



Redwood School Number Knowledge Progression

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As these are a progression, students should feel secure with the number knowledge at the previous stage before moving on to the next stage.

Stage 0 - Year 0 / arrival at school

I can:

- ★ Read numbers from 0 to 5
- ★ Count forwards to 5
- ★ Count backwards from 5
- ★ Say a number after a given number between 1 and 5
- ★ Order numbers to 5
- ★ Count forwards and backwards to and from 5 in Maori

Stage 0 - How to help at home

At this stage counting is the most important skill to master. Counting is learnt through repetition so take lots of opportunities to rote count (just saying the numbers) and counting objects. Count with your child, and help them count right up to 100, or demonstrate it to them so that they hear the patterns of the numbers.

- ★ Children can begin to explore the number of fingers on their hands and show numbers to 5 on them, perhaps more.
- ★ Singing counting/nursery rhymes.
- ★ Using picture books e.g. The Hungry Caterpillar
- ★ Play Snap with playing cards.
- ★ Counting backwards and forwards to 5.



Redwood School Number Knowledge Progression

Stage 1 - Year 0 / beginning of Year 1

I can:

- ★ Read numbers from 0 to 10
- ★ Count forwards to 10
- ★ Count backwards from 10
- ★ Say a number after a given number between 1 and 10
- ★ Order numbers to 10
- ★ Recognise pairs of numbers that make 5 e.g. $3+2$
- ★ Count forwards and backwards to and from 10 in Maori

Stage 1 - How to help at home

These children can count a small group of objects but have not yet learnt to add two numbers together. At this stage finger patterns to 10 are a very important tool to have (you always carry your fingers with you and don't need a container of counters). Support your child with these activities. They are not yet ready to do them by themselves.

- ★ Continue becoming proficient at showing numbers to 10 on fingers. "Show me 5 fingers (high five!), show me 7 fingers, etc.
- ★ "Show me 3 fingers on one hand and 2 fingers on the other hand. How many altogether? (Help the child count from one to find out. They will not yet be able to start from 3 and count on).
- ★ Show the child 5, 3, 7, 8, etc. fingers on your hands and see if they can tell you how many there are. As they get more proficient at this they may recognize patterns instantly. Build up to five fingers on one hand first, then some more eg 7 will be one whole hand and 2 more.
- ★ Three big plates on the table and three small plates. How many plates altogether? (Count from one)
- ★ Practise counting up to 10 e.g. number rhymes "Ten Little Indians", "Once I caught a fish alive" etc.
- ★ Practise counting down from 10 e.g. a rocket blasting off. "Ten Fat Sausages" song.
- ★ Look at the calendar to see what the number today is. What number was it yesterday? What will it be tomorrow?
- ★ Look at the numbers on letter boxes.
Learn a useful phone number and read it as well.
- ★ Use everyday happenings to discuss numbers – counting people, food, cars in the driveway, wheels on the cars, etc.
- ★ Include subtraction with addition. We have 9 muffins. How many will be left when we have eaten 2? Find out by eating 2 muffins to see if you were right!
- ★ Halve and quarter oranges and apples and name the pieces. Count how many quarters there are in two apples when cut, etc.
- ★ Play Dominoes.



Redwood School Number Knowledge Progression

Stage 2 - Middle of Year 1

I can:

- ★ Read numbers from 0 to 20
- ★ Read $\frac{1}{2}$ s and $\frac{1}{4}$ s
- ★ Count forwards to 20
- ★ Count backwards from 20
- ★ Say a number after and before a given number between 1 and 20
- ★ Order numbers to 20

Stage 2 - How to help at home

These children can now solve addition and subtraction problems to 10 using their fingers, by counting from the first finger. They now need to learn to hold an image of these numbers in their head. They will need patience and support to do this. They can now explore problems with bigger numbers – to 20, and start to group objects into tens to learn about our place value system.

- ★ Cut up a calendar so that you have the numbers to 31. Help the child to reassemble the numbers into the right order (you could start with smaller sections first eg 1 – 10, 1 – 20, etc.) Use a complete page of a month to check whether it's correct, or use a complete month to use as a guideline. Count the numbers and point to each number in order. Count backwards while pointing to the numbers. Cover up some numbers and see if the child can tell you what they are. E.g. cover 15. The child might count from one to find out, or just know. Uncover the number to see if they were right.
- ★ Use fingers to learn the groupings to 5. eg 2 and $_?$, 4 and $_?$, 3 and $_?$ And groupings to 10: "How many more do we need to make ten? We have 6; we have 8; we have 2, etc."
- ★ Pizza night! "We have 2 pizzas cut into 6 pieces each. How many pieces altogether? How many will the 4 of us have each if we share them evenly?" Do it with your child to find out.
- ★ "Nana gave us 20 lollies. Two people will get half each. How many is half of 20?" Share the lollies out to find out.
- ★ Use fingers to solve addition and subtraction problems to 10, then when really good at that, do it on your fingers behind your back. Check if you're right by looking at the fingers afterwards.



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Stage 3 - End of Year 1

I can:

- ★ Say what the answer is for doubles up to $5+5$ e.g. $2+2=4$
- ★ Recognise pairs of numbers that make 10 e.g. $4+6=10$ and $10-6=4$

Stage 3 - How to help at home

These children can now hold numbers in their heads without having to look at all the objects and need to learn to count on eg $9 + 4$ - is 10, 11, 12, 13 (counting from the 9 now and not from one) and back down for subtraction eg $12 - 3$ is 11, 10, 9. It is important that the second number added is no bigger than 4 while learning this skill, as it is the optimum number that can be kept track of in their head. Children can keep track of what they're adding on either by their fingers or in their head.

- ★ Count with or for your child in 10s to 100, 2s to 20 or more, 5s to 50 or more. Then back again. Write the numbers down so the child can use them as a guide. Keep skip counting in 2s, 5s 10s etc. To work out three 2s, use fingers to track - 2, 4, 6. Or use pictures cut out and group into twos etc.
- ★ Board games eg snakes and ladders, etc help counting on because the child moves the counter from the number they're on (at earlier stages children want to move right back to one each time they have a turn as they don't yet understand about 6 more, 4 more, etc)
- ★ Bundle iceblock sticks with pipe cleaners into 10s, or haricot beans (uncooked!) into empty plastic containers to see how many there are. Count the tens in tens and the ones left over in ones. Start with numbers up to 40 or so. Start calling the bundles of ten a ten. —Let's get 30 sticks. How many bundles of 10 will that be? How many tens have we got here? How many is that altogether?
- ★ Play a game with 2 dice and the iceblock sticks or haricot beans boxes. Roll the dice and work out how many has been thrown. Collect that number of sticks or beans. The rule is that every time you have ten they must be bundled up or put in the canister. Keep playing and see who gets the most. (*Often interesting talk will be generated by this game as the children work out who has got the most, how many more they need to have the same number, etc. As adults we can generate this talk without dominating the game too much, to keep the game fun.*)
- ★ Use contexts to practice maths equations:
- ★ There are three people in our family, we have two people coming for tea - How many more chairs will we need? (No materials in front of the child - they need to picture what it will look like.)
- ★ Play card games such as Memory.



Redwood School Number Knowledge Progression

Stage 4 - End of Year 2

I can:

- ★ Read and write any number to 100
- ★ Read unit fractions with a 1 on top ($\frac{1}{2}$, $\frac{1}{4}$, $\frac{1}{3}$, $\frac{1}{5}$, etc)
- ★ Count forwards and backwards to 100 from any number
- ★ Say a number after and before a given number between 1 and 100
- ★ Order numbers to 100
- ★ Say what the answer is for doubles up to $10+10$ e.g. $8+8=16$
- ★ Recognise pairs of numbers that make 20 e.g. $14+6=20$ and $20-16=4$
- ★ Recognise teen facts e.g. $10 + ? = 18$
- ★ Recognise multiples of 10 that add to 100 e.g. $40+60=100$
- ★ Identify how many 10s are in the decades e.g four 10s in 40



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Stage 4 - How to help at home

These children may have trouble believing there are strategies beyond counting on, as counting on is a milestone in itself and the children are often very proud they have reached this stage! We now need to let them know that they're very clever at counting on, but now they need to use the knowledge they have of numbers to try to use other clever ways to add numbers.

This is a very difficult and lengthy transition to make so remain patient and support the child's effort. It may take a while. The thinking now required is the ability to split numbers into parts and rejoin them to solve sums, without having to count on or back in ones, etc.

- ★ e.g. working out $9 + 4$ by just knowing that $9 + 1 = 10$, so we can take one from the four and add it to the 9, making ten, then we'll have 3 left.
- ★ Or, $8 + 7 = 15$ because if they know that $8 + 8 = 16$ off by heart, I can take one off to get the answer, because 7 is one less than 8.
- ★ So in order to use these strategies the child needs to have certain knowledge:
 - ★ Know their doubles to 20 off by heart ($6 + 6$, $7 + 7$, $4 + 4$, etc.)
 - ★ Know combinations to 10 off by heart ($7 + 3$, $2 + 8$, $9 + 1$, etc.)
 - ★ Know $10 +$ some more off by heart ($10 + 2 = 12$, $10 + 6 = 16$, etc.)
- ★ When playing board games see if the child can work out which number they're going to land on without having to move space by space. e.g. I'm on 26 and I've thrown a 5. Where will I land? Games such as Ludo and Backgammon can involve split moves. e.g. instead of moving one counter 6, they could move another counter 4 and another 2.
- ★ Continue playing grouping to 10 games with iceblock sticks or haricot beans, etc (mentioned in 'Counting From One By Imaging' section.) Try using 3 dice to make adding the totals a little more challenging.
- ★ Board games could be played using two multi-sided dice so that the children are adding bigger numbers together.
- ★ Practise basic facts –doubles ($4 + 4$, $9 + 9$, etc.) and addition and subtraction facts to 10 (eg $6 + 4$, $2 + 8$, $5 - 3$ etc.)
- ★ Learn as family of facts:
 - ★ $4 + 3 = 7$ $3 + 4 = 7$ $7 - 4 = 3$ $7 - 3 = 4$
- ★ Practise counting forwards to 100 and back to 0 again (or lower!), counting in 2s 5s 10s.
- ★ Use the odometer of the car to practise reading large numbers
- ★ Use real life contexts e.g. I have 50 cents and I get 20 more cents - how much have I got?



Redwood School Number Knowledge Progression

Stage 5 - End of Year 4

I can:

- ★ Read and write any number to 1000
- ★ Read unit fractions with a 1 on top ($\frac{1}{2}$, $\frac{1}{4}$, $\frac{1}{3}$, $\frac{1}{5}$, etc) and explain what they mean
- ★ Count forwards and backwards in 1s, 10s and 100s to 1000
- ★ Say the number 1, 10 or 100 more and less than numbers to 1000
- ★ Order numbers to 1000
- ★ Order fractions with the same denominators
- ★ Round 3 digit numbers to the nearest 10 and 100
- ★ Explain what fractions greater than 1 whole mean e.g. $\frac{3}{2}$, $1\frac{1}{2}$

I know:

- ★ Addition facts to 20
- ★ Multiples of 100 that add to 1000 e.g. $400 + ? = 1000$
- ★ Know multiplication facts for 2x, 5x, x10
- ★ The face, place and total value of any digit in a 4 digit number
- ★ How many 10s in number up to 1000
- ★ + and - number pairs that make 100 e.g. $57 + 43 = 100$, $100 - 75 = 25$



Redwood School Number Knowledge Progression

Stage 5 - How to help at home

Students at this stage are becoming capable with the ability to split numbers into parts and rejoin them to solve sums, without having to count on or back in ones, etc.

Eg working out $9 + 4$ by just knowing that $9 + 1 = 10$, so we can take one from the four and add it to the 9, making ten, then we'll have 3 left.

Or, $8 + 7 = 15$ because if I know that $8 + 8 = 16$ off by heart, I can take one off to get the answer, because 7 is one less than 8.

- ★ Car journeys – we've travelled 25 km today. If we travel that far tomorrow, how far will we have gone? If we'd stopped 8 km back, what would the odometer reading be?
- ★ Explain to your child the strategies you are using to work things out as they occur. You may be surprised by the number of mental strategies you have. See if your child can use your strategy and you use theirs. See if they can think of other ways it could be worked out. E.g. when shopping, you may have bought something for \$12 and something for \$9. How would you work out the total in your head? You may know that \$12 and \$8 is \$20, then one more is \$21. Or that $\$9 + \$9 = \$18$, and \$3 more is \$21.
- ★ Children at this stage need to learn a lot about the Base Ten nature of our number system. Continue playing grouping to 10 games with ice-block sticks or haricot beans, etc (as mentioned in Stage 1. Try using 3 dice to make adding the totals a little more challenging.
- ★ Continue checking doubles to 20 ($4 + 4$, $9 + 9$, $14 - 7$ etc.) have been remembered and facts to 20 (eg $16 + 4$, $2 + 12$, $9 + 11$, $17 - 4$).
- ★ Practise automatically knowing facts from the 2, 5 and 10 times tables (\times and \div). Learn them as family of facts. Use flash cards to help with this.
- ★ **$5 \times 4 = 20$** $4 \times 5 = ?$ $20 \div 4 = ?$ $20 \div 5 = ?$ Talk about the link between basic facts and fractions (using common fractions)
- ★ eg. $5 \times 4 = 20$ so $1/4$ of 20 = 5 $1/5$ of 20 = 4
- ★ Begin to learn counting patterns and groupings for the others eg 3's, 4's etc. forwards and backwards.
- ★ Take opportunities to share your maths strategies with your child and encourage them to share their own. Play board games and card games together– crib, 500, etc.
- ★ Using dates and calendars e.g. I was born in 1987 – How old am I now?



Redwood School Number Knowledge Progression

Stage 6 - End of Year 6

I can:

- ★ Read and write any number to 1,000,000
- ★ Read and write decimals to 3 decimal places
- ★ Read any fractions including mixed and improper fractions
- ★ Say the number 1, 10 or 100 more and less than numbers to 1,000,000
- ★ Order numbers to 1,000,000
- ★ Order fractions with the different denominators
- ★ Round whole numbers to the nearest 10, 100 and 1000
- ★ Round decimals to the nearest whole number

I know:

- ★ All times tables up to 12×12
- ★ How many 2s, 3s, 5s, 10s are in numbers to 100 and any remainders
- ★ All + and - facts to 20
- ★ How many 10s and 100s in a 4 digit number
- ★ + and - number pairs that make 1000 e.g. $570 + 430 = 1000$,
 $1000 - 750 = 250$
- ★ How to move numbers up and down the decimal scale by multiplying and dividing by 10 and 100
- ★ What happens to a number when we multiply or divide it by 1 and 0



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Stage 6 - How to help at home

Advanced additive children use a variety of ways to solve and estimate the answers to addition and subtraction problems. They see numbers as whole units in themselves but are also able to split numbers up and see lots of possibilities for subdivision and recombining.

Children working at this stage need lots of reinforcement of their basic facts both in addition, subtraction, multiplication and division.

- ★ Make small flash cards of all the basic facts and put them into piles of those that are known and those that aren't. Work on the pile they don't know, gradually getting that pile less.
- ★ Continue reading large numbers up to trillions. Use the odometer of the car and read these numbers. What is one more? One less? Ten more? Twenty more? A hundred less? A hundred more?
- ★ Gather some decimal numbers from magazines, newspapers, advertising flyers etc. Place these in order. Be careful to use more than just prices. Do the same with fractional numbers.
- ★ Use the car sales pages or house sale pages in a Saturday paper and get the children to say and then order some large numbers. Which is the most expensive car? The cheapest?
- ★ Using dates and calendars, look for patterns e.g. numbers in a square or diagonal numbers.

Use contexts to practice maths equations:

- ★ Buying packs e.g. cans of soft drink – 6 packs of 4 cans – how many altogether? What is the total volume?
- ★ If a packet of 10 cakes were \$2.50 – how much would each cake cost? 8 pies shared among 3 people – how much would each person get?
- ★ Reading family phone numbers as a number rather than as digits e.g. 3126533 – three million, one hundred and twenty-six thousand, five hundred and thirty-three.
- ★ Practise automatically knowing all basic facts (\times and \div). Learn them as family of facts. Use flash cards to help with this.
- ★ **$5 \times 4 = 20$** $4 \times 5 = ?$ $20 \div 4 = ?$ $20 \div 5 = ?$ Include fractions $1/4$ of $20 = 5$ $1/5$ of $20 = 4$



Redwood School Number Knowledge Progression

Stage 8 - End of Year 8

I can:

- ★ Read and write any decimal, fraction, ratio, percentage or integer
- ★ Count forward and backwards in decimals (thousandth, hundredth, tenth, one, tens etc)
- ★ Say the number $1/10$ th, $1/100$ th or $1/1000$ th more and less any number
- ★ Order decimals to 3 decimal places
- ★ Order mixed fractions
- ★ Order fractions with the different denominators
- ★ Round whole numbers and decimals to nearest 100, 10, 1, 0.1, 0.01
- ★ Convert fractions to decimals and percentages
- ★ Identify factors of numbers up to 100

I know:

- ★ All times tables and division facts up to 12×12
- ★ Equivalent fractions with denominators 10, 100 and 1000
- ★ Decimal and percentage amounts for $1/2$, $1/4$, $1/5$, $1/10$
- ★ Squares and square roots to 100
- ★ Face, Place and Total Value of any digit in numbers up to 1,000,000



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Stage 8 - How to help at home

Mathematicians at this stage find solutions using common factors, the multiplication of decimals and the calculation of percentages. These thinkers can find the relationship between two different measures.

- ★ Children should be encouraged to say decimal word sequences counting forwards, backwards by the thousandth, hundredths, tenths, ones, tens etc., starting at any decimal number.
- ★ Children need to practice saying the number one-thousandth, one-hundredth, one-tenth, one, ten, etc. before and after any decimal number.
- ★ Gather some decimal numbers from magazines, newspapers, advertising flyers etc. Place these in order. Be careful to use more than just prices. Do the same with fractional numbers.
- ★ Use the car sales pages or house sale pages in a Saturday paper and get the children to say and then order some large numbers. Which is the most expensive car? The cheapest? What is the difference between the two?

Continue to use contexts to practice maths equations:

- ★ Make use of percentages – 20% discount on an item? How much will we save? What will the final price be?
- ★ Use ratio/proportion – At our hangi we need six carrots for every five people, how many will we need for 15 people?

Again encourage students to try other strategies to check their answers.