



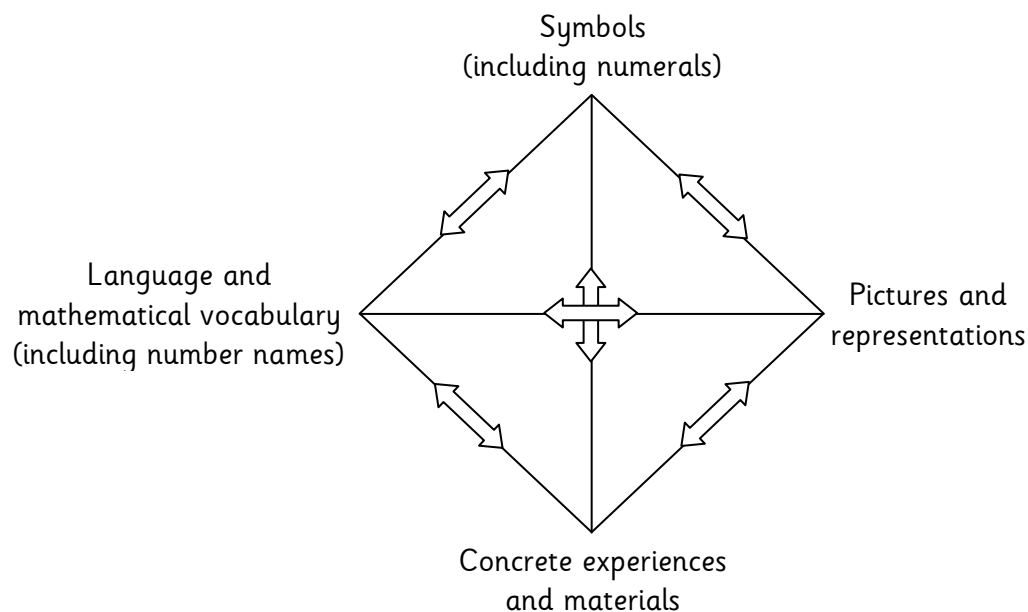
# Willow Dene School Scheme of Work

## MATHEMATICS

### Counting and Understanding Number

**P4 – P8**

**About this Scheme of Work:** This unit explores Counting and Understanding Number. Within this Scheme of Work, there are four strands of mathematical experience: concrete experiences; language; pictures; and symbols. It is the development of networks of cognitive connections between these that allow concepts of number to be developed. In the Scheme of Work, some elements of the process of developing a concept of number have been separated out. However, the diagram below illustrates the possible connections between experiences that might form part of the understanding of a mathematical concept and the importance of interlinking aspects:



It is really crucial when teaching mathematics, not to focus too heavily on any one of the above aspects. A specific aspect may be a legitimate focus during an activity, or over a short period of time, but the aim should then be to make a connection between that aspect of understanding and another. There is a common problem with children demonstrating an aptitude for one aspect of mathematical understanding, such as numeral recognition and sequencing, without being able to make connections between this and a concrete understanding of what those numerals and sequences represent. Thus if a child can recognise and sequence numbers to 10, then next logical

step would probably not be to recognise and sequence numbers to 20, but rather to develop and strengthen the connections between the symbols, language, representations and concrete experiences of numbers to 10.

**This Scheme in no way attempts to be comprehensive. Rather, it aims to offer some ideas of the different areas of early mathematical development, the way mathematical skills may progress, relevant objectives to support progress and a small range of possible teaching activities to promote the development of these skills which can be used as starting points.**

#### **VOCABULARY:**

*Own names, yes, no, more, finished, like, don't like, stop, go, ready*

- Words related to number names, such as: *zero, one, two, three, four, fifteen, sixteen, seventeen, eight, ninety, one hundred, one thousand, etc.*
- Words related to counting, such as: *count, count up to, count on, count back, how many, one each, touch each one, move each one, set*
- Words related to quantity such as: *more, less, many, few*
- Words related to counting in steps, such as: *count in ones, two, tens..., odd, even, every other, multiple of, sequence, continue, predict*
- Words related to estimating and rounding, such as: *guess how many, estimate, nearly, close to, about the same as, just over, just under, too many, too few, enough, not enough, roughly, exact, exactly, round, round to the nearest 10*
- Words related to comparing and ordering numbers, such as: *compare, order, size, the same number as, greater/est, more/most, less/least, bigger/est, larger/est, smaller/est, fewer/est, first, second, third...tenth, next, after, before, between, above, below, equal to*
- Words related to place value, such as: *tens, ones, units, hundreds, digit, "teens number", one-, two- or three-digit number, place, place value, stands for, represents, exchange*
- Words related to fractions, such as: *part, equal parts, fraction, one whole, half, quarter, third, three-quarters, two-thirds*

#### **RESOURCES:**

These have not been specified for this Scheme of Work, as the possibilities are infinite. Children's interests can be exploited if appropriate, although this may not always be the case if it encourages obsessive behaviour.

Use imaginative resources to attract children's attention, such as nasty plastic fingers or pink washing up gloves for finger counting. Or put objects in a surprising place, such as cups in the biscuit tin to engage the children.

It is also really important to encourage children to use maths in practical and real life situations, such as counting the number of children when the register is called, providing enough cups and snacks at drinks time, laying the table for dinner, etc.

AREA	LEARNING OBJECTIVES	POSSIBLE TEACHING ACTIVITIES
<p>The sequence of numbers used for counting (Prerequisite to counting<sup>1</sup>)</p>	<ul style="list-style-type: none"> <li>• To respond to familiar number rhymes, stories, songs, and games</li> <li>• To join in with number rhymes, songs, stories and games</li> <li>• To follow a rote count by clapping, stamping feet, pointing along a number line or signing</li> <li>• To understand that numbers in the counting system are always in the same order</li> <li>• To join in rote counting up to 5 then up to 10</li> <li>• To say the next number in a familiar sequence (e.g. one, two...)</li> <li>• To rote count confidently to 10 independently</li> </ul>	<ul style="list-style-type: none"> <li>• Rote count to three in anticipation activities and encourage children to participate either vocally or through the use of Big Mack or Step-By-Step switches – e.g. 1, 2, 3, Pizza! game with Lycra (stretch the Lycra out on a slow count of 1, 2, 3 and let go on “Pizza!”)</li> <li>• Sing counting songs, supported by props or visual cues, such as presentations on the IWB – the LDA book “10 Little Fingers” has lots of ideas</li> <li>• Rote count along to a drum beat or clap – ask the child to do one drum beat (or clap) for each number. Encourage them to coordinate their drum beat with their (or an adult’s) count</li> <li>• Practice moving different parts of the body along with a count, e.g. stamping feet, nodding head, patting tummy, etc. Encourage the children to match their stamps, nods and taps to the count</li> <li>• Ask children to rote count to 5 or 10 while they hold a visually or physically engaging (distracting) object, such as a spinning light stick or a wiggly giggly ball. This is to practice the skill of saying the numbers while having to take other factors into account, a skill they will need for counting a group of objects</li> <li>• Get a puppet to make a mistake when counting (missing out a number, saying a number twice, getting numbers in the wrong order etc.). Can the children indicate the mistake?</li> <li>• Touch each number on the number track as it counted (with physically prompting if required). This is important even if the child does not recognise the numerals, as finger touching sends strong tactile messages about sequence and quantity directly to the part of the brain that deals with quantity</li> <li>• Count around the circle, each child saying the next number in turn</li> <li>• Count together as coins or conkers are dropped into a jar. Can the children also count quietly using their fingers or in their head?</li> </ul>
<p>Counting to find a quantity<sup>2</sup></p>	<ul style="list-style-type: none"> <li>• To show an interest in number activities and counting</li> <li>• To pair sets of items (e.g. gloves, socks, etc.)</li> </ul>	<ul style="list-style-type: none"> <li>• Show the child two bowls – one containing one button, the other containing lots of buttons. Encourage child to label the bowls “one” and “lots” with symbols and or verbally</li> <li>• Have a group of lots of objects. Ask the child to give you “one”. Label the new sets</li> <li>• Give children experiences daily in one-to-one correspondence by asking them to pass out snacks, put pegs in holes, or put inset puzzle pieces in their holes</li> </ul>

AREA	LEARNING OBJECTIVES	POSSIBLE TEACHING ACTIVITIES
Counting to find a quantity (Continued)	<ul style="list-style-type: none"> <li>• To indicate “one” and “lots” (using words / symbols / signs)</li> <li>• To indicate “one or “two” (using words / symbols / signs)</li> <li>• To develop an understanding of one-to-one correspondence in a range of contexts</li> <li>• To move each object as it is counted</li> <li>• To touch each object as it is counted</li> <li>• To touch or mark each picture as it is counted</li> <li>• To count reliably up to 3 then 5 objects</li> <li>• To recognise differences in quantity</li> <li>• To make sets of up to eight objects</li> <li>• Compare two small sets of</li> </ul>	<ul style="list-style-type: none"> <li>• Ask children to show one or two using their arms, legs, hands or feet.</li> <li>• Ask children to fill a muffin tray with tennis balls or to put one cotton ball in each section of an ice cube tray</li> <li>• Put one spoon in each bowl / one cup on each saucer / one piece of fruit to each doll / one drink to each child / one hat on each doll / one playmobile person in each car / one cube in each train carriage. Increase the number of factors involved – e.g. start with two doll and two hats. Increase gradually to five dolls and five hats as competence develops. Complicate things by giving the child four cups and six saucers, or five bowls with two forks and four spoons.</li> <li>• Glue a specific number of squares on each page (or create a sheet on the computer). Write the numeral at the top. Ask the children to take manipulatives (e.g. Compare Bears or Unifix cubes) and match them up one-to-one with the squares on each page</li> <li>• Cut apples into quarters. How many pieces is each apple cut in to? Ask child to put all of the quartered apples onto a plate for snack time. Encourage them to count each apple as it is put onto the plate</li> <li>• Post letters. Give each child a small number of letters and ask them to count each one as they post it in the letter box. Encourage them to coordinate their “count” with the physical act of dropping the letter</li> <li>• Throw a big foam dice. Count or match objects on to each spot. Encourage children to say each number as the object is placed on the spot.</li> <li>• Guess the amount of cubes, oranges, toy people in a bag. Count each object as you take it out of the bag</li> <li>• Park toy cars into numbered parking spaces in a toy garage. This could be extended into a recording activity by using different coloured cars (e.g. red, green, yellow) and asking children to stick paper representations onto car parking spaces or by asking them to colour in the cars to show the order they parked in</li> <li>• Model counting strategies – placing all of the objects in a line and touching each one as it is counted aloud. Ask the children to copy what you did and verbalise what they are doing “Oh, you’re lining them up, that will help you so you don’t get muddled up about which ones you’ve counted...”</li> <li>• Use motivating resources to practice the skill of touching each object as it is counted. These could include a “magic wand”, a torch, a puppet, a “counting</li> </ul>

AREA	LEARNING OBJECTIVES	POSSIBLE TEACHING ACTIVITIES
<p>Counting to find a quantity (Continued)</p>	<p>objects and say which has more and which has less</p> <ul style="list-style-type: none"> <li>• To subitise small quantities (i.e. recognise how many there are without having to count) e.g. recognise that there are a pair of gloves, or three dice spots</li> <li>• To understand the order irrelevance principle – that the order objects are counted in does not affect their cardinal value</li> </ul>	<p>glove”, etc.</p> <ul style="list-style-type: none"> <li>• Hide plastic insects in sand. Let each child scoop up some sand in a cup and count the number of insects they have caught. Who has the most / least?</li> <li>• Fish large sequins out of the water using a small sieve. How many can you catch in one go?</li> <li>• Make a set of picture cards for the children to match. They then have to find all the cards with two objects on, all the cards with three etc.</li> <li>• Throw a dice. Count that many cups of sand/water into a bucket. Who can fill their bucket first?</li> <li>• Put some small dinosaurs in a box. Ask the children to estimate how many are in the box by shaking. Tip the dinosaurs out and count to check.</li> <li>• Hide farm animals around the playground. Go on a ‘hunt’ to find them. How many can each child collect? How many pigs are there? How many sheep?</li> <li>• Spread out about 10 blank carpet tiles to make a trail of stepping stones. Throw a large dice. Jump on this many tiles.</li> <li>• Find sets of four things e.g. 4 cars, 4 bricks, 4 straws. How many different collections can you make?</li> <li>• Make a picture using sticky shapes. Count the squares, the red shapes, how many shapes in the picture altogether.</li> <li>• Make a bracelet using 3 red beads and 4 blue beads</li> <li>• Lay the table for four teddies. How many cups will you need? How many spoons? Plates? etc.</li> <li>• Give children a picture of a snake with 10 spots on it. Each child tosses a coin. If it lands on heads, they collect one counter and place it over a ‘spot’. If it lands on tails, they collect two. Encourage children to count how many spots they have covered altogether.</li> <li>• Make a domino trail using floor dominoes – to put down another domino you must match the spots</li> <li>• Use a circular track divided into different coloured squares. Throw the dice and move that many spaces around the track. Take a cube to match the colour. Use the cubes you collect to build towers (all the cubes in a tower must be the same colour). Who has the tallest tower at the end of the game?</li> <li>• Use 5 (or 8 or 10) pegs to make a pattern on a pegboard, or hexagonal pattern</li> </ul>

AREA	LEARNING OBJECTIVES	POSSIBLE TEACHING ACTIVITIES
Counting to find a quantity (Continued)		<p>blocks to make a pattern / How many diamond pattern blocks do you need to make a flower?</p> <ul style="list-style-type: none"> <li>• Put count the spots on a piece of paper (1-3). Place a mirror on the paper. Count the number of spots you can see altogether. If you move the mirror does the number of spots stay the same?</li> <li>• Each child has 10 nice objects on a plate. Throw the dice and give that many objects to the person on your right. Continue with each player giving objects to the person on the right. After each round, encourage children to count the objects they have. Talk about who has the most / least and who has more than they started with</li> <li>• Make designs with a fixed number of pattern blocks. Rearrange them into different patterns and count how many have been used. Repeat and emphasis that there are the same amount each time (to encourage development of the order irrelevance principle)</li> <li>• Order a row of cars and count how many. Reorder them and count again. Is there the same amount as before?</li> <li>• Play “Grab a Handful” – place a some objects in a bag and ask the child to grab a handful then count how many they have got. For children at earlier stages of counting, use large objects, such as Duplo, so they will only be able to grab two or three. For children able to count larger sets, use smaller objects, such as Playmobil people or small Compare Bears.</li> <li>• Hide a set of interesting objects (e.g. pretend jewels) around an outdoor area, then take the children on a hunt to find them. After a set amount of time, meet back together to talk about the ‘treasure’. Questions could include:               <ul style="list-style-type: none"> <li>◦ How might you count your jewels?</li> <li>◦ How many jewels have you found?</li> <li>◦ How can you be sure you have counted all of the jewels? Could you check in a different way?</li> <li>◦ Who has collected the most / least?</li> <li>◦ How do you know?</li> <li>◦ How could we sort the jewels?</li> </ul> </li> <li>• Throw a bean bag along a floor number track. Count how many steps you need to take along the track to reach it</li> </ul>

AREA	LEARNING OBJECTIVES	POSSIBLE TEACHING ACTIVITIES
<p>Recognition of numerals (Early Place Value and Ordering)<sup>3</sup></p>	<ul style="list-style-type: none"> <li>• To use fingers to indicate numbers to 5 then 10</li> <li>• To know that a symbol represents each number name</li> <li>• To point to numerals “numbers” (as opposed to text or pictures) in a book</li> <li>• To match numerals to numerals</li> <li>• To recognise and select the correct numeral from a choice of two (or more)</li> <li>• To name numerals to up to 3, then 5 and beyond (using words / symbols / signs)</li> <li>• To associate numerals with their respective dice patterns</li> <li>• To associate numerals with random spot patterns</li> <li>• To use numerals up to 5 in familiar activities and games</li> </ul>	<ul style="list-style-type: none"> <li>• Respond to songs or questions about quantity and numerals by showing the appropriate number of fingers</li> <li>• Match identical numerals to each other on a number track or grid</li> <li>• Make collections of the numerals 1, 2 and 3 using numerals of different sizes colours and fonts</li> <li>• Find the “numbers” in a counting book or page numbers in a story book</li> <li>• Float magnetic numbers in the water tray. Use a magnet on the end of a piece of string to catch a number. If you can read your number, a token? Who has the most tokens after three turns?</li> <li>• Find ‘three’ (or another quantity) e.g. 3 spoons, 3 pencils, 3 bricks. Can you label each collection with a large numeral ‘3’</li> <li>• Hide wooden numbers in the sand. Try to guess the number by feel alone before you dig it out of the sand</li> <li>• Cut large numerals out of different textured materials e.g. sandpaper, textured wallpaper, velvet. Trace over them with a finger</li> <li>• Make rubbings using large wooden numerals, or cut numerals out of textured wallpaper</li> <li>• Children each have a large number card (2 or 3 children with the same number). An adult does a short sequence of claps. Children count the claps together. The children with the correct number of claps on their card stand up</li> <li>• Make numerals out of play dough and press the correct number of counters into the number</li> <li>• Trace numerals in talc / wet sand</li> <li>• Give each child a number card – this must be kept a secret. They do actions to match the number on their card (if the number is 4, they may do 4 jumps, touch the ground 4 times etc.). The other children then have to guess the number on the card</li> <li>• Use a large paintbrush and water to paint numbers on an outside wall. Name the numbers or match to numeral cards</li> <li>• Practise drawing large numerals on the playground with chalk</li> <li>• Use finger paint to paint numerals</li> <li>• Label small containers with numbers. Ask children to put the correct number of buttons in each tub</li> <li>• Print out lots of the target numerals in different font (e.g. 1-3) and ask children to</li> </ul>

AREA	LEARNING OBJECTIVES	POSSIBLE TEACHING ACTIVITIES
Recognition of numerals (Early Place Value and Ordering) (Continued)		<p>stick all of the number ones on the green piece of paper, all the numbers twos on the red pieces of paper, etc.</p> <ul style="list-style-type: none"> <li>• Cover all the numbers on a number track with a counter. Remove one of the counters. If the child can read the uncovered number correctly, they keep the counter</li> <li>• Use a 0 to 12 number track for each child. In turn, each child takes a domino and counts the spots. They then cover the matching number on the track with the domino. If the number is already covered, they must put the domino back. The first player to cover all of their numbers is the winner</li> <li>• Cut numerals out of card. Stick the correct number of stars onto each numeral</li> <li>• Cut up a big cardboard numeral to make a jigsaw for the children</li> <li>• Make towers of cubes or bricks to match the numbers on cards. Swap over 2 of the towers. Can the children work out which ones have been changed? You could also use beads on a string or biscuits on a plate instead of towers</li> <li>• Throw a dice and collect the matching number card. The winner is the first person to collect the number cards 1 to 6</li> <li>• Children each have a set of number cards (1 to 10) and put these in order. Show a number of fingers and the children have to point to the correct card. If they are correct, they can turn the card over</li> <li>• Make postboxes, each with a different numeral on. Children draw a picture (e.g. 4 sweets) on an envelope and post it into the appropriate box. Empty the boxes and check the envelopes have been posted correctly</li> <li>• Make door numbers for a road of model houses</li> <li>• Provide opportunities for writing numerals in the role play area e.g. making stamps, tickets, price labels</li> <li>• Make a mobile phone</li> <li>• Make numerals using pipe cleaners</li> <li>• Look for numbers in newspapers or magazines. Cut them out and put all the numerals that are the same together. Can you find enough numerals to make your own number line?</li> <li>• Order a set of birthday cards with ages on, or match them to pictures of children of different ages</li> </ul>



AREA	LEARNING OBJECTIVES	POSSIBLE TEACHING ACTIVITIES
Number Sequencing (Early Place Value and Ordering) <sup>4</sup>	<ul style="list-style-type: none"> <li>• To order a set of objects in terms of size</li> <li>• To order 3 then 5 numerals</li> <li>• To begin to use ordinal numbers (first, second, third) when describing the position of objects, people and events</li> <li>• To recognise dice spot patterns and relate them to numerals</li> </ul>	<ul style="list-style-type: none"> <li>• Identify the “big” and “small” objects</li> <li>• Order sets of three, five, or more objects in terms of size</li> <li>• Match dice spots (or random patterns of spots) to numerals</li> <li>• Match numerals to dice spot patterns</li> <li>• Order dice spot patterns</li> <li>• Mix up numbers on the washing line while the children have their eyes shut. Can they spot what has happened and put the numbers back in order? Counting along the washing line may help</li> <li>• Put numbered carpet tiles in order to make your own number track</li> <li>• Give children Velcro backed numerals and ask them to place them on a number stick in the right order</li> <li>• Find out by counting which of two collections has more/fewer objects. In each case, check if necessary by lining up and matching one-to-one. For example:               <ul style="list-style-type: none"> <li>◦ Count the cups and saucers (e.g. 5 cups and 3 saucers). Are there more cups or more saucers, or the same number?</li> <li>◦ Count the girls and boys. Are there fewer girls or fewer boys?</li> <li>◦ Would you rather have five £1 coins, or four £1 coins? Why?</li> </ul> </li> <li>• Ask the children to chalk their own number line on the playground</li> <li>• Cut a number track into pieces to make a jigsaw for the children to reassemble</li> <li>• Use a skipping rope as a number line (1 to 5). Children turn over each number card in turn and estimate its position on the line</li> <li>• Make a staircase pattern with bricks, or on pegboard... Make each step one more, or two more... Count how many cubes or pegs make each step. Predict what would come next.</li> <li>• Know that a number following another number in the counting sequence is bigger. For example, look at a number track. Which is more: 3 or 6? Which is less: 4 or 7?</li> <li>• Arrange in order a complete set of numbers (objects, dot patterns, numerals): from 1 to 3 then to 5... progressing to 10 or more... Say the complete sequence.</li> <li>• Put in order these nests with eggs in... this set of cards with buttons on... these boxes with bricks in... these jars with walnuts in... these sticks of cubes... these pots with pens in...</li> <li>• Peg these dotty cards in order to the washing line. Start with the smallest/biggest number.</li> </ul>

AREA	LEARNING OBJECTIVES	POSSIBLE TEACHING ACTIVITIES
Recording <sup>5</sup>	<ul style="list-style-type: none"> <li>• To make marks or collect tokens to represent a count</li> <li>• To record a set with pictures</li> <li>• To trace over numerals and indicate their name (using words / symbols / signs)</li> <li>• To record a set with a numeral (written / stamped / typed)</li> <li>• To write numerals to 10</li> </ul>	<ul style="list-style-type: none"> <li>• Match a variety of different picture sets of “one” and “lots” to the appropriate symbol (or symbols to the picture sets). Encourage the child to say or sign the word, if appropriate</li> <li>• Record “one” or “two” with hand prints or footprints – this could be in sand, by drawing round them, in paint</li> <li>• Bury objects in sand. Children could record how many objects have been found by simply collecting them; by drawing shapes or pictures to represent each object he find; or by making tally marks</li> <li>• Play a game – skittles, throwing beanbags into a hoop etc. Record your score on a whiteboard by tallying, drawing a pictorial representation or writing the correct numeral</li> <li>• Record the number of animals seen on a safari hunt (hide groups of animals around the classroom and ask children to record how many are in each group, e.g. four elephants, three hippos, two lions, etc.)</li> <li>• Write numerals next to a simple symbol-supported recipe, e.g. fruit salad, to record how much of each ingredient to add</li> <li>• The role play area provides a purposeful context for recording. Ideas for recording include: <ul style="list-style-type: none"> <li>◦ Make price labels for items in the shop</li> <li>◦ Make tickets for the bus (put the bus number and / or the price on it)</li> <li>◦ Make menus for the café with prices on them</li> <li>◦ Label the seats on a coach or aeroplane and make tickets with numbers on. Give the ticket out - can all the passengers find their seats?</li> <li>◦ Label boxes with sizes in the shoe shop</li> <li>◦ Label pots with the number of seeds in them in the garden centre</li> <li>◦ Take bookings at the travel agency</li> <li>◦ Make stamps for the post office</li> <li>◦ Take orders for a certain number of items in the restaurant</li> <li>◦ Leave notes for the milkman</li> <li>◦ Write down telephone numbers in the office</li> <li>◦ Note appointment times for patients in the doctors</li> <li>◦ Make notices to show film times at the cinema</li> <li>◦ Write down recipes in the kitchen</li> </ul> </li> </ul>

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<sup>1</sup> Children who are non-verbal may still develop the ability to count and label a set of objects without being able to rote count verbally. However, some may be rote counting internally, so it is important they have lots of opportunities for counting songs, rhymes and stories

<sup>2</sup> There is a lot of overlap between activities to develop counting strategies, recording and numeral recognition (see diagram at the beginning of the Scheme of Work). These links should be emphasised and exploited, and activities adapted according to the primary learning objective

<sup>3</sup> See note 2

<sup>4</sup> See note 2

<sup>5</sup> See note 2