

Unit 8
Counting, properties of numbers and reasoning about numbers

Five daily lessons

Primary
National Strategy

Year 1
Spring term

This Unit Plan is designed to guide your teaching.

You will need to adapt it to meet the needs of your class.

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, then one, and begin to recognise odd or even numbers to about 20 as ‘every other number’;
 count in steps of 5 from zero to 20 or more, then back again;
 begin to count on in steps of 3 from zero.
- Solve simple mathematical problems or puzzles; recognise and predict from simple patterns and relationships. Suggest extensions by asking ‘What if...?’ or ‘What could I try next?’.

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Resources needed to teach this unit:

- Resource sheet 8.1
- Resource sheet 8.2
- OHT of Activity sheet 8.1
- Activity sheet 8.1
- Activity sheet 8.2
- Digit cards 1–6
- Pile of socks
- Two baskets, one labelled ‘even’, one labelled ‘odd’
- Two 1-10 number tracks
- OHP counters
- Large 0-20 number line
- 0–50 number lines
- Dice marked 5 and 10
- Purse, 2p, 5p, 10p coins
- 1-100 square
- Large digit cards 0–10
- Whiteboards

Also see Problem Solving Strategies table.

Link Objectives

Reception

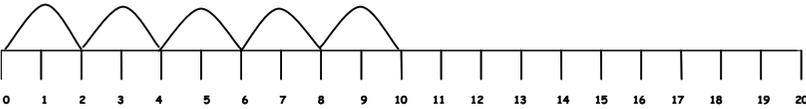
- Recite the number names in order, continuing the count forwards or backwards from a given number.
- Count in tens.
- Count in twos.
- **Talk about, recognise and recreate simple patterns** for example, simple repeating or symmetrical patterns from different cultures.
- Solve simple problems or puzzles in a practical context, and respond to ‘What could we try next?’.

Year 2

- **Describe and extend simple 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 or any small number, 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.
- Solve mathematical problems or puzzles, recognise simple patterns and relationships, generalise and predict. Suggest extensions by asking ‘What if...?’ Or ‘What could I try next?’.

(Key objectives in bold)

Planning sheet	Day One	Unit 8 <i>Counting, properties of numbers and reasoning about numbers</i>		Term: <i>Spring</i>	Year Group: <i>1</i>																				
Oral and Mental		Main Teaching			Plenary																				
Objectives and Vocabulary	Teaching Activities	Objectives and Vocabulary	Teaching Activities		Teaching Activities/ Focus Questions																				
<p>Count on in twos from zero, then one.</p> <p>VOCABULARY count in twos</p> <p>RESOURCES Large 0–100 number line</p>	<ul style="list-style-type: none"> Seat the children in a circle. Count around the circle in twos from zero asking each child to put two hands in the air as they say their number. Repeat, starting with a different child. <p>Q What number will Siân say? Who will say 8?</p> <ul style="list-style-type: none"> Illustrate the jumps on a number line. Join the circle and raise one hand. Ask the children to count in twos around the circle this time starting at one, i.e. adding two hands each time to your one hand. <p>Q I already have one hand up. What will the next number be if we count on in twos?</p> <p>Q How many hands are raised now?</p> <ul style="list-style-type: none"> Repeat, starting with a different child. <p>Q What number will Faron say?</p> <ul style="list-style-type: none"> Illustrate these jumps on a number line. Point out that they are missing every other number, i.e. the even numbers. So the pattern is odd, even, odd, even... 	<p>Begin to recognise odd and even numbers to about 20 as 'every other number'.</p> <p>VOCABULARY odd even every other pattern pair</p> <p>RESOURCES Digit cards 1–6 (enough for one set between two) Socks Two baskets, one labelled 'odd' and one labelled 'even' Two 0–10 number tracks Resource sheet 8.1</p>	<ul style="list-style-type: none"> Give children examples related to pairs, such as 'lining up' in twos, pairs of socks and hands. Draw the picture on the board: <div style="text-align: center;">  </div> <p>Q What do you notice about these pictures?</p> <p>Draw out that the first picture only has pairs and so there is an even number of dots. The other picture has pairs but has an odd one left over so there is an odd number of dots.</p> <ul style="list-style-type: none"> Take a digit card (1–6) and the corresponding number of socks. Pair the socks. If there is an odd number, put the digit card in the basket labelled 'odd'. If there is an even number, place the digit card in the basket labelled 'even'. Ask the children to continue this activity in pairs, placing each card on the correct side of Resource sheet 8.1. Collect answers and sort the digit cards into the correct baskets. Put two 1–10 number tracks where all the children can see them. <p>Ask a child to take a number out of the basket labelled 'even' and ring that number on the track. Repeat for each card from the 'even' basket.</p> <p>Q What do you notice about the numbers we have ringed?</p> <p>Q Which might be the next number in the pattern?</p> <p>Q What does that tell us about number 8?</p> <p>Help a child to pair eight socks to demonstrate that 8 is an even number.</p> <ul style="list-style-type: none"> Repeat with the cards from the 'odd' basket. Place the two number tracks one above the other on the board. <table border="1" data-bbox="828 1197 1713 1220"> <tr> <td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td><td>9</td><td>10</td> </tr> </table> <table border="1" data-bbox="828 1252 1713 1276"> <tr> <td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td><td>9</td><td>10</td> </tr> </table> <p>Q What patterns do you notice now?</p> <p>Ensure the children use the vocabulary 'odd' and 'even'.</p> <p>Ask for volunteers to ring the other odd and even numbers on the tracks and explain how they know how to do this.</p>		1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	10	<ul style="list-style-type: none"> Turn the tracks over and then replace them on the board. <p>Q How do you know which track shows the odd numbers and which track shows the even numbers?</p> <p>Q How would you explain to someone who can't remember how to find out?</p> <p>Draw attention to how even numbers can be broken into pairs with none left over, but an odd number will have one left over.</p> <p>By the end of the lesson the children should be able to:</p> <ul style="list-style-type: none"> understand and use in practical contexts: <i>odd, even, every other.</i> <p>(Refer to supplement of examples, section 5, page 4.)</p>
1	2	3	4	5	6	7	8	9	10																
1	2	3	4	5	6	7	8	9	10																

Planning sheet	Day Two	Unit 8 <i>Counting, properties of numbers and reasoning about numbers</i>	Term: <i>Spring</i>	Year Group: <i>1</i>
Oral and Mental		Main Teaching		Plenary
Objectives and Vocabulary	Teaching Activities	Objectives and Vocabulary	Teaching Activities	Teaching Activities/ Focus Questions
<p>Know by heart all pairs of numbers with a total of 10.</p> <p>VOCABULARY how many more to make...?</p> <p>RESOURCES Large digit cards 0–10</p>	<ul style="list-style-type: none"> Hold up a number of fingers and when you say 'show me' ask the children to show how many more are needed to make 10 using their fingers. <p>Q If you don't know the answer, how could you work it out?</p> <p>Share ways of finding answers including counting on from the first number.</p> <ul style="list-style-type: none"> Show a digit card, again asking the children to show on their fingers how many more are needed to make 10. <p>Q Does using cards rather than fingers make a difference to the way you work out the answer?</p> <ul style="list-style-type: none"> Now say the number and ask the children to respond in the same voice as you e.g. if you whisper 6, they whisper 4. <p>Q Which pairs to 10 do you now know, rather than having to work them out?</p> <p>Collect answers.</p>	<p>Describe and extend number sequences: begin to recognise odd and even numbers to about 20 as 'every other number'.</p> <p>Solve simple mathematical problems or puzzles; recognise and predict from simple patterns and relationships. Suggest extensions, such as 'What if...?'. VOCABULARY pattern twos odd even every other</p> <p>RESOURCES Large 0-20 number line 0-50 number lines Pattern strips cut from Resource sheet 8.2</p>	<ul style="list-style-type: none"> Count as a whole class in 2s from zero to 10. Mark the jumps on the number line (marked 0–20).  <p>Q If we continued counting in twos, which would be the last number we would land on this line? Why do you think that?</p> <ul style="list-style-type: none"> Agree that if you continued to count in 2s the last number on this line would be 20. Ring the numbers said when counting in 2s. <p>Q Which numbers have we ringed?</p> <p>Agree that the even numbers have been ringed.</p> <p>Q What can you tell me about the numbers that haven't been ringed?</p> <p>Agree that every other number has not been ringed and that these are the odd numbers. <ul style="list-style-type: none"> Give children a 0–50 number line. Ask them to ring the even numbers in one colour and the odd numbers in a different colour up to 20. Refer to a 0–50 line and ask 'What if...?' questions. <p>Q What if I had 27 shoes, would I have an odd or an even number of shoes?</p> <p>When children respond, ask them to show that the number is odd or even by jumping in twos on the number line from 20. <ul style="list-style-type: none"> Invite other children to ask 'What if...?' questions and another child to respond and show on the number line that the number is odd or even. <p>Ask children to work in pairs to ask 'What if...?' questions, answer them and use the number line to show if the numbers are odd or even.</p> </p></p>	<p>Q How did you find out which numbers greater than 20 were odd and which were even?</p> <p>Q If you made a mistake on the number line how could you tell?</p> <p>Discuss how the pattern of ringing every other number made it easier to see mistakes.</p> <ul style="list-style-type: none"> Take a pattern strip from Resource sheet 8.2 and reveal one picture at a time. Ask children to tell you the next picture in the sequence only when they are certain. <p>Reinforce the point that we need sufficient information before we can be sure of a sequence.</p> <p>By the end of the lesson the children should be able to:</p> <ul style="list-style-type: none"> describe the rule of a pattern or relationship in words or pictures; respond to questions such as; what numbers come next? 2, 4, 6, 8... <p>Refer to supplement of examples section 5, page 4 and Problem Solving Strategies table.)</p>

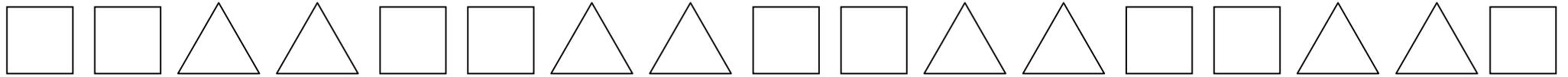
Planning sheet	Day Three	Unit 8 <i>Counting, properties of numbers and reasoning about numbers</i>		Term: <i>Spring</i>	Year Group: <i>1</i>
Oral and Mental		Main Teaching			Plenary
Objectives and Vocabulary	Teaching Activities	Objectives and Vocabulary	Teaching Activities	Teaching Activities/ Focus Questions	
<p>Recall doubles up to 5 + 5.</p> <p>VOCABULARY double</p> <p>RESOURCES Large digit cards 1–5 Whiteboards</p>	<ul style="list-style-type: none"> Show a number of fingers on one hand. Ask children to double the number you show by showing the same amount on both hands and call out this number when you say. Show a digit card 1–5. Ask children to write double the number on their whiteboards. <p>Q If you can't remember how might you work it out?</p> <p>Suggest that they could put the same numbers of fingers up on each hand to help.</p> <ul style="list-style-type: none"> Repeat with other 1 – 5 cards. <p>Q Which doubles can you now remember without working it out?</p> <p>Collect answers and ensure that they all know at least double 1 and double 2.</p>	<p>Solve simple mathematical problems or puzzles; recognise and predict from simple patterns and relationships.</p> <p>Suggest extensions by asking 'What if...?' or 'What could I try next?'.</p> <p>VOCABULARY symmetry odd even share equally</p> <p>RESOURCES Activity sheet 8.1 and an OHT of it OHP counters</p>	<ul style="list-style-type: none"> Show the OHT of Activity sheet 8.1 and point out the butterfly outline. Discuss what they know about butterflies, eliciting the symmetrical properties. Show children the special spots (OHP counters) that have fallen off the Special Spotted Butterfly. Tell children that Special Spotted Butterflies never have more than 20 spots, but they always have the same number of spots on each wing. Demonstrate how to put 6 spots on the butterfly, 3 on each wing, and how to record this on the OHT of Activity sheet 8.1. Then show how to put 9 spots on the butterfly, 4 on each wing and 1 left over. <p>Q Can a Special Spotted Butterfly have 6 spots? 9 spots?</p> <p>Draw out that it can have 6 spots as these can be shared equally between its wings but not 9 spots as there is one left over.</p> <ul style="list-style-type: none"> Give out Activity sheet 8.1 and counters and ask the children to find out which numbers will give the same number of spots on both wings and which won't. <p>Q How will you make sure that you have checked all the numbers to 20?</p> <p>If necessary, demonstrate ticking off a list of numbers 1–20.</p> <p>Q Which numbers do you have in the 'same number of spots' box?</p> <p>Ask children to volunteer to demonstrate that they checked all the numbers to 20.</p> <p>Q What do you notice about the numbers in the 'same number of spots each side' box?</p> <p>Q What do you know about numbers you can share equally into two?</p> <p>Draw out that these are the even numbers,</p> <ul style="list-style-type: none"> Pretend to catch a Very Special Spotted Butterfly. Explain that this is a Very Special Spotted Butterfly, and has more than 20 spots. <p>Q How many spots do you think it might have?</p> <p>Q How did you decide that it could have that many spots? Could it have 21 spots? Why not?</p> <p>Draw out that it must have an even number of spots as even numbers of spots can be shared equally between the two wings.</p>	<ul style="list-style-type: none"> Draw a ladybird outline on the board. Explain that the ladybird has the same number of spots on both sides and that you are going to work out how many spots the ladybird might have. Randomly choose numbers (not in order) and draw that amount of spots on the ladybird. Record those numbers which allow the ladybird to have the same number of spots on both sides. Miss out some numbers as you are demonstrating an inefficient approach to solving the problem. <p>Q Have I got all the answers? Could I have done it in a better way?</p> <p>Draw out that it would have been better to start with one spot, then two... in order to ensure no solutions were missed.</p> <p>By the end of the lesson children should be able to:</p> <ul style="list-style-type: none"> solve puzzles and problems such as: 'Investigate different ways of putting 10 buttons in 2 boxes'; have a system for finding the possibilities, e.g. start with the smallest number; know when all possibilities have been found. <p>(Refer to supplement of examples, section 5, page 62 and Problem Solving Strategies table.)</p>	

Planning sheet	Day Four	Unit 8 <i>Counting, properties of numbers and reasoning about numbers</i>	Term: <i>Spring</i>	Year Group: 1
Oral and Mental		Main Teaching		Plenary
Objectives and Vocabulary	Teaching Activities	Objectives and Vocabulary	Teaching Activities	Teaching Activities/ Focus Questions
<p>Count in steps of 5 from zero to 20 or more.</p> <p>VOCABULARY fives patterns ones digit multiple of 5</p> <p>RESOURCES 1-100 square</p>	<ul style="list-style-type: none"> Sit the children in a circle. Chant in 5s from zero. Show one hand for every number ending in 5 and two hands for every multiple of 10. <p>Encourage children to join in the chant when they think they can hear the pattern.</p> <p>Q What did you notice about the numbers we said?</p> <p>Draw out that they end in 0 or 5.</p> <p>If children need more support, ring the numbers on a hundred square.</p> <ul style="list-style-type: none"> Explain that you are now going to count around the circle in ones. Explain that if they say one of the numbers that is a multiple of 5, i.e. a number they said when they were counting in 5s, you will all put up one hand and show five fingers. <p>Q If I start on zero, when will we first put up our hands?</p> <p>Count around the circle. Every so often ask:</p> <p>Q When will we next raise our hands?</p>	<p>Count in steps of 5 from zero to 20 or more.</p> <p>Solve simple mathematical problems or puzzles; recognise and predict from simple patterns and relationships.</p> <p>VOCABULARY count in 5s count in 10s multiple of 5 multiple of 10 pattern</p> <p>RESOURCES Dice marked with 5 and 10 1–100 square Activity sheet 8.2 Purse containing six 5p coins Two 10p coins</p>	<ul style="list-style-type: none"> Ring the number 5 on the 1–100 square. <p>Show dice marked with only 5s and 10s. Throw the dice, moving along the number rolled and then ring the number you land on.</p> <p>Q I'm on 10 and I need to count on 5, where should I go?</p> <p>Ensure the children know where to move to when they get to the end of the row.</p> <ul style="list-style-type: none"> Ask children to repeat this activity on Activity sheet 8.2. After the children have ringed numbers on several rows, stop them and discuss what they have found. Draw out that they only land on numbers ending 5 or 0. Say that numbers ending in 5 are multiples of 5 and numbers ending in 0 are multiples of 10. <p>Q Do you think you might land on 27? Why not? Which numbers close to 27 might you land on?</p> <ul style="list-style-type: none"> Ask the children to continue and check that they only land on numbers that are multiples of 5 or 10. When the children have got at least half way down the square, stop them and discuss what they have found. <p>Q What do you notice about the ringed numbers? What would the grids look like if we only had 10 on the dice? And if we only had 5 on the dice?</p> <ul style="list-style-type: none"> Reinforce the last digits in multiples of 5 and multiples of 10. Show the children the purse containing six 5p coins. <p>Q If I took three coins from my purse, how much money would that be? Agree that this would be 15p and count the coins saying 5p, 10p, 15p.</p> <p>Q If I took five coins from my purse how much would that be?</p> <p>Agree that this would be 25p and count the coins to check, saying 5p, 10p, 15p, 20p, 25p.</p> <ul style="list-style-type: none"> Ask the children to work in pairs to find all the amounts of money it is possible to make using up to six 5p coins. Remind them that counting in 5s will help. <p>Q How many coins might it be best to start with?</p> <p>Agree that it is helpful to start with one coin, then two and so on, to make sure all answers are found.</p>	<ul style="list-style-type: none"> Collect answers and write them in order on the board. Say that these are all multiples of 5 as we were adding 5s together. Show the children two 5p coins and two 10p coins. <p>Q What amounts of money could we make with these? What will all the answers end in?</p> <p>Draw out that the answers will end in 0 or 5 as the ringed numbers did on the hundred square, as then we were adding 5s and 10s.</p> <p>Q What would the smallest amount be? The next smallest?</p> <p>Agree that the smallest amount would be 5p and the next smallest would be 10p. Continue until all amounts are found (5p, 10p, 15p, 20p, 25p and 30p).</p> <p>HOMEWORK – Explain to the children that in preparation for tomorrow's lesson you would like them to find out how many 2p coins they can hold in one hand.</p> <p>By the end of the lesson the children should be able to:</p> <ul style="list-style-type: none"> mark hops of 5 on a number track, and say the numbers you land on; describe a rule of a pattern or relationship in words or pictures; have a system for finding the possibilities, e.g. start with the smallest number. <p>(Refer to supplement of examples, section 5, page 6 and Problem Solving Strategies table.)</p>

Planning sheet	Day Five	Unit 8 <i>Counting, properties of numbers and reasoning about numbers</i>	Term: <i>Spring</i>	Year Group: <i>1</i>
Oral and Mental		Main Teaching		Plenary
Objectives and Vocabulary	Teaching Activities	Objectives and Vocabulary	Teaching Activities	Teaching Activities/ Focus Questions
<p>Count in tens from any small number. Count in twos.</p> <p>VOCABULARY less than even count in tens ones digit multiple of 10</p> <p>RESOURCES 1-100 square</p>	<ul style="list-style-type: none"> Ask the children to give you an even number less than 10 and count on in tens from that number, e.g. 2, 12, 22... Point to the numbers on the hundred square as you do so. <p>Q What do you notice about the ones digit?</p> <p>Agree that it remains the same.</p> <p>Repeat.</p> <ul style="list-style-type: none"> Ask the children to choose a number less than 50 that is a multiple of 10, i.e. a number ending in zero. <p>Count on in twos from this number, e.g. 20, 22, 24. Point to them on the hundred square as you do so.</p> <p>Q What do you notice about these numbers?</p> <p>Agree that they are all even.</p> <p>Repeat.</p>	<p>Solve simple mathematical problems or puzzles; recognise and predict from simple patterns and relationships. Suggest extensions by asking 'What if...?' or 'What could I try next?'</p> <p>Count on in twos from zero.</p> <p>VOCABULARY total count in 2s even</p> <p>RESOURCES 5p coins Purse 2p coins 0-20 number line</p>	<ul style="list-style-type: none"> Ask the children how many 2p coins they managed to hold in their hands (yesterday's homework). Calculate how much money they held in their hands by counting in 2s, showing this on a number line. Tell the children that you will be setting them a challenge to find out what different totals you can make by using up to ten 2p coins. <p>Take three 2p coins from a purse, total them and tell the children that you have found out that it is possible to make 6p. Record $2p + 2p = 6p$</p> <p>Repeat with five 2p coins.</p> <p>Q How will I know when I have found all the different totals?</p> <ul style="list-style-type: none"> Now work in a more systematic way, taking one coin and recording 2p, then two 2p coins, and three 2p coins. <p>Show how to use a number line to help to calculate the total by counting in 2s.</p> <p>Q What were the differences between the two methods I used to find the totals? Which was better?</p> <p>Draw out that the strategy with one coin, then two... was better because you are less likely to miss out possible totals.</p> <ul style="list-style-type: none"> Ask the children to find all the different totals they can make just using up to ten 2p coins and recording them in their books as they do so. <p>Q What did you notice about all the totals?</p> <p>Draw out that they are all even numbers.</p> <ul style="list-style-type: none"> Explain that this time the purse has three 2p coins and two 10p coins. Ask the children to find all the possible totals using one or more of these coins. <p>Q What will be the smallest total? The largest?</p> <p>Agree that the smallest total will be 2p i.e. one of the coins, and that the largest will be 26p using all the coins.</p>	<ul style="list-style-type: none"> Collect solutions in order from the smallest to the largest. <p>Q How did you make sure you'd got all the totals?</p> <p>Draw out that starting with the smallest total, then the next smallest was helpful.</p> <p>Q If we added another 10p to the purse, what would the biggest total be?</p> <p>Agree that this would be 36p i.e. 10p more than the total of the coins already in the purse.</p> <p>Q If I had a purse full of 2p coins, could I make 29p? What if it was full of 10p coins, could I make 29p then?</p> <p>Agree that you can only make even totals from 2p coins and 29 is not even.</p> <p>Agree that if you add 10p coins, you will get totals which end in 0 and 29 does not.</p> <p>By the end of the lesson children should be able to:</p> <ul style="list-style-type: none"> have a system for finding the possibilities, e.g. start with smallest number; know when all possibilities have been found. <p>(Refer to supplement of examples, section 5, pages 62 and Problem Solving Strategies table.)</p>

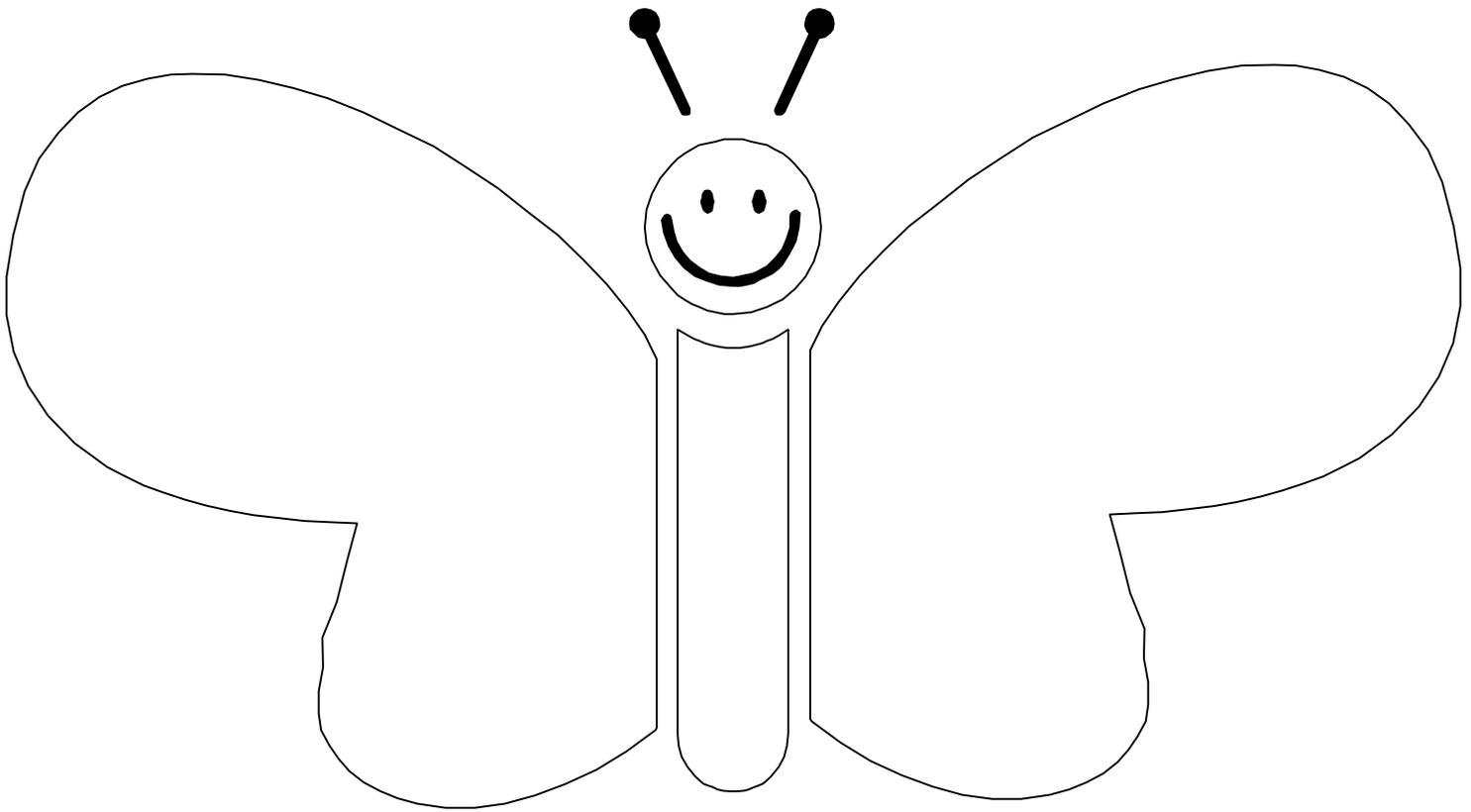
Odd

Even



3 2 1 2 3 2 1 2 3 2 1 2 3 2 1 2 3 2 1





Same Same number of spots both sides	Same Different number of spots on each side

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

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51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100