

Unit 8
Properties of numbers

Five daily lessons

Merseyside Consultants'
Cluster Group

Year 2
Autumn term

Unit Objectives
Year 2

Describe and extend number sequences.

Count on and back in twos from zero or any small number.

Recognise odd, even numbers and two-digit multiples of 2 to 30.

Solve mathematical problems/puzzles, recognise simple patterns and relationships and make predictions. Suggest extensions.

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Link Objectives

Year 1

Year 3

Count on and back in ones from any small number, and in tens from and back to zero.

Begin to recognise odd and even numbers to about 20.

Solve simple mathematical problems and puzzles, recognise simple patterns.

Count on in steps of 2, 3 or 5 from any small number.

Recognise odd and even numbers to at least 100.

Solve mathematical problems/puzzles, generalise and predict.

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:

Large 100 square

1 – 30 cards

Feely bags

Washing line and pegs

Resource Sheet 1

Resource Sheet 2

Homework Sheet

Magnetic board or OHP.

Counters

1 – 15 number tracks

3 large boxes

9 teddies

Containers and counters

Flat and 3-D shapes

Hoop

Planning Sheet	Day 1	Unit 8: Properties of numbers	Term: Autumn	Year Group: 2
Oral and Mental		Main Teaching		Plenary
Objectives and Vocabulary	Teaching Activities	Objectives and Vocabulary	Teaching Activities	Teaching Activities/Focus Questions
		<p>Count on and back in twos from zero or any small number.</p> <p>Recognise odd, even numbers and two-digit multiples of 2, to 30.</p> <p>Vocabulary: count in twos odd even</p> <p>Resources: Large 100-square Set of 1-30 number cards for each pair. Feely bags</p>	<p>Whole class activity: Display 100-square. Rehearse counting forwards in 'twos', starting at 1, to at least 30. Ask a child to cover/circle the numbers as you count. Ask: Q. What do you notice about the covered numbers? Q. What would we cover next? Count back again. Ask: Q. What do we call these numbers? (Bring children's attention to the final digits.) Repeat starting at 1.</p> <p>Paired activity: Demonstrate the activity to the class. Put number cards from 1 – 30 in a bag. Ask for two volunteers. Decide who will be 'odd' and who will be 'even'. Take turns to take a number card from the bag. The 'odd' child keeps any odd numbers selected; the 'even' child keeps any 'even' numbers selected. The game finishes when one child has 6 cards. Change 'odd and even' and play again.</p>	<p>Roll a large 1-6 die. Ask the children to count on in twos. Stop the count and ask: Q. Will we say 17? How do you know? Roll two dice to generate a two-digit number. Ask a volunteer to count back in twos. Stop and ask: Q. Will Jane say 7? How do you know?</p> <div style="border: 1px solid black; padding: 5px; margin-top: 10px;"> <p>By the end of the lesson children should be able to: Count on and back in twos from zero or any small number. Recognise odd and even numbers</p> </div>

Planning Sheet	Day 2	Unit 8: Properties of numbers	Term: Autumn	Year Group: 2
Oral and Mental		Main Teaching		Plenary
Objectives and Vocabulary	Teaching Activities	Objectives and Vocabulary	Teaching Activities	Teaching Activities/Focus Questions
		<p>Describe and extend number sequences.</p> <p>Vocabulary: Sequence Continue</p> <p>Resources: Washing line and pegs Numbers 1-50 A set of cards 1-30 for each pair Resource sheet 1 Homework sheet</p>	<p>Whole class activities:</p> <p>??Call out a sequence of numbers such as 21, 23, 25, 27. When you stop the children must continue. Repeat several times, varying the sequence and counting on and back. Challenge individuals and the whole class.</p> <p>??Ask volunteers to begin the sequence for the class to continue.</p> <p>??Peg the following numbers on the line – 4, 6, 8 and 10. Ask: Q. Which number will be next? How do you know?</p> <p>Encourage children to describe the sequence in their own words and discuss.</p> <p>Repeat for other sequences such as: 5, 10, 15 32, 31, 30 23, 33, 43</p> <p>??Encourage children to extend sequences in both directions, explaining the 'rule' each time.</p> <p>Paired activity: Demonstrate the activity. Each pair needs a set of number cards from 1 to at least 30. Children take turns to choose 3 cards to lay out in sequence. Their partner must complete the sequence by adding 2 more cards. Children check the sequence and record in their books. Examples: [], 8, 9, 10 [] [], [], 12, 14, 16</p>	<p>Each pair needs a whiteboard and pen.</p> <p>Ask a volunteer to choose one of their examples to share with the class.</p> <p>Ask: Q. What comes next?</p> <p>Discuss it with your partner and write it on your whiteboard.</p> <p>Q. How do you know?</p> <p>Repeat for several sequences. Introduce the homework.</p> <div style="border: 1px solid black; padding: 5px; margin-top: 10px;"> <p>By the end of the lesson children should be able to:</p> <p>?? Extend number sequences.</p> <p>?? Describe number sequences .</p> </div>

Planning Sheet	Day3	Unit 8: Properties of numbers	Term:Autumn	Year Group:2														
Oral and Mental		Main Teaching		Plenary														
Objectives and Vocabulary	Teaching Activities	Objectives and Vocabulary	Teaching Activities	Teaching Activities/Focus Questions														
		<p>Solve mathematical problems/puzzles, recognise simple patterns and relationships and make predictions.</p> <p>Vocabulary: predict</p> <p>Resources: Magnetic board or OHP and counters 1-15 number tracks counters</p>	<p>Whole class activity:</p> <p>Using a magnetic board or OHP display 13 counters. Explain that two players take turns to remove 1 or 2 counters. The player that removes the last counter wins. Choose two volunteers to play. Repeat the game, this time arranging the counters on a track numbered 1 – 15. Begin at 15. The player to remove the counter from number 1 wins.</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <tr> <td>○</td><td>○</td><td>○</td><td>○</td><td>○</td><td>○</td><td>○</td><td>○</td><td>○</td><td>11</td><td>12</td><td>13</td><td>14</td><td>15</td> </tr> </table> <p>(track here 1-15 with some counters on).</p> <p>Paired activity:</p> <p>Ask the children to play several games, keeping count of the number of wins. After 5 minutes stop the children and ask: Q. Who won a lot of games? Did you have a special way of winning (a strategy)? Q. Is it better to go first or second?</p> <p>Allow the children to play several more games, trying out some of the ideas discussed. Stop the children and ask: Q. Did any of the ideas work? Did you win more games? (Have the children noticed that when there are 3 counters left you can predict the winner?) Invite two children to demonstrate on the magnetic board or OHP. Stop them when 3 counters remain. Ask: Q. Do you know who will win? Q. How do you know? Allow children to play a final game.</p>	○	○	○	○	○	○	○	○	○	11	12	13	14	15	<p>Invite two children to play on the magnetic board. This time use 13 counters. Ask: Q. Will the strategy still work?</p> <p>Stop the game after several moves and ask: Q. Who do you think will win? Why? Q. What should John do next?</p> <p>(You could repeat with 17 counters or play in reverse. Take turns to put 1 on 2 counters on the number track. The player placing the last counter wins.)</p> <div style="border: 1px solid black; padding: 5px; margin-top: 10px;"> <p>By the end of the lesson children should be able to:</p> <p>Play the game and predict the winner before the game ends.</p> </div>
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Planning Sheet	Day 4	Unit 8: Properties of numbers	Term: Autumn	Year Group: 2
Oral and Mental		Main Teaching		Plenary
Objectives and Vocabulary	Teaching Activities	Objectives and Vocabulary	Teaching Activities	Teaching Activities/Focus Questions
		<p>Solve mathematical problems/puzzles, recognise simple patterns and relationships and make predictions.</p> <p>Vocabulary: most least arrange</p> <p>Resources: Three large boxes 9 teddies 3 containers and 9 counters for each pair</p>	<p>Whole class activities: Show the children 3 boxes (with lids). Tell the children that there are 9 teddies inside the boxes. Ask: Q. How many teddies do you think there are in this box? Take several suggestions. Ask: Q. What is the most there could be? The least? Open the box and show the children the contents. Repeat for the second and third boxes. Empty all the boxes and ask the children to think how the teddies could be arranged in the three boxes. Give them two or three minutes to discuss with a partner and then ask for suggestions, recording several on the board. Example $3 + 3 + 3$</p> <p>Paired activity: Children work in pairs with boxes and counters, finding as many ways as possible of arranging the counters in the boxes. After 5 or 10 minutes stop the children and collect responses. If any pair has been systematic ask them to explain their method. Ask: Q. Have we found them all? How do you know? Q. How many ways do you think there are? Allow children a few more minutes to try to find more.</p>	<p>Ask: Q. How many ways did you find? Ask pairs to contribute examples and list. You may want to discuss whether: $3 + 2 + 4$ is the same as $4 + 3 + 2$. Try to encourage children to think systematically by listing systematically. Example: $9 + 0 + 0$ $8 + 1 + 0$ $7 + 1 + 1$ Ask: Q. Have we found them all?</p> <div style="border: 1px solid black; padding: 5px; margin-top: 10px;"> <p>By the end of the lesson children should be able to:</p> <p>?? Solve a mathematical problem.</p> <p>?? Make a prediction.</p> </div>

Planning Sheet	Day 5	Unit 8: Properties of numbers	Term: Autumn	Year Group: 2
Oral and Mental		Main Teaching		Plenary
Objectives and Vocabulary	Teaching Activities	Objectives and Vocabulary	Teaching Activities	Teaching Activities/Focus Questions
		<p>Recognise simple patterns and relationships and make predictions.</p> <p>Vocabulary: multiple of rule digit flat straight curved</p> <p>Resources: Resource sheet 2 flat and 3D shapes – one for each child hoop</p>	<p>Whole class activity: Draw a large circle on the board and write the following numbers inside: 5 25 45 Tell the children that you have a 'secret rule'. Invite children to suggest a number to go inside the circle. If it obeys the 'secret rule' write it in the circle. If not, write it outside the circle. Invite children to contribute numbers until it is evident that most children have guessed your rule. Ask: Q. What is my rule? How do you know? Allow children to add numbers to the circle. ??Repeat with a different rule. Try: Odd numbers Multiples of 2 Two-digit numbers or Numbers more than 20 Choose a volunteer to repeat with their own 'secret rule'.</p> <p>Individual or paired activity: Children work individually or in pairs to complete Resource Sheet 2. Encourage children to extend the activity by setting challenges for one another.</p>	<p>Sit in a circle. Put a large hoop in the centre and give each child a shape (flat or 2D). Place a shape in the hoop. Children take turns to place their shape in the hoop. If it belongs, leave it there. If it does not belong (does not follow the secret rule), ask them to keep it. Children join the teacher in accepting or rejecting shapes as they guess the rule. Ask: Q. Does this belong in the hoop? How do you know? Encourage children to explain the rule in their own words. Repeat with a different rule. (Try 4 sides, flat shape, etc.)</p> <div style="border: 1px solid black; padding: 5px; margin-top: 10px;"> <p>By the end of the lesson children should be able to: Recognise simple patterns and relationships. Say which number or shape follows the rule.</p> </div>

Put in the missing numbers

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Which numbers belong in the circle? Put them in.

2
4
6 12

8, 10, 3, 7

3
5
7 11

1, 9, 10, 12

12
13
16 17

14, 15, 4, 8

7
17
47 87

27, 77, 25, 34

32
31
38 35

23, 8, 34, 39

5
25
30 10

15, 20, 18, 23

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
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1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
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1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
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1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
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1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
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1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
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1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
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Put in the missing numbers

7	9	11		
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		21	22	23
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	12	14	16	
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25	20	15		
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1	4	7		
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