lesson, children should be able to:

?? **mark hops of 3 on a number line to at least 20. Say the numbers you land on;**
?? **say which number comes next.**

(Refer to supplement of examples, section 5, page 6.)

Planning sheet	Day Two	Unit 8 *Counting, properties of numbers and reasoning about numbers*	Term: *Summer*	Year Group: *1*

Oral and Mental

Objectives and Vocabulary	Teaching Activities
Begin to count in steps of 3 from zero. Know by heart addition facts for each number to 10. VOCABULARY count on threes how many? add plus together makes RESOURCES Coathanger Nine pegs Cloth	Count in threes with the class by whispering 1, 2 and saying out loud 3, etc. **Q** Who can tell me a number that we said in a loud voice? **Q** If we count in threes what number will I say after 6? Show the children a coathanger with nine pegs on it. **Q** How many pegs are on the coathanger? Ask the children to show you the answer using their fingers. Now cover up five of the pegs by sliding them to one end underneath a cloth. **Q** How many pegs can you see? **Q** So how many pegs are hidden underneath the cloth? Ask the children to respond using fingers. Encourage them to count on from the number they can see to 9 to work out the answer. Say 5 and 4 is 9. Write on the board 5 + 4 = 9. Repeat hiding different numbers each time.

Main Teaching

Objectives and Vocabulary	Teaching Activities
Count in steps of 3 from zero. Solve simple mathematical problems or puzzles. Recognise and predict from simple patterns and relationships. VOCABULARY count in threes how much? how many? RESOURCES Resource sheet 8.2 Bag or box Envelopes Postcard Purse 2p coins Large 0-20 number line	Show the children a 3p stamp (Resource sheet 8.2). Explain that the Post Office only had 3p stamps left and that you bought ten of them. **Q** How much did I spend on the stamps? Count in threes touching each stamp to keep count. Show the children an envelope and explain that it will cost 12p to post it. **Q** How many 3p stamps do I need to stick on my letter? Encourage children to count in threes until they reach 12, model on a number line by holding up a finger on each count: 3, 6, 9, 12. Count the 4 fingers and agree they represent the 4 stamps. Show a postcard to the children and say that this will cost 6p to send. **Q** How many stamps do I need to stick on my postcard? Model holding up a finger for each count: 3, 6; say 'I need two stamps'. Put ten stamps in a box; ask for a volunteer to pull out some stamps. **Q** Ali has five stamps. How much would these stamps cost him? **Q** How can we find out? Establish the amount by counting the stamps, saying 3p, 6p, 9p, 12p and 15p. **Q** If I took four stamps from the box, how much would they cost me? Establish the amount by counting the stamps saying 3p, 6p, 9p, 12p. Ask the children to work in pairs to find all the amounts of money it is possible to spend by buying up to six stamps. **Q** What is the smallest amount you could spend? **Q** How can you make sure that you find all the possible answers? Agree that it will be useful to start by counting one stamp, then two, then three, and so on. Demonstrate using pictures to record, sketching a rectangle for each stamp and writing the total at the side.

Plenary

Teaching Activities/Focus Questions

?? Collect all answers, writing them in a table on the board:

Number of stamps	Cost
1	3p
2	6p
3	9p
4	12p
5	15p
6	18p

Q What is the largest amount I could spend?

Q How much would four stamps cost me?

Q If my letter is going to cost 18p to post, how many stamps do I need to buy?

?? Show the children a purse and explain that it has six 2p coins in it.

Q How much money is in my purse?

Count the coins to establish that there is 12p.

Q What other amounts could I make from the coins in my purse?

Q How will I know if I have all the possible totals?

Q Can we draw a table to help us?

By the end of the lesson, children should be able to:
?? **organise the recording of possibilities, e.g. in an ordered list or table**

(Refer to the table of Problem Solving Strategies.)

Planning sheet	Day Three	Unit 8 *Counting, properties of numbers and reasoning about numbers*	Term: *Summer*	Year Group: *1*

Oral and Mental

Objectives and Vocabulary	Teaching Activities
Recall doubles up to 5 + 5. Count on or back in steps of one. VOCABULARY threes count on RESOURCES Large dice	Roll a large dice and ask the children to double the number rolled as quickly as they can and to show you the answer with their fingers. (If you roll a 6, roll it again.) **Q** How might you work out the answer? Encourage the children to put the same number of fingers up on each hand to help. Repeat. Sketch a 0-10 number line on the board. **Q** If you count on from 7 to 10, how many jumps will you take? **Q** If you count on 4 from 3, what number will you land on? Encourage the children to count on using fingers as well as referring to the number line. **Q** If you count back from 10 to 6, how many did you count? **Q** If you count on 2 from 6, what number will you land on? **Q** If you count on 3 from 5, what number will you get to?

Main Teaching

Objectives and Vocabulary	Teaching Activities
Recognise and extend number sequences with differences of 1, 2 or 3. VOCABULARY pattern sequence twos threes ones even odd difference rule RESOURCES Resource sheet 8.3 (copied and cut out for pairs to use) Flat shapes Whiteboards	Write on the board the sequence 3, 6, 9, 12. **Q** What is the difference between the neighbouring numbers in the sequence? **Q** Can anyone describe this sequence of numbers? What is the rule? **Q** What would the next two numbers be? Write on the board the sequence 2, 4, 6, 8. **Q** Can anyone describe this sequence of numbers? What is the rule? **Q** What would the next three numbers be? Ask the children to write the next three numbers on their whiteboards. Encourage the children to use the term even numbers to describe the numbers in this sequence. **Q** Would 18 be in this sequence? How do you know? Agree that it is an even number and so will be in this sequence. Write on the board the sequence 1, 3, 5, 7. **Q** Can anyone describe this sequence of numbers? What is the rule? **Q** What would the next three numbers be? Ask the children to write the next three numbers on their whiteboards. Encourage the children to use the term odd numbers to describe the numbers in this sequence. **Q** Would 19 be in this sequence? How do you know? Write on the board the sequence 2, 5, 8, 11. **Q** What is the rule in this sequence? Encourage the children to find the difference between the numbers in the sequence by counting on from the previous number to the next. **Q** What would be the next two numbers? Ask the children to write the next two numbers on their whiteboards. Pick one of the instruction cards from Resource sheet 8.3, read the instructions and ask children to make suggestions. Check the difference between each consecutive pair of numbers. Give out sets of problems from Resource sheet 8.3. Ask the children to work in pairs taking it in turns to count and check.

Plenary

Teaching Activities/Focus Questions
?? Ask a pair to choose one of the challenges on Resource sheet 8.3 and explain what they did. ?? Draw a repeating pattern on the board using dots and dashes. – . – . – . – . – . – . – . **Q** Who can describe what is happening in this pattern? What would come next? ?? Draw a repeating pattern on the board using triangles and circles. ? ? ? ? ? ? ? ? ? ? **Q** Who can describe what is happening in this pattern? Can you continue the pattern? Ask for a volunteer to use some flat shapes to make a repeating pattern on the board. **Q** Who can continue the pattern Naz has started? HOMEWORK – Use three different shapes to make a repeating pattern. **By the end of the lesson, children should be able to:** ?? **describe the rule of a pattern or a number sequence in words or pictures;** ?? **predict the next few terms in a sequence to test the rule;** ?? **use the rule to decide whether a given number will be in the sequence or not.** (Refer to the table of Problem Solving Strategies.)

Planning sheet	Day Four	Unit 8 *Counting, properties of numbers and reasoning about numbers*	Term: *Summer*	Year Group: *1*

Oral and Mental

Objectives and Vocabulary	Teaching Activities
Extend repeating patterns. Order a set of numbers to 30. VOCABULARY repeating pattern largest smallest order compare tens ones digit RESOURCES Number cards 0–30 Bag or box Whiteboards	Ask for volunteers to share the homework task from yesterday. Copy the repeating patterns onto the board and ask the rest of class to describe pattern. **Q** Can you continue the pattern on your whiteboards? Put cards 0–30 in a bag, pull out three cards and ask the children to order them smallest to largest. They should record this on their whiteboards. **Q** What is this number? **Q** How many tens in this number? **Q** What is the value of this digit? **Q** How many ones in this number? **Q** Which digit do we look at first when ordering these numbers? Repeat picking three cards from the bag and asking similar questions.

Main Teaching

Objectives and Vocabulary	Teaching Activities
Investigate a general statement about familiar numbers by finding examples that satisfy it. Explain methods and reasoning orally. VOCABULARY calculation tens digit ones digit add plus together makes total RESOURCES Bead string Hundred square Number cards 0–90	Write on the board: When I add 10 to a number the ones digit stays the same. Explain that we are going to find examples to find out if this statement is true. Write on the board 2 + 10. **Q** What is the answer to 2 + 10? **Q** How can we show this on the hundred square? Model using the hundred square to count on 10 from 2. **Q** Did the ones digit stay the same? Agree that it did. Record 2 + 10 = 12 then write on the board 12 + 10. **Q** What is the ones digit in 12? Will it stay the same if we add 10? Ask the children to find 12 + 10. Collect responses and discuss strategies. Look at the hundred square and add on 10 from 12. Record on the board 12 + 10 = 22 **Q** Is there a short cut that we can use on the hundred square? Remind the children that when we count on 10 squares we land on the number below. Use the bead string to add 10 onto 12. Draw attention to the pattern of the beads. **Q** Did the ones digit stay the same? Agree that it did. Write on the board 13 + 10 and ask the children to work out the calculation. Collect answers and strategies. Establish that the ones digit stayed the same. Repeat for other examples, using the hundred square and bead string to show the pattern. **Q** Do you think that this will always be true? Establish that it would take a long time to test every number but that as a class we could test a lot of numbers. Say that you will share out the number cards 0–90 to the children in the class and that you would like them to work in pairs to test the numbers they are given. They should add 10 to their numbers, record the number sentences in their books and see if the units digit does stay the same.

Plenary

Teaching Activities/Focus Questions

?? Take examples from the class and write them on the board.

Q Do these examples satisfy our statement? Do you think it's always one?

Q What is 56 + 10? How do you know?

?? Ask similar questions to establish that the children understand that when 10 is added to a number the ones digit remains the same.

?? Give the children some 'real life' problems to solve that involve adding 10.

Q I had 34p and then I was given 10p more. How much do I have now?

Q I have 12 sweets and Mrs Withers has 10 sweets. How many sweets do we have altogether?

Q I am on page 78 of my book; there are 10 more pages to read. How many pages are in my book?

By the end of the lesson, children should be able to:

?? **add 10 to a two-digit number;**

?? **give examples to match statements such as: when I add 10 to a number the ones digit remains the same.**

(Refer to supplement of examples, section 5, page 64.)

Planning sheet	Day Five	Unit 8 *Counting, properties of numbers and reasoning about numbers*	Term: *Summer*	Year Group: *1*

Oral and Mental

Objectives and Vocabulary	Teaching Activities
Recall pairs of numbers which total 10. Recognise odd and even numbers. Order and compare numbers. VOCABULARY tens ones odd even add together makes total more than less than RESOURCES Number cards 0–10 Bag Whiteboards	Put number cards 0–10 in a bag. Pull out a card and ask children to show you on their fingers the number needed to make it up to 10. **Q** If I show you 6, how many more are needed to make 10? Encourage the children to count on from 6 or use fingers to help. Repeat. Ask the children to work in pairs to show you two numbers that total 10. For example, one child could hold up six fingers and the other child four fingers. Repeat. Play the game 'I am thinking of a number'. Ask the children to write on their whiteboards the numbers that you are describing. (For some descriptions more than one number will apply.) **Q** My number has got 2 tens. What could it be? **Q** My number is an odd number less than 10. What could it be? **Q** My number is an even number more than 10 but less than 20. What could my number be? **Q** I am thinking of a number that lies between 50 and 60. What could it be? **Q** This number is 10 more than 4. What is it?

Main Teaching

Objectives and Vocabulary	Teaching Activities
Investigate a general statement about familiar numbers by finding examples that satisfy it. VOCABULARY tens place ones place two-digit number digit RESOURCES Sets of 1–9 digit cards	Write on the board: I can make four different two-digit numbers with two different digits. Explain that you are going to find examples to establish if this statement is true. Ask a child to give you a digit from 1 to 9. Write it on the board. Ask a second child for a different digit from 0 to 9. Write it on the board. **Q** Look at our digits 3 and 4. Can we make four different two-digit numbers using these digits? Collect responses. **Q** How do I know that I have all possible numbers? Model a systematic approach: – I can use the 3 twice to make 33 – I can use the 4 twice to make 44 – I can put the 3 in the tens place and the 4 in the ones place to make 34 – I can put the 4 in the tens place and the 3 in the ones place to make 43. **Q** Are there any other numbers we can make using 3 and 4? Agree that you have all possibilities and that there are four different two-digit numbers we can make. Write the two digits 5 and 6 on the board. **Q** What number can we make if we use the 5 twice? **Q** What number can we make if we use the 6 twice? **Q** What number can we make if we put 5 in the tens place? **Q** What number can we make if we put the 6 in the tens place? **Q** How many numbers have we made? Agree that four different numbers have been made using the two digits 5 and 6. Repeat process for two more digits, ensuring the children can recognise repeats. Place digit cards 1–9 on tables. Ask the children to pick two cards and list the different numbers they can make, check for repeats, and record them in their books.

Plenary

Teaching Activities/Focus Questions

?? Collect some examples from the class.

?? Write 2 and 6 on the board. Ask for volunteers to come up and write a two-digit number that can be made from the two digits.

Q Can you explain your strategy?

Encourage children to explain that they have used a digit twice or put a digit in the tens place, etc.

?? Write on the board the digits 1, 2 and 3. Challenge the children to make some two-digit numbers from these digits.

Q What number will you start with? Why?

Q How many numbers can you make with 1 in the tens place?

Q What if you used 3 in the ones place? Are there any repeats?

?? Agree the nine possibilities (11, 12, 13, 21, 22, 23, 31, 32, 33).

By the end of the lesson, children should be able to:

?? **have a system for finding all possibilities;**
?? **check for repeats;**
?? **give examples to match general statements.**

(Refer to the table of Problem Solving Strategies and to the supplement of examples, section 5, page 64.)