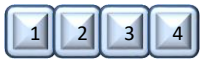
Unit Overview and Guidance

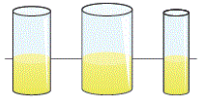
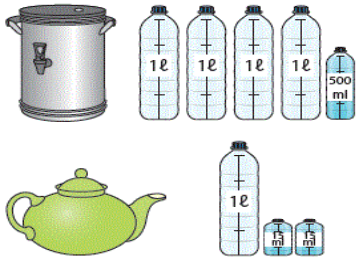
- The exemplification has been taken from the NCETM online 'Resource Toolkit', with additions in order to ensure full coverage.
- Links to the White Rose Maths hubs schemes of work (with questions categorised into the three aims of the national curriculum i.e. fluency, problem solving and reasoning) are hyperlinked to each of the objectives. Many thanks go to the White Rose Maths hub for permission to include their resources.
- The NCETM reasoning questions have also been incorporated into each unit and are identified in pale purple boxes underneath the group of the most relevant objectives.
- The 'big Ideas' sections from the NCETM 'Teaching for Mastery' documents have been included at the start of each unit. Hyperlinks to the full NCETM 'Teaching for Mastery' documents have also been included for easy reference.
- Hyperlinks to NRich activities have also been added to this version. These are found by clicking on the blue buttons like this one  at the bottom of relevant objective.
- Some additional content has been added in order to support mixed-aged planning. Any additional content is in *italics*. Occasionally ~~strikethrough~~ has been used to identify when an objective has been altered and this is primarily where an objective has been split between two units.
- Each unit is sub-divided into sections for ease of planning. Sub-categories in this unit are;
    1. Estimate, measure, weigh and compare
    2. Money
    3. Perimeter
    4. Time

	Reception	Yr 1	Yr 2	Yr 3
NCETM Teaching for Mastery Questions, tasks and activities to support assessment	**The Big Ideas** *Shape, Space and Measures (Early Learning Goals)* Use everyday language to talk about size, weight, capacity, position, distance, time and money to compare quantities and objects and to solve problems.	**The Big Ideas** Measurement is about comparison, for example measuring to find out which rope is the longest. Measurement is about equivalence, for example how many cubes are equivalent to the length of the table or the mass of the teddy? Standard units can initially be introduced through using a unit that is greater than the things being compared, for example comparing the capacity of a cup and a carton by filling each and pouring into matching bottles to compare the two. Measuring is a practical activity and the activities below should be conducted in practical contexts, using real materials.	**The Big Idea** We need standard units of measure in order to compare things more accurately and consistently.	**The Big Ideas** Developing benchmarks to support estimation skills is important as pupils become confident in their use of standard measures. The height of a door frame, for example, is approximately 2 metres, and a bag of sugar weighs approximately 1 kilogram.
	Becoming a Mathematician	Teaching for Mastery Year 1	Teaching for Mastery Year 2	Teaching for Mastery Year 3

MEASUREMENT (MEA - 9 weeks)

Strand		Reception	Yr1	Yr2	Yr3
Estimate, measure, weigh, compare and convert units	Measuring – lengths and height (and Perimeter)	***30-50 months*** *Uses shapes appropriately for tasks.* ***30-50 months*** *Beginning to talk about the shapes of everyday objects, e.g. 'round' and 'tall'.* ***40-60+ months*** *order two or three items by length or height* ***40-60+ months*** *estimate how many objects they can see and check by counting them* ***40-60+ months*** *use the language of 'more' and 'fewer' to compare two sets of objects* ***Adult Initiated*** **Compare the heights** of two, then three, children by standing back to back or lying on the floor. **Compare the lengths** of two, then three, pencils, pens, crayons and paint brushes. Check that the children match the ends correctly. *Which is longest? How can you tell? Is the crayon longer or shorter than the pen? Where do you think we should put this brush? Why?* **Find, pick out or make** objects that are taller, shorter, wider, thinner … than a given one; *Can you find a ribbon in the 'ribbon shop' that is wider than this one?* **Guess first then check:** *How far up the wall you can reach?* *How far you can throw the bean bag?* *How far you can jump from this line?* **Use non-standard measures**. *How many cubes long is your foot? Whose foot is longest?* Measure the rocket using Lego bricks. Measure it again using lolly sticks. *What do you notice? Why do you think it measured less when you used the lolly sticks?* ***Enabling Environments –child initiated, adult supported*** **Tidying routines: e.g.** Putting sand and water resources, organising the different sizes of wood blocks. *Where does the larger spade go? Which block is the same size as this one?* Ribbons on a washing line: model language e.g.,-long, longest, longer than-short, shortest, shorter than, equal length Treasure hunts: *Can you find….2 sticks shorter than this one? How many sticks wide is the….? How many sticks high is the ….* **Indoors** **Role Play: Traditional stories** Goldilocks and the 3 Bears in the home corner Titch: explore the different sized clothes and toys etc Ruby and the Parcel Bear: play activities linked to different sized parcels, wrapping presents **Malleable Area:** making playdoh worms. *Which is the longest? Can you make one shorter/longer that this one?* Choosing/ ordering different sized rolling pins. *Which rolling pin is longer?*	**compare, describe and solve practical problems for:** • **lengths and heights (e.g. long/short, longer/shorter, tall/short, double/half)** Use their experience of standard units to make realistic estimates, answering questions such as: • Is the table taller or shorter than a metre? • Is this doll taller or shorter than one of the class rulers?  **measure and begin to record the following:** • **lengths and heights** Use standard units to measure and compare objects. For example, they place metre sticks end-to-end to find out how much wider the hall is than the classroom. 	**choose and use appropriate standard units to estimate and measure length/height in any direction (m/cm); to the nearest appropriate unit, using rulers and scales** Suggest sensible units you might use to measure: the height of your table? Choose a piece of equipment to help you measure: how long the classroom is; how long this lesson lasts. How long is this line? Now draw a line 2 cm longer than this one. How long is the pencil?  Find an object in the classroom that you think is about 10 cm long. If I programme my floor turtle to go forward three metres is there enough room in the classroom? How could you measure to find out?  **compare and order length and record the results using >, < , =**	**measure, compare, add and subtract: lengths (m/cm/mm);** Length: children should be able to find something that they think is just shorter/longer than a metre/centimetre/millimetre. They should be able to check whether they are right. What is the difference in length between the pen and the pencil?  Say what each division on this scale is worth and explain how they worked this out.  **measure the perimeter of simple 2-D shapes** Measure the sides of regular polygons in centimetres and millimetres and find their perimeters in centimetres and millimetres

MEASUREMENT (MEA - 9 weeks)

Estimate, measure, weigh, compare and convert units	Measuring – Capacity (and temperature)	***30-50 months*** *Uses shapes appropriately for tasks.* ***30-50 months*** *Beginning to talk about the shapes of everyday objects, e.g. 'round' and 'tall'.* ***40-60+ months*** *order two items by weight or capacity* ***40-60+ months*** *estimate how many objects they can see and check by counting them* ***40-60+ months*** *use the language of 'more' and 'fewer' to compare two sets of objects* ***Adult Initiated*** **Find, pick out or make** objects that are taller, shorter, wider, thinner or heavier, lighter… than a given one; *Which bucket will hold the bucket the most? How can we find out?* *Will all the water in the bowl will go into the bucket, or will there be too much?* **Guess first then check:** *How full will this bottle will be when I pour in this jug of water?* ***Enabling Environments –child initiated, adult supported*** **Indoors and Outdoors** Make sure there are resources and collections e.g. natural objects, seasonal nature collections etc. available for children to make comparisons and extend adult initiated experiences. **Outdoors** Investigate the size of puddles. *How can we work out which is the bigger?* **Water/ sand area:** comparisons of which container holds more/ is the heavier? Using non-standard containers to measure, e.g. cups, spoons, tubs etc. *How many did it take to fill it?*	**compare, describe and solve practical problems for:** • **capacity/volume (full/empty, more than, less than, quarter)** Use their experience of standard units to make realistic estimates, answering questions such as: • Does this bottle hold more or less than the litre jug? Captain Conjecture says "Each of theses glassess contains the same amount of juice" Do you agree? Explain your answer.   **measure and begin to record the following:** • **capacity and volume** Use standard units to measure and compare objects. For example, they use a litre jug to measure how much more the washing-up bowl holds than the cola bottle.	**choose and use appropriate standard units to estimate and measure temperature (°C) and capacity (litres/ml) to the nearest appropriate unit, using thermometers and measuring vessels** Suggest sensible units you might use to measure: how much water is in a cup; the weight of my reading book; how long it takes me to wash my hands, what is the temperature on this thermometer? Choose a piece of equipment to help you measure: how long this lesson lasts; how much water a cup holds. How much water is in this measuring jug?  **compare and order volume/capacity and record the results using >, < , =** Megan and Jack are growing beans. Megan's plant is 25 cm tall. Jack's is 38 cm tall. Whose plant is the taller? By how much? Can you compare them using > or < ?	**measure, compare, add and subtract: volume/capacity (l/m)** Here is a tea urn and a teapot. The bottles show how much water each can hold.  How much more does the tea urn hold? Capacity: Find a container that they think would hold one litre and check to find out if they were correct.

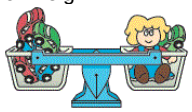
MEASUREMENT (MEA - 9 weeks)

<table>
<tr>
<td rowspan="2">Estimate, measure, weigh, compare and convert units</td>
<td>Measuring – Mass and Weight</td>
<td>30-50 months Uses shapes appropriately for tasks.
30-50 months Beginning to talk about the shapes of everyday objects, e.g. ‘round’ and ‘tall’.
40-60+ months order two items by weight or capacity
40-60+ months estimate how many objects they can see and check by counting them
40-60+ months use the language of ‘more’ and ‘fewer’ to compare two sets of objects

Adult Initiated
Find, pick out or make objects that are or heavier, lighter… than a given one;
Can you find a shell that is lighter than this one? How can we check?
Use a balance to find out which of two, then three, teddies, lunch boxes, shoes… is lighter
Guess if the banana is lighter than the orange, when they are held in the hands.
How can we check? What do you think will happen when we put the banana on this side of the balance scale and the orange on this side?
Find three things which you think will be lighter than the orange. Were you right?
Predict whether a large packet of cotton wool is heavier or lighter than a small tin of tomatoes.

Enabling Environments –child initiated, adult supported
Indoors and Outdoors
Treasure hunts: Can you find…. 3 stones heavier than the shell?
Make sure there are resources and collections e.g. natural objects, seasonal nature collections etc. available for children to make comparisons and extend adult initiated experiences.
Tidying routines: e.g. Putting sand and water resources, organising the different sizes of wood blocks. Which parcel is the heaviest? Can we sort them heaviest to lightest?
Indoors
Set up a shop /post office- weighing</td>
<td>compare, describe and solve practical problems for:
• mass or weight (e.g. heavy/light, heavier than, lighter than)

Use their experience of standard units to make realistic estimates, answering questions such as:
• Which of these things do you think will weigh less than a kilogram?

There are five cars in one side of the scales. The scales are balanced. What could the doll weigh?
 

measure and begin to record the following:
• mass/weight</td>
<td>choose and use appropriate standard units to estimate and measure length/height in any direction (m/cm); mass (kg/g); to the nearest appropriate unit, using rulers and scales

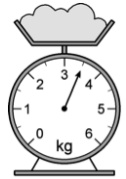
Suggest sensible units you might use to measure: the weight of my reading book;

Choose a piece of equipment to help you measure: the weight of your shoe;

About how heavy do you think your pencil case is?

compare and order mass, and record the results using >, < , =</td>
<td>measure, compare, add and subtract: mass (kg/g);

Mass: Say which object in the classroom is heavier than 100 g/kilogram/half-kilograms and know how to check if they are correct.

What is the weight of the flour shown by this scale?
  </td>
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<tr>
<td>NCETM Reasoning</td>
<td>NRICH EYFS: Making Caterpillars
NRICH EYFS: Long Creatures
NRICH EYFS: Presents
NRICH EYFS: Balances
NRICH EYFS: Water Water</td>
<td>Top tips
How do you know that this (object) is heavier / longer / taller than this one?
Explain how you know
Application
(Can be practical)
Which two pieces of string are the same length as this book?</td>
<td>Top tips
Put these measurements in order starting with the smallest.
75 grammes
85 grammes
100 grammes
Explain your thinking
Position the symbols
Place the correct symbol between the measurements > or <
36cm ▢ 63cm
130ml ▢ 103ml
Explain your thinking
Application
(Practical)
Draw two lines whose lengths differ by 4cm.</td>
<td>Top Tips
Put these measurements in order starting with the largest. Explain your thinking
Half a litre, Quarter of a litre, 300 ml
Position the symbols Place the correct symbol between the measurements > or <
306cm ▢ Half a metre
930 ml ▢ 1 litre
Write more statements
If there are 630ml of water in a jug. How much water do you need to add to end up with a litre of water? What if there was 450 ml to start with?
Testing conditions
A square has sides of a whole number of centimetres. Which of the following measurements could represent its perimeter?8cm 18cm 24cm 25cm</td>
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</table>

MEASUREMENT (MEA - 9 weeks)

Money

Money

40-60+ months *Beginning to use everyday language related to money*

Adult Initiated

Use coins to pay for things or buy things in the class 'shop', tickets on the 'bus', at the 'funfair' or 'skittle alley'… recognising that coins are used to pay and give change.
Distinguish coins.
Sort money into spaces in a shop till, e.g. 10p, 50p, £1, £2;
Feed 20p or 50p coins into a pretend drinks machine or car park ticket machine;
Buy 20p stamps, using 20p coins;
In the 'pound shop', buy items costing £1, using £1 coins…
Visit a real shop and give children the opportunity to handle real money
Play money games.
For example, roll dice to collect £1 coins to the value of £10… or 1p coins to the value of 10p.
Help the puppet who has got into a muddle counting his money. *Can you help him sort his coins? How should he do it? Can you think of a good way to count these coins?*
Begin to recognise that some coins have a greater value than others, and will buy more: for example, 2p is worth more than 1p; 5p is worth more than 2p; £2 is worth more than £1.

Begin to count up how much is this is altogether?
Work out what to buy and how to pay. James paid 3p for chews. *Which coins could he use? What if he paid 4p?*
Make price labels on items in the class 'shop' and match penny coins to them.
Extend to using combinations of 2p and 1p coins.

Enabling Environments –child initiated, adult supported

Make sure the resources are available for children to extend and revisit the adult initiated experiences opposite.
Role play: cost of buying tickets for bus and train rides. Ice cream stall making labels for cost and using 1p coins to match prices and to buy the ice-creams.
Paying for repairs at the role play garage
Snack café/shop: pay the appropriate coin or number of 1 p coins to access snack as part of the independent snack routines in place.
Role play: shops (food, pets, bakery, greengrocers, market stall, shoe shop etc.) writing price labels and paying using pennies and /or appropriate coins.
How much will this cost altogether?
NRICH EYFS: Shopping

recognise and know the value of different denominations of coins and notes

Distinguish coins by sorting them and start to understand their value. They begin to recognise that some coins have a greater value than others, and will buy more: for example, 2p is worth more than 1p; 5p is worth more than 2p; £2 is worth more than £1. They play money games and collect 1p or 2p coins to the value of 10p and begin to count up 'how much this is altogether'. They extend their activities in the classroom shop, paying for items that cost 1p, 3p, 5p, 7p or 9p using only 2p coins, and receiving the appropriate amount of change in 1p coins. They use coins to help them to respond to questions such as:

- Michael had £5. He spent £3. How much did he have left?
- Rosie had a 10p coin. She spent 3p. How much change did she get?
- How much altogether is 1p and 2p and 5p?
- Sunita spent 5p and 6p on toffees. What did she pay altogether?
- Chews cost 2p each. How much do three chews cost?
- An apple costs 12p. Which two coins would pay for it? What combinations of 3 coins would pay for it?

Solve one step problems that involve addition and subtraction, using concrete objects and pictorial representations, and missing number problems.

recognise and use symbols for pounds (£) and pence (p); combine amounts to make a particular value;

find different combinations of coins that equal the same amounts of money

Holly has these coins.

Harry has the same amount of money but has six coins.

What are they? Is there only one possible answer?

1 2

solve simple problems in a practical context involving addition and subtraction of money of the same unit, including giving change

Jess has saved 62p. She spends 15p. How much money does she have left?

She pays with a 50p piece. How much change does she get?

1

add and subtract amounts of money to give change, using both £ and p in practical contexts

Jake wants to buy a comic that costs £1. He saves 25p one week and 40p the next. How much more money does he need to buy the comic?

Add these prices: £6.73, £9.10 and £7.00 to find the total. Find out how much more do you need to add to get

1

NCETM

Possibilities
Ella has two silver coins.
How much money might she have?

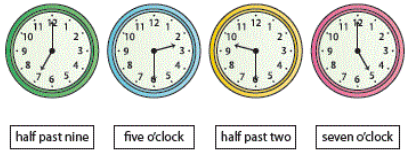
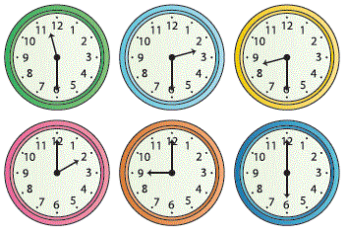
Possibilities
How many different ways can you make 63p using only 20p, 10p and 1p coins?

Position the symbols
Place the correct symbols between the measurements > or < Explain your thinking
£23.60 2326p
2623p

MEASUREMENT (MEA - 9 weeks)

Time	Time Sequences	***40-60+ months*** *use everyday language related to time* ***40-60+ months*** *order and sequence familiar events* ***Adult Initiated*** **Talk about days of the week** in everyday activities like taking the register, keeping a weather chart… *What did you do yesterday?* *What will you do tomorrow?* *Who has a birthday next week? Which day is it?* **Begin to sequence events** in the day, *Tell me what you did on your birthday* *What do you see on your way home?* Make a zigzag book or arrange picture cards to tell the story of their special day or journey: **Sequence events in a well-known story** ; The Very Hungry Caterpillar by Eric Carle The Bad-Tempered Ladybird by Eric Carle Mr Wolf's Week by Colin Hawkins ***Enabling Environments –child initiated, adult supported*** **Indoors/Outdoors** **Role play:** home corner- e.g. birthdays. *What day is the party on? What time are we going to the shops, doctors etc*. Provide wall diagrams, calendars and photographs to talk about -time, **NRICH EYFS: Timing**	**sequence events in chronological order using language such as: before and after, next, first, today, yesterday, tomorrow, morning, afternoon and evening** Continue to develop the concept of time in terms of time passing and sequencing events in familiar story or day-to-day routines. They use terms such as morning, afternoon and evening, yesterday and tomorrow. They learn to order the days of the week and learn that weekend days are Saturday and Sunday. They listen to stories and rhymes about time, such as The Very Hungry Caterpillar or The Bad-Tempered Ladybird by Eric Carle, Monster Monday by Susanna Gretz or Hard Boiled Legs by Michael Rosen and Quentin Blake. 1 2 **recognise and use language relating to dates, including days of the week, weeks, months and years** Order the months of the year and make a 12-page classroom calendar with pictures of each month, writing significant events underneath, such as Diwali, Pancake Day or Midsummer's Day, or the dates of their birthdays. 1	**compare and sequence intervals of time** Which is greater? Half an hour 45 minutes 65 minutes 1 hour Can you put these times in order from earliest to latest - Half past twelve in the afternoon - Quarter to four in the afternoon - Nine o'clock in the morning - Nine o'clock in the evening	

MEASUREMENT (MEA - 9 weeks)

Time	Telling the time	***40-60+ months*** *use everyday language related to time* ***40-60+ months*** *measure short periods of time in simple ways* ***Adult Initiated*** **Begin to know key times of the day** *We go to assembly at 9 o'clock;* *We go home at 3 o'clock;* *What time do we have dinner? What time do you go to bed?* ***Enabling Environments –child initiated, adult supported*** **Indoors/Outdoors** **Role play:** times of trains, opening times of shops, when the bus, train, aeroplane will arrive /depart.	**tell the time to the hour and half past the hour and draw the hands on a clock face to show these times** Read time to the hour and half hour on a clock with hands and recognise half past the hour in day-to-day routines. They use time lines or clocks to help them to respond to questions such as: It's half past seven. What time will it be in four hours' time? What time was it two hours ago? John went to the park at 9 o'clock. He left at half past eleven. How long was he at the park? TIME Match the clocks to the following times:  half past nine | five o'clock | half past two | seven o'clock	**tell and write the time to five minutes, including quarter past/to the hour and draw the hands on a clock face to show these times.**  What time does this clock show? Draw a clock showing the time five minutes later. Show your school day on clock faces: when do you leave home, have breaks, go back home, etc.?  Which of these clocks shows a time between 5 and 7 o'clock? 1 2	**tell and write the time from an analogue clock, including Roman numerals from I to XII, and 12-hour and 24-hour clocks** Read times like this in analogue and digital formats, including those with Roman numerals. What time does each clock show?  Ben's clock says 7:50 when he gets up. Show this time on a clock face. 1 2 3 4 5 **estimate and read time with increasing accuracy to the nearest minute,** **record and compare time in terms of seconds, minutes, hours and o'clock;** **use vocabulary such as a.m./p.m., morning, afternoon, noon and midnight** Kevin leaves home at quarter past 8 and arrives in school at 20 to 9. How long is his journey? How did you work this out? How long is it between the times shown on these two clocks? How did you work it out?   1 2

MEASUREMENT (MEA - 9 weeks)

Time	Calculating with time	***40-60+ months*** *use everyday language related to time* ***40-60+ months*** *order and sequence familiar events* ***40-60+ months*** *measure short periods of time in simple ways* ***Adult Initiated*** **Begin to be aware of the duration of time.** *Can we all change for PE before the sand runs through the timer?* *Can you pack the bricks away before I count to 10?* *How many hops can you do in a minute? Were you correct?* ***Enabling Environments –child initiated, adult supported*** **Outdoors** **Use a sand timer/ stop watches to:** Time laps done by child on bikes and scooters. *How may laps can you do in a minute?* *How long does it take to complete the obstacle course?* *How many objects e.g. pine cone can you find in 1 minute?* Playing Hide and Seek: give to the count of 10 to hide **Indoors** **Sand area:** Hide objects in the sand tray. *How many can find before the 10 second sand timer runs through?* Writing area- provide wall diaries and calendars to refer to, role play making appointments etc	**compare, describe and solve practical problems for:** • **time (quicker, slower, earlier, later)** Using a stop watch. Can you see who can do 10 stars jumps the quickest? Take it in turns to record each other.	**Know the number of minutes in an hour and the number of hours in a day** 1	**know the number of seconds in a minute and the number of days in each month, year and leap year** How many minutes is 140 seconds? What is the date of the day after 30th November? How many days are they in January? **compare durations of events, for example to calculate the time taken by particular events or tasks** Estimate how long your favourite TV programme lasts. Use a television guide to work out how close your estimation was. It takes 35 minutes to walk from home to school. I need to be there by 8.55 am. What time do I need to leave home? How much does it cost to hire a rowing boat for three hours? **Boat Hire** Motor boats £1.50 for 15 minutes Rowing boats £2.50 for 1 hour Sasha pays £3.00 to hire a motor boat. She goes out at 3:20 pm. By what time must she return? Explain how you solved this problem. Could you have done it in a different way? Sally and Maria both went to the gym on Saturday. Sally was there from 2 pm until 3.30pm. Maria was there from 12.30 pm until 3.15 pm. Who spent the longer time at the gym? How much longer was she there than her friend?

MEASUREMENT (MEA - 9 weeks)

Time	NCETM Reasoning		**Explain thinking** Ask pupils to reason and make statements about to the order of daily routines in school e.g. daily timetable e.g. we go to PE **after** we go to lunch. Is this true or false? What do we do before break time? etc.	**Undoing** The film finishes two hours after it starts. It finishes at 4.30. What time did it start? Draw the clock at the start and the finish of the film. **Explain thinking** The time is 3:15pm. Kate says that in two hours she will be at her football game which starts at 4:15. Is Kate right? Explain why. **Working backwards** Draw hands on the clock faces to show when break started and when it finished 15 minutes later at 10:35. **The answer is ….** 3 hours What is the question? **What do you notice?** What do you notice? 1 hour = 60 minutes ½ hour = 30 minutes ¼ hour = 15 minutes Write down some more time facts like these	**Undoing** A programme lasting 45 minutes finishes at 5.20. At what time did it start? Draw the clock at the start and finish time. **Explain thinking** Salha says that 100 minutes is the same as 1 hour. Is Salha right? Explain why. **Working backwards** Tom's bus journey takes half an hour. He arrives at his destination at 9:25. At what time did his bus leave? 9:05 8:55 8:45 **The answer is ….** 25 minutes What is the question? **What do you notice?** What do you notice? 1 minute = 60 seconds 2 minutes = 120 seconds Continue the pattern Write down some more time facts like these