FRACTIONS AND DECIMALS

Mathematics: Fractions and Decimals

Area	Objectives	Suggested Activities	Vocab
Cross-curricular links **PE** – *giving out equipment to peers. Halving into two teams.* **Art –** *halving materials, sharing material equally. Halving pictures. Drawing the other half to their portrait.* **DT** – *halving and sharing materials. Folding paper/card in half to make books, pictures, shelters or packaging.* **Science –** *halving materials during investigations and experiments.* **Literacy –** *following instructions to share and halve.* **Music –** *sharing instruments equally. Rounds splitting class in half.* **Cooking** – *sharing ingredients and halving them.*			
0 – 3 years (8–20 months)	To share objects equally.	• Children share objects between peers during snack time or when handing out resources or equipment for activities making sure everyone has the same. • In cooking, share equally between different bowls of ingredients. • Role-play tea parties sharing out cups and plates and food equally. • Share out toys or other motivating items. • Play games such as snap where children have to share out cards equally at the start.	Children must understand negation (not), same, different and 'equal' before working on fractions. one two share half halves parts
0 – 3 years (16–26 months)	To share objects equally.	• Children share objects between peers during snack time or when handing out resources or equipment for activities making sure everyone has the same. • In cooking, share equally between different bowls of ingredients. • Role-play tea parties sharing out cups and plates and food equally. • Share out toys or other motivating items. • Play games such as snap where children have to share out cards equally at the start.	
0 – 3 years (22-36 months)	To experience halving.	• During fruit time, cooking or class parties encourage children to help halve food items. • Halve towers of cubes or Lego. • Halve paper shapes. • Halve play dough shapes. • When playing with a range of toys e.g. trains or toy people, halve the number there are. • Split the class in half for games or different activities. • Use fractions songs (Google ideas). • Look at computer programmes	

Mathematics: Fractions and Decimals

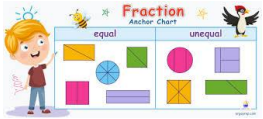
3- 4 years **(30-50 months)**	To experience halving	• During fruit time, cooking or class parties encourage children to help halve food items. • Halve towers of cubes or Lego. • Halve paper shapes. • Halve play dough shapes. • When playing with a range of toys e.g. trains or toy people, halve the number there are. • Split the class in half for games or different activities. • Use fractions songs (Google ideas). • Look at computer programmes	
Reception **(40-60 months)**	To experience halving.	• During fruit time, cooking or class parties encourage children to help halve food items. • Halve towers of cubes or Lego. • Halve paper shapes. • Halve play dough shapes. • When playing with a range of toys e.g. trains or toy people, halve the number there are. • Split the class in half for games or different activities. • Use fractions songs (Google ideas). • Look at computer programmes	

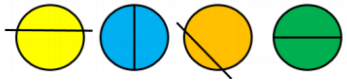
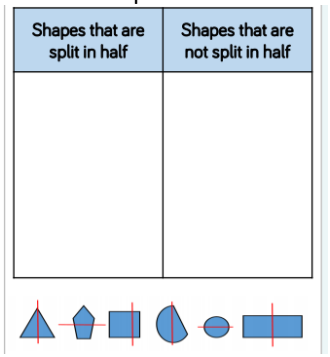
Area	Objectives	Suggested Activities	Vocab

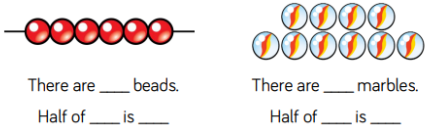
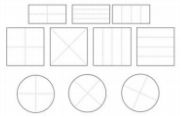
Cross-curricular links

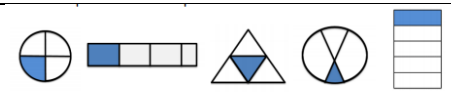
PE – *sharing equipment between groups of two and 4 exploring half and quarter (including putting children in teams). Look at turns in dance – half, quarter and whole.*
Art – *when children are splitting or cutting materials look at half and quarter. Create collages made of halved and quartered shapes. Create fractions walls using art.*
DT – *when decorating pieces discuss fractions they are decorating e.g. half the package is red etc.*
Science – *look at fractions when sorting or adding substances during investigations and experiments. Use quadrants for habitats, comparing halves of them.*
Literacy – *following and giving instructions – half tern, quarter turns etc.*
History – *look at periods of time e.g. half a century/decade.*
Geography – *use quadrants when looking at nature and the environment. Encourage children to look in parts of the quadrant e.g. half, quarter.*
ICT – *giving instructions to Beebot Robots – look at fractions of turns.*
Cooking – *sorting and adding ingredients in halves or quarters. Cutting ingredient in half or quarters or other equivalent fractions.*

Mathematics: Fractions and Decimals

Bridging 1	To experience halving and sharing activities.	• During fruit time, cooking or class parties encourage children to help halve food items. • Halve towers of cubes or Lego. • Halve paper shapes. • Halve play dough shapes. • When playing with a range of toys e.g. trains or toy people, halve the number there are. • Split the class in half for games or different activities. • Use fractions songs (Google ideas). • Look at computer programmes	one two three four five share equal (out of __parts) unequal (out of __parts) parts half halves number object shapes amount quantity quarter third equivalent
Bridging 2	To recognise when quantities are the same	• During fruit time/cooking or class parties, chn identify if food has been cut in half or not. Have things been shared equally? • Have tower of cubes or lego been shared fairly? • Chn identify if paper shapes have been halved fairly  • When playing with toys, give more to one child than another. Is this fair sharing? You can also do this with lego in building or counters in a game etc. • Split the class in 2 teams to play a game but have more on one team than another. IS this fair sharing? • Look at computer programmes	
Bridging 3	To understand that a whole objects can be split or shared equally	• Share objects (towers of cubes) or food (in cooking/fruit and drink). Emphasise the language half and that when we cut one thing in half we have two equal parts. • Do activities/games with groups or the class where they work in teams and you split them in half- show it is the same. • Display shapes with half coloured and labelled in words and symbols. • Split shapes/tables/hoops in half and colour them. Ask the children to place objects in the blue half or red half. • Use computer activities such as MathBase 4. • For team games encourage children to split the group in half making 2 teams. How many in each half? • Children make art pieces e.g. jewellery (make 2 necklaces putting half the blue beads on each • string, then half the red). Look at the totals of beads and what half the total is.	

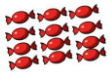
		• Play games in pairs – split cards/counters/balls in half. How many? • Link to division and sharing – use objects (age appropriate and motivating) to share into 2 groups or use mental recall skills depending on ability. • Use computer activities such as MathBase 2 and 4.	
Milestone 1	To recognise, find and name a half as one of two equal parts of an object, shape or quantity.	• Children explore finding a half for the first time using shapes and sets of objects. They will use the vocabulary 'half' and 'whole'. Children **will not** at this stage use fractional notation of ½ . It is important that they know that a half means 'one of two equal parts' and are able to count them. • Show the children real life objects and how they can be cut in half. How can we cut these objects in half? Can any of the objects be cut in half more than one way?  • Which circles have been split into equal halves. NB you can do this with other shapes  • Match the halves to make 5 complete shapes  • Sort the shapes into the table. Can you add anymore shapes to the table? 	

	To recognise a quarter as one of four equal parts of an object or shape. To find a quarter of an object or shape. To find a quarter of a quantity.	• Children use their understanding of finding half of an object or shape and apply this to finding half of a small quantity. It is important that children find the total amount and can then show how this number can be shared equally into two. The use of concrete manipulatives such as counters can help children to find a half. Show children how to share the objects into two groups. • Find half of each amount  • Find half of the amounts and complete the stem sentences  There are ___ beads. Half of ___ is ___ There are ___ marbles. Half of ___ is ___ • Find half of the sheep  There are ___ sheep. Half of ___ is ___ • Children explore quarters for the first time. They will develop their understanding of equal parts and non-equal parts and relate this to a shape or objects being split up into four equal parts. Children will use the words quarters and parts oat this stag but will not use the fractional notation of ¼ • Take two square pieces of paper, two circular pieces of paper and two rectangular pieces of paper. Model folding one of each part into four equal parts and the other into four non-equal parts. Which shapes show equal parts? Which do not? How many equal parts can we see> Can we fold any of the shapes in a different way and still get equal parts? Count the equal parts and then model counting them in quarters. • Colour a quarter of each shape. Can you colour it in different ways?  • Tick the shapes that show quarters	



- Children find a quarter of a small quantity through equal sharing. It is important they can show the groups clearly by drawing around quantities or by physically sharing into something. Children will use the word quarters and parts but will still not write the notation of ¼. They also begin to describe capacity using the terminology 'a quarter full'.
- Share each quantity into four equal groups

There are ___ cakes.
There is ___ cake in each quarter.
A quarter of ___ is ___

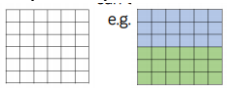


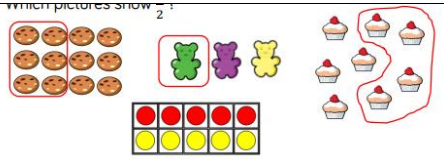
There are ___ sweets.
There are ___ sweets in each quarter.
A quarter of ___ is ___

There are ___ peaches.
There are ___ peaches in each quarter.
A quarter of ___ is ___

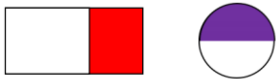
- Use a range of containers and rice/water. Can you show me a quarter full in each container? Do they look the same or different?
- Use counters to complete the sentences.
  A quarter of 4 is _____ A quarter of 8 is _____
  1 is one quarter of _____ 3 is one quarter of _____

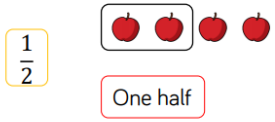
Numicon?

Milestone 2	To be able to recognise, find, name and write fractions of a half or quarter of a length, shape, set or objects or quantity.	• Children understand the concept of a whole as being one objects or one quantity. Children explore making and recognising equal and unequal parts. They should do this using both real life objects and pictorial representations of a variety of shapes and quantities. • Use different colours to show how this shape can be split into equal parts. How many different ways can you find?  • Look at the representations. Decide which show equal parts and which show unequal parts. Can you make some of your own representations of equal and unequal parts?  • Can you split the teddies into three equal groups? Can you split the teddies into three unequal groups? How many ways can you split the teddies into equal parts?  • Children understand that halving is splitting a whole into two equal parts. They are introduced to the notation of ½ for the first time and will use this alongside sentence stems and 'half' or 'halves'. They should be introduced to the language of numerator, denominator an what these represent. Children must explore halves in different contexts, for example, half of a length or set object. • The whole gummy bear is split into ____ equal parts. Eahc part I worth a _____.  • Which pictures who a ½?  • Which pictures who a ½?	

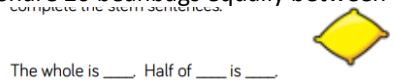


- Which is the odd one out? Explain your answer.



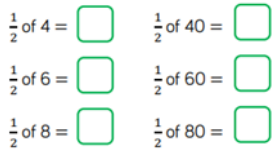


- In this small step children find a half of a set of objects or quantity. Link should be made here to dividing by 2. Children may need to use the concept of sharing to find a half. Paper plates, hoops and containers can be used to share objects into 2 equal groups.
- Share 20 beanbags equally between two containers, then complete the stem sentences.

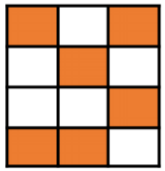


- Circle half the cakes. Circle half the triangles

- Fill in the blanks. Use counters to help you if needed

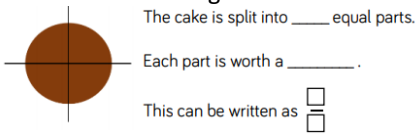


- Dora is asked to shade half of her shape. This is what she shades. Is she correct? Explain why?



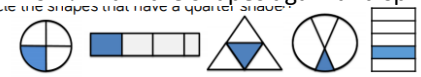
- Annie has some gummy bears. She circles half of the. How many gummy bears did she have at the start?

- Children extend their knowledge of the whole and halves to recognise quarters of shapes, objects and quantities. They continue to work concretely and pictorially, understanding that they are splitting the whole into 4 equal parts and that each part is one quarter.
- Four friends are sharing a cake

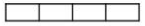
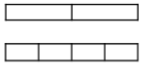
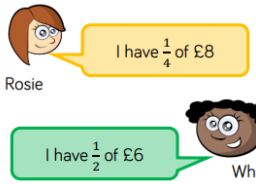
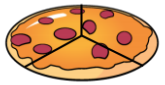


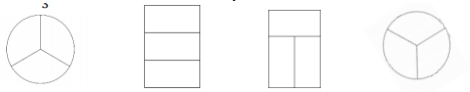
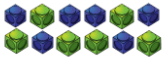
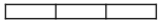
- Shade a ¼ of each shape

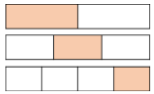
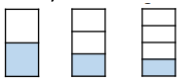
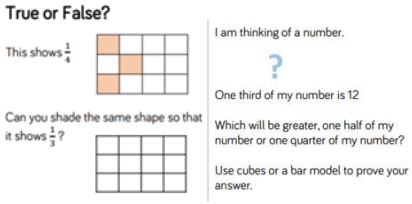
- Circle the shapes that have a quarter shaded. Which shapes do not have a quarter shaded? How do you know? Draw the shapes again and split them into quarters correctly.

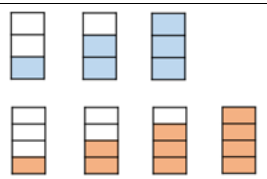


- Children find quarters of shapes, object and quantities. They begin by physically sharing amounts into four equal groups, or drawing around quantities then move towards working in abstract. The

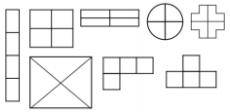
	To recognise 1/3 as one of three equal parts. To find 1/3 of objects and shapes. To find 1/3 of quantity or length.	link between the concrete, pictorial and abstract representations should be made explicit. Support children in seeing the relationship between half of an amount and a quarter of an amount. • Share the smarties equally between 4 people.  The smarties are split into ___ equal parts. Each part is worth a _____.  This can be written as $\frac{\square}{\square}$ • Circle one quarter of the cars  One quarter of ___ is ___ ___ is $\frac{1}{4}$ of ___ • Complete: $\frac{1}{2}$ of 12 = ☐ $\frac{1}{4}$ of 12 = ☐ $\frac{1}{2}$ of 20 = ☐ $\frac{1}{4}$ of 20 = ☐ $\frac{1}{2}$ of 8 = ☐ $\frac{1}{4}$ of 8 = ☐  • Who has more. Explain why?  • Children apply understanding of fractions to finding thirds. They continue to use the language of 'whole' and 'equal parts' and understand that one third is equal to one part out of three equal parts. • Three friends are sharing a pizza.  The pizza is split into ____ equal parts. Each part is worth a _____. This is the same as $\frac{\square}{\square}$	

		• Shade a 1/3 of each shape. What is the same? What is different?  • Which shapes represent one third? Explain why the other circles do not represent one third.  • Children build on their understanding of a third and three equal parts tin find a third in quantity. They use their knowledge of division and sharing in order to find a third of different quantities using concrete and pictorial representations to support their understanding. • Use the cubes to make three equal groups  There are ___ cubes altogether. One third of ____ is ____  ☐ of ___ is ___ • Rosie is organising her teddy bears. She donates 1/3 of them to charity. How many bears does she have left?  • Complete: $\frac{1}{3}$ of 9 = ☐ $\frac{1}{3}$ of 15 = ☐  $\frac{1}{3}$ of 12 = ☐ $\frac{1}{3}$ of 18 = ☐ Numicon?	

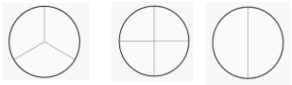
	To find and recognise unit and non-unit fractions	• Children understand the concept of unit fraction by recognising is as one equal part of a whole. They link this to their understanding of recognising and finding thirds, quarters and halves. Children also need to understand that the denominator represents the number of parts that a shape or quantity is split into • What is the same and what is different about each bar model?  • What fraction is shaded in each diagram? What do you notice? Complete the sentences. The _____ the denominator the _____the fraction (The smaller the denominator the bigger the fraction)  • Match the unit fraction to the correct picture  $\frac{1}{4}$ $\frac{1}{3}$ $\frac{1}{2}$ •  True or False? This shows $\frac{1}{4}$ Can you shade the same shape so that it shows $\frac{1}{3}$? I am thinking of a number. ? One third of my number is 12 Which will be greater, one half of my number or one quarter of my number? Use cubes or a bar model to prove your answer. • Children are introduced to th non-unit fractions 2/3 and ¾ for the first time. They also need to look at fractions where the whole is shaded and how these fractions are written. Children see that the numerator and denominator are the same when the fraction is equivalent to one whole. • What fraction I shaded in each diagram?	



- Shade ¾ of each shape



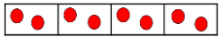
- Shade in the whole of each circle. What fraction is represented in each case?



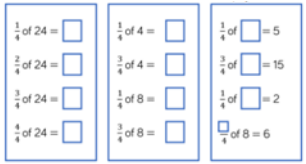
- Children use their understanding of quarters to find three quarters of a quantity. They work concretely and pictorially to make connections to the abstract. Children should be encouraged to spot patterns and relationships between quarters of amounts.
- Amir shares 12 beanbags into 4 equal groups. Use the images to complete the sentences.

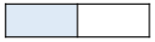
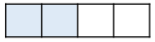
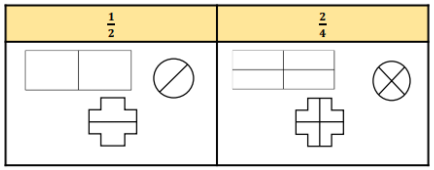
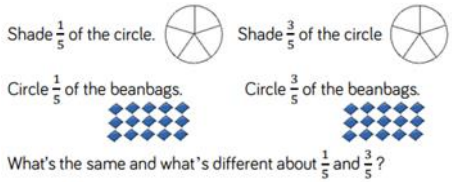
One quarter of 12 is equal to ____
Two quarters of 12 is equal to ____
Three quarter of 12 is equal to ____
Four quarters of 12 is equal to ____

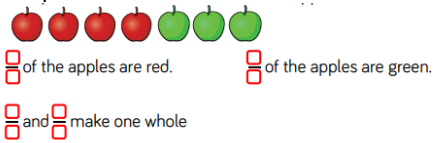
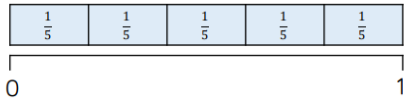
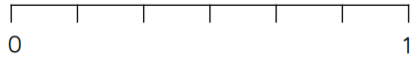
- Use counters and a bar model to help you find ¾ of 8 and ¾ of 16. What do you notice?

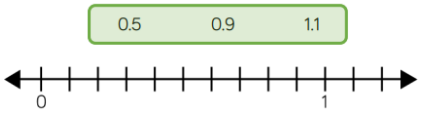
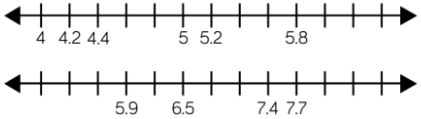
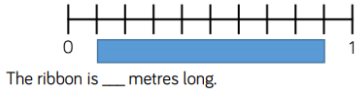
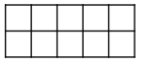
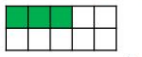
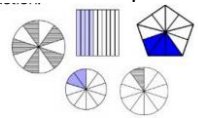


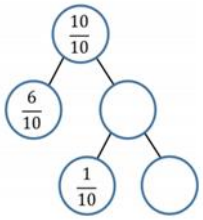
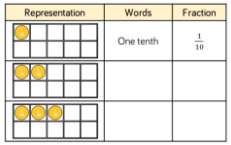
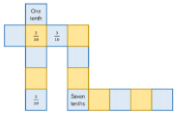
- Use counters, cubes, or bar models to help you fill in the blanks:



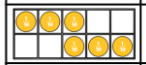
	To recognise equivalence of ½, and 2/4	• Children explore the equivalence of two quarters and one half as the same whole and understand that they are the same. Children work on this practically, using strips of paper and concrete apparatus e.g. counters, numicom) • Use two identical strips of paper, explore what happens when you fold the strips into two equal and four equal pieces. Compare one of the two equal pieces with two of the four equal pieces. What do you notice?    • Shade one half and two quarters of each shape  • Give children an amount of counters or concrete objects, can you find one half of them? Can you find two quarters of them? What do you notice?	
Milestone 3	To recognise unit and non-unit fractions	• Children recap their understanding of unit and non-unit fractions. They explain the similarities and differences between unit and non-unit fractions. Children are introduced to fractions with denominators other than 2, 3 and 4. Ensure children understand what the numerator and denominator represent. • Complete the sentences to describe the images.  ___ out of ___ equal parts are shaded. ☐/☐ of the shape is shaded. •  • Complete the sentences: A unit fraction always has a numerator of _____ A non-unit fraction has a numerator that is ____than____ An example of a unit fraction is _____	

	To know when fractions make a whole	An example of a non-unit fraction is _____ Can you draw a unit fraction and a non-unit fraction with the same denominator. • Children look at whole shapes and quantities and see that when a fraction is equivalent t a whole, the numerator and denominator are the same. Building on using part-whole with whole numbers, children use the models to partition the whole into fractional parts. • Complete the missing information  • Complete the sentences to describe the apples  • Sue 8 coins. Drop the coins on that bale. What fraction of the coins are heads? What fraction are tails? What fraction represents the whole group of counters? Complete part-whole models to show your findings.	
	To know that fractions can be more than a whole. To recognise and use fractions as numbers: unit fractions and non-unit fractions with small denominators	• Children use a number line to represent fractions beyond one whole. They count forwards and backwards in fractions. Children need to know how to divide a number line into specific fractions i.e. when dividing into quarters, we need to ensure our number line is divided into four equal parts. • Show 1/5 on the number line. Use a bar model to help you.  • The number line has been divided into equal parts. Label each part correctly.  • Divide the number line into eights. Can you continue the number line up to 2?	

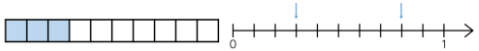
	To be able to count up and down in tenths. To recognise that tenths arise from dividing an object into 10 equal parts and in dividing one-digit numbers or quantities by 10	 • Children read and represent tenths on a number line. They link the number line to measurement, looking at measuring in centimetres and millimetres. Children use number line to explore relative scale. • Place the decimals on the number line:  • Complete the number line:  • How long is the ribbon? 	
	To recognise that tenths arise from dividing an object into 10 equal parts and in dividing one-digit numbers or quantities by 10	• Children explore what a tenth is. They recognise that tenths arise from dividing one whole into 10 equal parts. Children represent tenths in different ways and use words and fractions to describe them. For example, one tenth is 1/10 • If the frame represents 1 whole, what does each box represent? Use counters to represent: one tenth, two tenths, three tenths etc.  • Identify what fraction of each shape is shaded. Give you answer in words and as a fraction e.g.  	

		• Annie has 2 cakes. She wants to share them equally between 10 people. What fraction of the cakes will each person get? What fraction would they get if Annie had 4 cakes?  There are ___ cakes. They are shared equally between ___ people. Each person has $\frac{\square}{\square}$ of the cake. ___ ÷ ___ = ___ What fraction would they get if Annie had 4 cakes? • Fill in the missing values. Explain how you got your answers.  • Children count up and down in tenths using different representations. Children also explore what happens when counting past 10/10. They are not required to write mixed numbers; however, children may see that 11/10 as 1 and 1/10 due to their understanding of 1 whole. • The counting stick is worth 1 whole. Label each pr of the counting stick. Can you count forwards and backwards along the counting stick.  • Continue the pattern in the table. What becomes between 4/10 and 6/10? What is one more than 10/10? If I start at 8/10 and count back 4/10, where will I stop?  • Complete the sequences 	

- Children are introduced to tenths as decimals for the first time. They compare fractions and decimals written as words, in fraction form and as decimals and link them to pictorial representations. Children learn that the number system extends to the right of the decimal point into the tenths column.
- Complete the table:

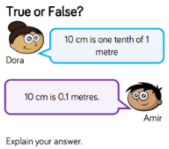
Image	Words	Fraction	Decimal
	One tenth	$\frac{1}{10}$	0.1
			
	Nine tenths		

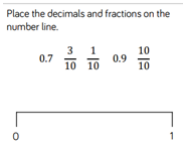
- Write the fraction and decimals shown



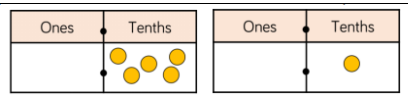
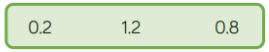
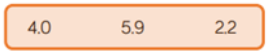
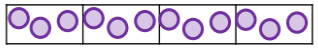
- Here is a decimal written in a place value grid. Can you represent the decimal pictorially? Can you write the decimal as a fraction?

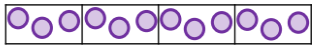
Ones	Tenths
0	8

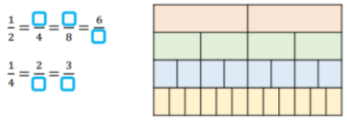
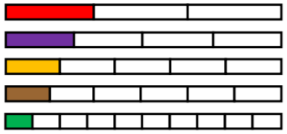




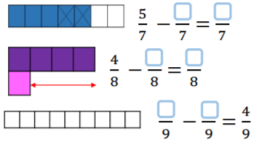
- Children read and represent tenths on a place value grid. They see that the tenths column is to the right f the decimal point. Children use concrete representations to make tenths on a place value grid and write the number they have made as a decimal. In this small step, children will be introduced to decimals greater than 1.
- Complete the stem sentences for the decimals in the place value grid

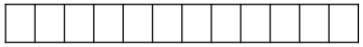
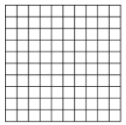
	To be able to recognise and use fractions of a discrete set of objects: unit fractions and non-unit fractions with small denominators	 There are ☐ ones and ☐ tenths. The decimal represented is ☐ • Use counters or place value counters to make the decimals on a place value grid  • Use the place value grid and stem sentences to describe the decimals:  There are ☐ ones and ☐ tenths. ☐ ones + ☐ tenths = 3 + 0.2 = 3.2  • Children find a unit fraction of an amount by dividing an amount into equal groups. They build on their understanding of division by using place value counters to find fractions of lager quantities including where they need to exchange tens for ones. • Find 1/5 of Eva's marbles  I have divided the marbles into ☐ equal groups. There are ☐ marbles in each group. $\frac{1}{5}$ of Eva's marbles is ☐ marbles. • Dexter has used a bar model and counters to find ¼ of 12. Use Dexter's method to calculate: 1/6 of 12, 1/3 of 12, 1/3 of 18 1/9 of 18 etc  • Amir uses a bar model and place value counters to find one quarter of 84. Use Amir's method to find: 1/3 of 36, 1/3 of 45, 1/5 of 65  • Children need to understand that the denominator of the fraction tells us how many equal parts the whole will be divided into e.g. 1/3 means dividing the whole into 3 equal parts. They need to understand that the numerator tells them how many parts of the whole there are e.g. 2/3 means dividing the whole into 3 equal parts, the counting the amount of 2 of these parts. • Find 2/5 of Eva's marbles.  I have divided the marbles into ☐ equal groups. There are ☐ marbles in each group. $\frac{2}{5}$ of Eva's marbles is ☐ marbles.	

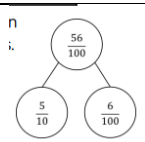
	To recognise and show, using diagrams, equivalent fractions with small denominators	• Dexter has sued a bar model and counters to find ¾ of 12. Use Dexter's method to calculate: 5/6 of 12, 2/3 of 12, 2/3 of 18, 7/9 of 18 etc.  • Amir uses a bar model and place value counters to find three quarters of 84. Use Amir's method to find: 2/3 of 36, 2/3 of 45, 3/5 of 65  • Children then move onto applying their knowledge of fractions to solve problems in various contexts. They recap and build their understanding of different measures. • Ron has £3 and 50p. He wants to give half of his money to his brother. How much would his brother receive. • A bag of sweets weights 240g. There are 4 children going to the cinema, each receives ¼ of the bag. What weight of sweets will each child receive? • Find 2/3 of 1 hour. Sue the clock face to help you.  1 hour = ☐ minutes $\frac{1}{3}$ of ☐ minutes = ☐ $\frac{2}{3}$ of ☐ minutes = ☐ • Children begin by using Cuisenaire or number rods to investigate and record equivalent fractions. Children then move on to exploring equivalent fractions through bar models. Children explore equivalent fractions in pairs and can start to spot patterns. • The pink Cuisenaire rod is worth 1 whole  Which rod would be worth ¼, which rods would be worth 2/4? Which rod would be worth ½? Use Cuisenaire to find rods to investigate other equivalent fractions. • Use equal strips of equal sized paper. Fold on strip into quarters and the other into eights. Place the quarters on top of the eights and lift up one quarter, how many eighths can you see? How many eights are equivalent to one quarter? Which other equivalent fractions can you find? • Using squared paper, investigate equivalent fractions using equal parts e.g. $\frac{\square}{4} = \frac{\square}{8}$ Start by drawing a bar 8 squares along. Label each square 1/8. Underneath compare the same length bar split into four equal parts. What fraction is each part now?	

	To be able to compare and order unit fractions and fractions with the same denominator	• Children use proportional reasoning to link pictorial images with abstract methods to find equivalent fractions. They look at the links between equivalent fractions to find missing numerators and denominators. Children look for patterns between the numerators and denominators to support their understanding of why fractions are equivalent e.g. fractions equivalent to a half have a numerator that is half of the denominator. • Complete the table. Can you spot any patterns?  • Use the fraction wall to complete equivalent fractions  • Children compare unit fractions or fractions with the same denominator. For unit fractions, children's natural tendency might be to say that ½ is smaller than ¼, as 2 is smaller than 4. Discuss dividing something into more equal parts makes each part smaller. • Use >,< or + to compare the fractions  When the numerators are the same, the _____ the denominator, the _____the fraction • Use paper strips to compare the fractions using >, < or = When the denominators are the same, the ___ the numerator, the _____ the fraction. • Children order unit fractions and fractions with the same denominator. They use bar models and number lines to order the fractions and write them in ascending and descending order. Continue to	

	To be able to add and subtract fractions	encourage children to use stem sentences to explain why they can compare fractions when numerators or denominators are the same. • Divide strips of paper into halves, thirds, quarters, fifths and sixths and colour in one part of each strip. Now order the strips from the smallest to the largest fraction.  When the numerators are the same, the _____ the denominator, the ____ the fraction • Place the fractions on the number line $\frac{2}{4}$ $\frac{3}{4}$ $\frac{1}{4}$  • Order the fractions in descending order: 3/8, 5/8, 1/8, 8/8, 7/8 • Children use practical equipment and pictorial representation to add two or more fractions with the same denominator where the total is less than 1. They understand that we only add the numerators and the denominators stay the same. • Take a paper circle. Fold your circle to split it into 4 equal parts. Colour one part red and two parts blue. Use your model to complete the sentences: _____ quarter is red. _____ quarters are blue. _____ quarters are coloured in. Show this as a number sentence. $\square_4 + \square_4 = \square_4$  We can use this model to calculate $\frac{3}{8} + \frac{1}{8} = \frac{4}{8}$ Draw your own models to calculate • $\frac{1}{5} + \frac{2}{5} = \frac{\square}{5}$ $\frac{2}{7} + \frac{3}{7} + \frac{1}{7} = \frac{\square}{\square}$ $\frac{7}{10} + \frac{\square}{\square} = \frac{9}{10}$ • Ava eats 5/12 of a pizza and Annie eats 1/12 of a pizza. What fraction of the pizza do they eat altogether? • Children use practical equipment and pictorial representations to subtract fractions with the same denominator within one whole. They understand that we only subtract the numerators and the denominators stay the same.	

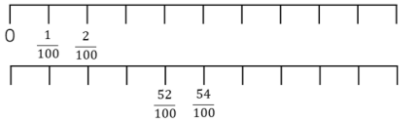
		• Ava is eating a chocolate bar. Fill in the missing information. Can you write a number story using 'first', 'then' and 'now' to describe your calculation?  • Use the models to help you subtract the fractions  • Complete the part whole models. Use equipment if needed. Can you write fact families for each model? 	
Milestone 4	To recognise and show, using diagrams, families of common equivalent fractions.	• Children use strip diagrams to investigate and record equivalent fractions. They start by comparing two fractions before moving on to finding more than one equivalent fraction on a fraction wall. • Use two strips of equal sized paper. Fold one strip into quarters and the other into eights. Place the quarters on top of the eights and lift up one quarter. How many eighths can you see? How many eights are equivalent to one quarter? Which other equivalent fractions can you find? • How many fractions that are equivalent to one half can you see on the fraction wall? Are there any other one? Investigate and work with a fraction wall.  • Children continue to understand equivalent through diagrams. They move onto using proportional reasoning to find equivalent fractions. Attention should be drawn to the method of multiplying the numerators and denominators by the same number to ensure the fractions are equivalent. • Using the diagram, complete the equivalent fractions	

	To count up and down in hundredths and recognise that hundredths arise when dividing an object by 100 and dividing tenths by 10	 $\frac{1}{4}=\frac{\square}{12}$ $\frac{1}{\square}=\frac{6}{12}$ $\frac{2}{3}=\frac{\square}{12}$ $\frac{5}{12}=\frac{\square}{24}$ • Using the diagram, complete the equivalent fractions.  $\frac{1}{3}=\frac{\square}{6}=\frac{\square}{12}=\frac{\square}{24}$ • Complete: $\frac{1}{4}=\frac{2}{\square}=\frac{\square}{12}=\frac{4}{\square}=\frac{\square}{100}=\frac{\square}{500}$ • Children recognise tenths and hundredths using a hundred square. When first introducing tenths and hundredths, concrete manipulatives such as Base 10 an be used to support children's understanding. They see that ten hundredths are equivalent to one tenth and can use a part-whole model to partition a fraction into tenths and hundredths. • If the hundred square represents one whole:  Each square is ___ out of ___ equal squares. Each square represents $\frac{\square}{\square}$ Each row is ___ out of ___ equal rows. Each row represents $\frac{\square}{\square}$ • Complete the table: | Shaded	Tenths	Hundredths
---	---	---
20 squares	$\frac{2}{10}$	$\frac{20}{100}$
4 columns		
3 rows		
	$\frac{7}{10}$	| • We can use a part-whole model to partition 56 hundredths into tenths and hundredths.	



Partition into tenths and hundredths: 65 hundredths, 31/100, 80 hundredths

- Children recognise that hundredths arise from dividing one whole into one hundred and equal parts. Children count in hundredths and represent tenths and hundredths on a place value grid and a number line.
- Compete the number lines:



- Complete the sequences

$\frac{27}{100}, \frac{28}{100}, \square, \square, \frac{31}{100}, \square$

$\frac{52}{100}, \frac{51}{100}, \frac{5}{10}, \square, \square, \square$

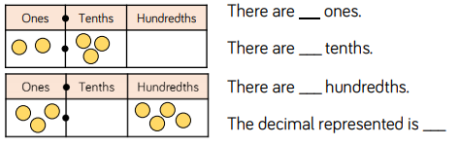
- Use fractions to complete the number lines

- Using the hundred square and Base 10, children can recognise the relationship between 1/100 and 0.01. Children write hundredths as decimals and as fractions. They write any number of hundredths as a decimal and represent the decimals using concrete and pictorial representations. Children understand that a hundredth is a part of a whole split into 100 equal parts.
- Complete the table

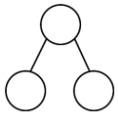
Image	Words	Fraction	Decimals
	56 hundredths		
		$\frac{17}{100}$	
			0.2

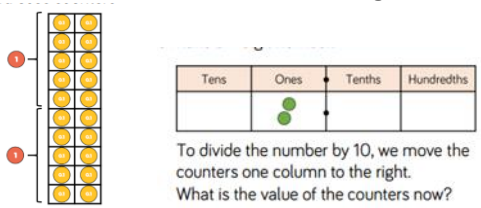
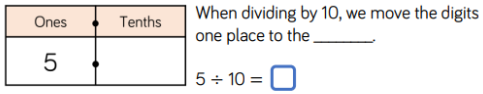
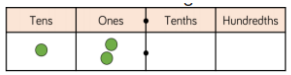
- Write the number as a fraction and as a decimal. How else could you represent this number?

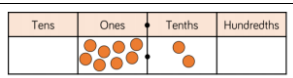
- Children read and represent hundredths in a place value grid. They see that the hundredths column is to the right of the decimal point and the tenths column. Children use concrete representations to make numbers with tenths and hundredths on a place value grid and write the number they have made as a decimal.
- Write the decimal represented in each place value grid

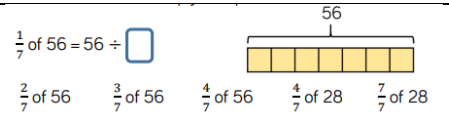
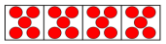
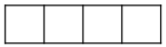
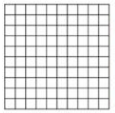


- Make the decimals on a place value grid. Use the sentence stems to describe each number.
  0.34 2.15 0.03 1.01
- Represent the decimals on a place value grid and in a part whole model. How many ways can you partition each number?
  0.27 0.72 0.62



	To know and find the effect of dividing a one or two digit number by 10 and by 100; identifying the value of the digits in the answer as ones, tenths and hundredths	• Children need to understand when dividing by 10, the number is being split into 10 equal parts and is 10 times smaller. Children use counters on a place value chart to see how the digits more when dividing by 10. Emphasise the importance of 0 as a place holder. • Eva uses counters to make a 1-digit number  Use this method to solve: $3 \div 10 = \square$ $7 \div 10 = \square$ $\square = 4 \div 10$ • Here is a one-digit number on a place value chart.  When dividing by 10, we move the digits one place to the _____. $5 \div 10 = \square$ Use this method to solve: $8 \div 10 = \square$ $\square = 9 \div 10$ $0.2 = \square \div 10$ • Children use a place value chart to see how 2-digit numbers move when dividing by 10. They use counters to represent the digits before using actual digits within the place value chart. • Teddy uses counters to make a 2-digit number. To divde the number by 1-, we move the counters one column to the right. What is the value of the counters now?  Use this method to solve: $42 \div 10 = \square$ $35 \div 10 = \square$ $\square = 26 \div 10$ • Here is a 2-digit number on a place value chart	

	To be able to find fractions of a quantity using larger non unit fractions.	 When dividing by 10, we move the digits 1 place to the _____. 82 ÷ 10 = ☐ Use this method to solve: 55 ÷ 10 = ☐ ☐ = 90 ÷ 10 3.2 = ☐ ÷ 10 • Children need to understand when dividing by 100 the number is being split into 100 equal parts and is 100 times smaller. Children use counters on a place value chart to see how the digits move when dividing by 100. Emphasise the importance of 0 as a place holder. • Dexter uses counters to make a 1 digit number. To divide the number by 100, we need to move the counters two columns to the right. What is the value of the counters now?  Use this method to solve: 4 ÷ 100 = ☐ 5 ÷ 100 = ☐ ☐ = 6 ÷ 100 • Here is a 2-digit number on a place value chart. When dividing by 100, we move the digits to places to the ____. 72 ÷ 100 = Use this method to solve: 82 ÷ 100 = 930 ÷ 100 = 0.23 ÷ 100 = • Children use their knowledge of finding unit fractions of a quantity to find non-unit fractions of a quantity. They use concrete and pictorial representations to support their understanding. Children link bar modelling to the abstract idea in order to understand why the method works. • Mo has 12 apples. Use counters to represent his apples and find: ½ of 12 ¼ of 12 1/3 of 12 1/6 of 12 Now calculate: 2/2 of 12, ¾ of 12 2/3 of 12 5/6 of 12. What do you notice? What is the same and what is different? • Use a bar model to help you represent and find: 1/7 of 56 = 56	

	To know tenths and hundredths	 • Whitney eats 3/8 of 240g bar of chocolate. How may grams of chocolate has she eaten? • Children solve more complex problems for fractions of a quantity. They continue to use practical equipment and pictorial representations to help them see the relationships between the fraction and the whole. Encourage children to use the bar model to solve word problems and represent the formal method. • Use the counter and bar models to calculate the whole:  There are ___ counters in one part. $\frac{1}{4}$ = ___ $\frac{2}{4}$ = ___ $\frac{3}{4}$ = ___ $\frac{4}{4}$ or 1 whole = ___  There are 7 counters in one part. $\frac{1}{4}$ = ___ $\frac{2}{4}$ = ___ $\frac{3}{4}$ = ___ $\frac{4}{4}$ or 1 whole = ___ • Complete: **DECIMALS** • Children recognise tenths and hundredths using a hundred square. When first introducing tenths and hundredths, concrete manipulatives such as Base 10 can be used to support children's understanding. They see that ten hundredths are equivalent to one tenth and can use a part whole model to partition a fraction into tenths and hundredths. • If the hundred square represents one whole:  Each square is ___ out of ___ equal squares. Each square represents ☐/☐ Each row is ___ out of ___ equal rows. Each row represents ☐/☐	

Whole	Unit Fraction	Non-unit Fraction
The whole is 24	$\frac{1}{6}$ of 24 = ___	$\frac{5}{6}$ of 24 = ___
The whole is ___	$\frac{1}{3}$ of ___ = 30	$\frac{2}{3}$ of ___ = ___
The whole is ___	$\frac{1}{5}$ of ___ = 30	$\frac{3}{5}$ of ___ = ___

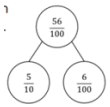
<table>
<tr>
<td></td>
<td>To write tenths and decimals

To know the place value of tenths</td>
<td>

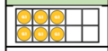
Complete the table:

<table>
<tr><th>Shaded</th><th>Tenths</th><th>Hundredths</th></tr>
<tr><td>20 squares</td><td>$\frac{2}{10}$</td><td>$\frac{20}{100}$</td></tr>
<tr><td>4 columns</td><td></td><td></td></tr>
<tr><td>3 rows</td><td></td><td></td></tr>
<tr><td></td><td>$\frac{7}{10}$</td><td></td></tr>
</table>

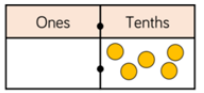
We can use a part whole model to partition 56 hundredths into tenths and hundredth.

Partition into tenths and hundredths:
• 65 hundredths
• $\frac{31}{100}$
• 80 hundredths


Using a hundred square and Base 10, children can recognise the relationship between 1/10 and 0.1. Children write tenths as decimals and fractions. They write any number of tenths as a decimal and represent them using concrete and pictorial representations. Children understand that a tenth is a part of a whole split into 10 equal parts. In this small step children stay within one whole.
Complete the table:

<table>
<tr><th>Image</th><th>Words</th><th>Fraction</th><th>Decimal</th></tr>
<tr><td>  </td><td></td><td></td><td></td></tr>
<tr><td></td><td>five tenths</td><td></td><td></td></tr>
<tr><td></td><td></td><td></td><td>0.9</td></tr>
</table>

Children read and represent tenths on a place value grid. They see that the tenths column is to the right of the decimal point. Children use concrete representations to make tenths on a place value grid and write the number they made as a decimal. In this small step, children will be introduced to decimals greater than 1.
Complete the stem sentences for the decimal in the place value grid:



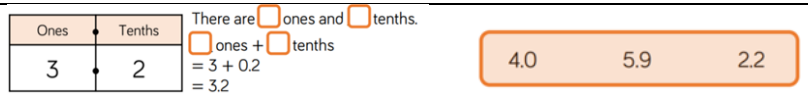
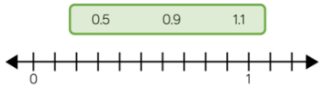
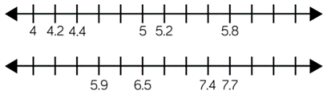
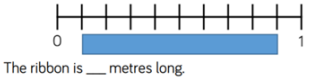
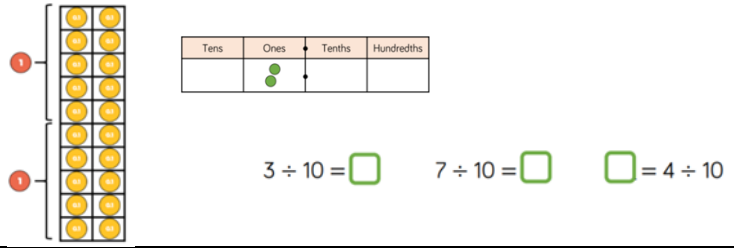
There are ☐ ones and ☐ tenths.
The decimal represented is ☐

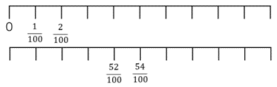
Use counters or place value counters to make the decimals on a place value grid:

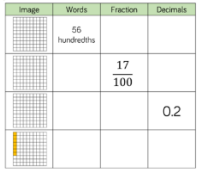
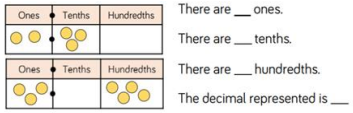
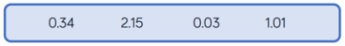
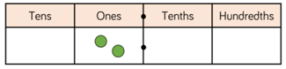
0.2 1.2 0.8

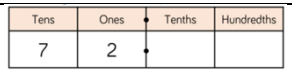
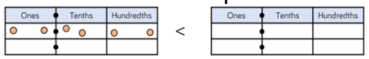
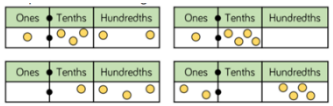
Use the place value grid and stem sentences in the example to describe these decimals:

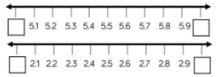
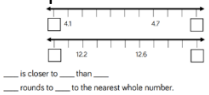
</td>
<td></td>
</tr>
</table>

	To be able to write tenths on a number line	 • Children read and represent tenths on a number line. They link the number line to measurement, looking at measuring in centimetres and millimetres. Children use number lines to explore relative scale. • Place the decimals on the number line:  • Complete the number lines:  • How long is the ribbon? 
	To be able to divide 1 digit by 10	• Children need to understand when dividing by 10 the number is being split into 10 equal parts and is 10 times smaller. Children use counters on a place value chart to see how the digits move when dividing by 10. Children should make links between the understanding of dividing by 10. Emphasise the importance of 0 as a place holder. • Ava uses counters to make a 1-digit number. To divide the number by 10, we move the counters one column to the right. What is the value of the counters now? Use this method to solve: 	

	To be able to divide 2-digits by 10	• Here is a one digit number on a place value chart. When dividing by 10, we move the digits one place to the _____.  $5 \div 10 = \square$ Use this method to solve: $8 \div 10 = \square$ $\square = 9 \div 10$ $0.2 = \square \div 10$ • As in the previous step, it is important for children to recognise the similarities and differences between the understanding of dividing by 10 and the more efficient method f moving digits. Children use a place value chart to see how 2-digit numbers move when dividing by 10. They use counters to represent the digits before using actual digits within the place value chart. • Teddy uses counters to make a 2-digit number  To divide the number by 10, we move the counters one column to the right. What is the value of the counters now? Use this method to solve: $42 \div 10 = \square$ $35 \div 10 = \square$ $\square = 26 \div 10$ • Here is a 2-digit number on a place value chart  When dividing by 10, we move the digits 1 place to the _____ $82 \div 10 = \square$ Use this method to solve: $55 \div 10 = \square$ $\square = 90 \div 10$ $3.2 = \square \div 10$	
	To understand hundredths as fractions	• Children recognise that hundredths arise from dividing one whole into one hundred equal parts. Linked to this, they see that one tenth is ten hundredths. Children count in hundredths and represent tenths and hundredths on a place value grid and a number line. • Complete the number lines:  • Complete the number sequences: ◦ $\frac{27}{100}, \frac{28}{100}, \square, \square, \frac{31}{100}, \square$ ◦ $\frac{52}{100}, \frac{51}{100}, \frac{5}{10}, \square, \square, \square$ • Use fractions to complete the number lines:  	

	To write hundredths as decimals	• Use the hundred square and Base 10, children can recognise the relationship between 1/100 and 0.01. Children write hundredths as decimals and fractions. They write any number of hundredths as a decimal and represent the decimal using concrete and pictorial representations. Children understand that a hundredth is a part of a whole split into 100 equal parts. Children should stay within the whole • Complete the table:  	
	To write hundredths on a place value grid	• Children read and represent hundredths on a place value grid. They see that the hundredths column is to the right of the decimal point and the tenths column. Children use concrete representations to make numbers with tenths and hundredths on a place value grid and write the number they have made as a decimal. • Write the decimal represented in each place value grid:  • Make the decimals on a place value grid. Use the sentence stems to describe each number:  	
	To divide 1 or 2-digits by 100	• Children need to understand that when dividing by 100 the number is split into 100 equal parts and is 100 times smaller. Children use counters on a place value chart to see how the digits move when dividing by 100. Children should make links between the understanding of dividing by 100 and this more efficient method. Emphasise the importance of 0 as a place holder. • Dexter uses counters to make a 1-digit number:  To divide tge number by 100, we move the counters two columns to the right. What is the value of the counters now? Use this method to solve: $4 \div 100 = \square$ $5 \div 100 = \square$ $\square = 6 \div 100$ • Here is a two-digit number on a place value chart	

	To be able to compare decimals	 When dividing by 100, we move the digits 2 places to the _____. $72 \div 100 = \square$ Use this method to solve: $82 \div 100 = \square$ $\square = 93 \div 100$ $0.23 = \square \div 100$ • Children apply their understanding of place value to compare numbers with decimals with up to t wo decimal places. They will consolidate and deepen their understanding of 0 as a place holder when making a comparison. • Write the numbers shown and compare using < or >  • Draw counters in the place value chart to make the statement correct:  • Complete: 5.5 ◯ 5.7 0.37 < 0._7 0.14 ◯ 0.29 2.22 > 2._2 1 ◯ 0.64 1._1 > 1._1 3.32 ◯ 3.23 9.9_ < 9.9_	
	To order decimals	• Children apply their understanding of place value to order numbers with decimals with up to two decimal places. They will consolidate their understanding of 0 as a place holder, the inequality symbols and language such as ascending and descending. • Write the decimals represented in the place value grid and then place them in ascending order.  • Place the numbers in descending order. 46.2 9.64 46.02 40.46 • Complete: 1.11 ◯ 1.12 ◯ 1.13 0.1_ < 0.1_ < 0.15 3.32 ◯ 3.23 ◯ 2.32 1.9_ < 1.9_ < 2.01 4.44 ◯ 4.34 ◯ 4.04 6.67 > 6._7 > 6.37	

	To round decimals to the nearest whole number	• Children round numbers with 1 decimal place to the nearest whole number. They look at the digit in the tenths column to understand whether to round a number up or not. It is best to avoid the phrase 'round down' as this can sometimes lead to misconceptions. Children need to be taught if a number is exactly half way, then by convention we round up to the next integer. • Which integers do the decimals lie between?  • Complete the sentences to describe each decimal.  • Circle the numbers that round up to the nearest whole number: 4.5 3.7 2.3 4.2 16.8 1.9	