Unit 4
Fractions

Five Daily Lessons

National Numeracy Strategy

Year 5
Autumn term

Unit Objectives

Year 5

• Use fraction notation, including mixed numbers, and the vocabulary numerator and denominator. Change an improper fraction to a mixed number (e.g. change $^{13}/_{10}$ to $1\ ^{3}/_{10}$).	Page 23
• Recognise when two simple fractions are equivalent, including relating hundredths to tenths (e.g. $^{70}/_{100} = {}^{7}/_{10}$).	Page 23
• Order a set of fractions such as 2, $2^{3}/_{4}$, $1^{3}/_{4}$, $2^{1}/_{2}$, $1^{1}/_{2}$ and position them on a number line.	Page 23

Link Objectives

Year 4

- Use fraction notation. **Recognise simple fractions that are several parts of a whole**, such as $^{2}/_{3}$ or $^{5}/_{8}$, **and mixed numbers**, such as 5¾;**recognise the equivalence of simple fractions** (e.g. fractions equivalent to ½, ¼ or ¾). Identify two simple fractions with a total of 1 (e.g. $^{3}/_{10}$ and $^{7}/_{10}$).
- Order simple fractions: for example, decide whether fractions such as $^{3}/_{8}$ or $^{7}/_{10}$ are greater or less than one half.

Year 6

- Change a fraction such as $^{33}/_{8}$ to the equivalent mixed number $4\ ^{1}/_{8}$, and vice versa. Recognise relationships between fractions: for example, that $^{1}/_{10}$ is ten times $^{1}/_{100}$, and $^{1}/_{16}$ is half of $^{1}/_{8}$. **Reduce a fraction to its simplest form by cancelling common factors** in the numerator and denominator.
- Order fractions such as $^{2}/_{3}$, ¾ and $^{5}/_{6}$ by converting them to fractions with a common denominator, and position them on a number line.

(Key objectives in bold)

This Unit Plan is designed to guide your teaching.
You will need to adapt it to meet the needs of your class.

Resources needed to teach this unit:

- Resource sheet 4.1
- Activity sheet 4.1
- Activity sheet 4.2
- Activity sheet 4.3
- Activity sheet 4.4
- OHT 4.1
- OHT 4.2
- OHT 4.3
- OHT 4.4
- OHT 4.5
- OHT 4.6
- Whiteboards
- Counting stick
- 10 x 10 grid

department for education and skills

Planning sheet	Day One	Unit 4 *Fractions*	Term: *Autumn*	Year Group: *5*

Oral and Mental

Objectives and Vocabulary	Teaching Activities
Add and subtract pairs of two-digit numbers. VOCABULARY strategy doubling/near doubling partitioning counting on nearest ten and adjusting RESOURCES Resource Sheet 4.1 Whiteboards	• Display the strategy cards on Resource Sheet 4.1. • Provide 'quick-fire' questions such as 36 + 28, 87 – 29 for children to answer using whiteboards. • After each question, ask children to identify the strategy they used with reference to the cards. (Make new cards for different strategies if appropriate.)

Main Teaching

Objectives and Vocabulary	Teaching Activities
Use fraction notation including mixed numbers and the vocabulary numerator and denominator. Change an improper fraction to a mixed number VOCABULARY numerator denominator equivalent proper fraction mixed number RESOURCES Resource sheet 4.1	• Ask a volunteer to write any fraction on the board (using notation). • Ask all children to write any fraction on their whiteboards. Ask one or two children to read their own, or another child's fraction. • Introduce 'numerator' and 'denominator' in relation to the fraction on the board. Record numerator on the board. denominator • Ask children to hold up their board if their fraction has a numerator of 1; denominator less than 6; numerator and denominator the same etc. **Q** Is it still a fraction if the numerator and denominator are the same? Discuss and establish that such fractions are equivalent to 1. • Ask children to show their fraction if it is less than 1. **Q** How do you know when a fraction is less than 1? Confirm that the numerator is less than the denominator. **Q** What would we add to this fraction to total 1? Record, e.g. $^{3}/_{5} + {}^{2}/_{5} = 1$ on the board. • Ask children to show their fraction if it is greater than 1. Remind the class that these are 'improper fractions' and that those less than one are 'proper fractions'. • Show OHT 4.1; conceal the 'mixed numbers' column. Ask a child to identify the column for his fraction. Record it on the OHT. Repeat with other children. • Ask children to complete Activity Sheet 4.1 writing fractions from the set in the appropriate columns.

Plenary

Teaching Activities/Focus Questions
• Show the 'mixed numbers' column on OHT 4.1. Remind the class what a mixed number is. • Look at the first improper fraction on the OHT, e.g. $^{9}/_{5}$. **Q** How many fifths make 1? How many more than $^{5}/_{5}$ are there? So what is $^{9}/_{5}$ as a mixed number? Record $1\ ^{4}/_{5}$ in the mixed number column. **Q** What is $^{11}/_{5}$ as a mixed number? How do you know? Establish that $^{11}/_{5} = {}^{5}/_{5} + {}^{5}/_{5} + {}^{1}/_{5}$ $= 1 + 1 + {}^{1}/_{5}$ $= 2{}^{1}/_{5}$ • Ask children to give the mixed numbers for the other improper fractions. **Q** Can $^{8}/_{8}$ be converted to a mixed number? Ask children to explain their reasoning. **By the end of the lesson, the children should be able to:** • **Convert improper fractions to mixed numbers;** • **Understand the terms numerator, denominator, proper fractions, improper fractions, mixed number.** (Refer to supplement of examples, section 6, page 23).

Planning sheet	Day Two	Unit 4 *Fractions*	Term: *Autumn*	Year Group: *5*

Oral and Mental

Objectives and Vocabulary	Teaching Activities
Read and write numbers to 100,000. VOCABULARY five-digit numbers	• Divide the class into groups of four. One child in each group secretly writes down a five-digit number, then shows it to the next child. The second child whispers it to the third child who writes it down and shows it to the fourth child. The fourth child reads it aloud for the other three in the group to verify. **Q** What is the highest possible five-digit number? What is the lowest? Record 999 999 at the top of the board and 10 000 at the bottom. Join with a line. • Ask each group to discuss where their number would fit on the vertical line. • Ask one child from each group to write their number in the estimated position. Discuss any points of contention and agree estimate.

Main Teaching

Objectives and Vocabulary	Teaching Activities
Change an improper fraction to a mixed number and vice versa. VOCABULARY improper fraction mixed number numerator denominator equivalent RESOURCES OHT 4.2 OHT 4.3 Whiteboards	• Show OHT 4.2. Look at the second row of chocolate bars. Ask children to record on whiteboards, the number of bars in the row. Discuss different ways of recording, including 2 ½ and $^{5}/_{2}$. • Look at the third row. **Q** How many half bars are there? How many whole bars could be made? How much chocolate altogether? Record $^{7}/_{2}$ = 3 ½ and 3 ½ = $^{7}/_{2}$. • Use the array of bars (last 3 rows on OHT). Cover parts of it, asking children to identify different quantities. Record as statements e.g. $^{5}/_{2}$ = 2 ½ . • Use OHT 4.3. Use a similar process to establish equivalent or improper fractions and mixed numbers involving quarters. • Write 4 $^{3}/_{5}$ on the board. **Q** How can we convert this to an improper fraction? Discuss then confirm effective methods. e.g. the denominator will be 5. $^{5}/_{5}$ = 1, 4 lots of $^{5}/_{5}$ = $^{20}/_{5}$, add the $^{3}/_{5}$ = $^{23}/_{5}$ • Record the following randomly on the board: $^{7}/_{2}$, 3 ¾, 8 ½, $^{21}/_{4}$, 6 $^{1}/_{3}$, $^{15}/_{4}$, 2 $^{1}/_{3}$, 5 ¼ , $^{17}/_{2}$, $^{19}/_{3}$. Ask children to work with a partner to find matching pairs. • Take feedback, asking children to justify their choices. • In pairs, one child writes a mixed number on paper. The other records the equivalent improper fraction anywhere on the paper, then writes any mixed number for the first child to record the improper fraction randomly. • After about five minutes, change sheets with another pair of children and match the fractions.

Plenary

Teaching Activities/Focus Questions
• Write on the board: 2 ½ , 3 ¾ , $^{22}/_{4}$, $^{5}/_{2}$, 5 ½ , $^{15}/_{4}$. Ask children to identify matching pairs. • Take feedback. Discuss why $^{22}/_{4}$ and 5 ½ are equivalent. **By the end of the lesson, the children should be able to:** • **Convert improper fractions to mixed numbers and vice versa.** (Refer to supplement of examples, section 6, page 23)

Planning sheet	Day Three	Unit 4 *Fractions*	Term: *Autumn*	Year Group: *5*

Oral and Mental

Objectives and Vocabulary	Teaching Activities
Multiply or divide whole numbers up to 10 000 by 10, 100 or 1. RESOURCES Whiteboards	• Write a number on the board, e.g. 37. Ask children to multiply it by 10 and show answers on whiteboards. Repeat with a few more operations e.g. divide by 10, multiply by 1000 etc. • Repeat with other starting numbers. **Q** What happens when a number is multiplied or divided by 1? Confirm that the number is unchanged.

Main Teaching

Objectives and Vocabulary	Teaching Activities
Recognise when two simple fractions are equivalent. RESOURCES Activity sheet 4.2 OHT 4.4 OHT 4.5	**Q** What do fractions that are equivalent to 1 have in common? Establish that the numerator and denominator are the same. Ask children to give examples of such fractions. Record them on the board. • Show OHT 4.4. Explain the 'fraction wall'. Refer to appropriate fractions on the board and show how each is represented by a row on the diagram. e.g. $^{4}/_{4}$, $^{6}/_{6}$ etc. • Point out that the ½ line goes through some rows and not others. **Q** Which rows have a half line? Record as a ½, ¼, $^{1}/_{6}$, $^{1}/_{8}$, $^{1}/_{10}$, $^{1}/_{12}$. Discuss that they are in descending order of size. **Q** How many ¼ make ½ ? How many $^{1}/6$ make ½ etc.? Record as ½ = $^{2}/_{4}$ = $^{3}/_{6}$ = $^{4}/_{8}$ = $^{5}/_{10}$ = $^{6}/_{12}$. • Build up equivalence families for thirds and fifths in a similar way. • Look at the ½ family. **Q** What is the relationship between the numerator and the denominator in each fraction? Establish that the denominator is 2 x the numerator. • Repeat with the other families to establish that in the $^{1}/_{3}$ family, d = 5 x n and in the $^{1}/_{5}$ families d = 5 x n. Ask children to look at the fraction wall. **Q** How many 12ths are equal to ¾ ? Record ¾ = $^{9}/_{12}$ Give out Activity Sheet 4.2 and ask children to use the wall to identify equivalent pairs, joining each pair with a line.

Plenary

Teaching Activities/Focus Questions
• Show OHT 4.5. Ask children to discuss in pairs which statements are true and which are false. • Take feedback, asking children to justify their decisions. Agree the true statements. **By the end of the lesson, children should be able to:** • **Recognise simple relationships between equivalent fractions.** (Refer to supplement of examples, section 6, page 23).

Planning sheet	Day Four	Unit 4 *Fractions*	Term: *Autumn*	Year Group: *5*

Oral and Mental		Main Teaching		Plenary
Objectives and Vocabulary	**Teaching Activities**	**Objectives and Vocabulary**	**Teaching Activities**	**Teaching Activities/Focus Questions**
Recall facts in the x2, x3, x4, x5, x6 and x10 tables and derive corresponding division facts.	• Ask quick fire multiplication facts and related division facts for the class to answer together to set rhythm. e.g. Teacher says: '3 x 4' (clap, clap) 'answer'. Class says: 'Twelve' Teacher says: '12÷ 3' (clap, clap) 'answer' etc..	Recognise equivalence between tenths and hundredths. Order tenths and hundredths. VOCABULARY equivalent RESOURCES Activity sheet 4.3 10 x 10 grid on OHP (or enlarged) Counting stick	• Use a 10 x 10 grid on OHP. Cover the top left square. **Q** What fraction of the whole square is covered? Cover different single squares and repeat the question. • Cover the top row and discuss to establish that $^{10}/_{100} = {}^{1}/_{10}$ emphasising 'equivalent'. Cover other tenths, e.g., right hand column, diagonal, 5 x 2 rectangle etc. and repeat. • Hold up a counting stick. Explain that it represents the scale from 0 to 1. Point to the first division. **Q** What fraction of the line is this? • Repeat with the fifth division and relate to ½ , recording ½ = $^{5}/_{10} = {}^{50}/_{100}$. • Ask children to indicate the position of different fractions on the stick, e.g. $^{4}/_{10}$, $^{90}/_{100}$, $^{20}/_{100}$ etc then $^{25}/_{100}$. Emphasise that $^{25}/_{100}$ is between $^{2}/_{10}$ and $^{3}/_{10}$, repeat with other hundredths which do not correspond to a marked division. • Ask children to complete Activity Sheet 4.3. They should pair equivalent fractions in the box, then write the given fractions in appropriate positions below the line below the box.	• Discuss any misconceptions which emerged during the activity. **Q** Is $^{45}/_{100}$ bigger than $^{5}/_{10}$? How do you know? Ask children to prepare a reasoned answer in pairs. • Take feedback. Record: $^{45}/_{100} < {}^{5}/_{10}$ and $^{5}/_{10} > {}^{45}/_{100}$ on the board. HOMEWORK Children to write statements using <, > or = signs and fractions that include tenths and hundredths. **By the end of the lesson, children should be able to:** • **Recognise equivalence between tenths and hundredths;** • **Order fractions including tenths and hundredths.** (Refer to supplement of examples, section 6, page 23).

Planning sheet	Day Five	Unit 4 *Fractions*	Term: *Autumn*	Year Group: *5*

Oral and Mental

Objectives and Vocabulary	Teaching Activities
Order mixed numbers. VOCABULARY mixed number RESOURCES Whiteboards	• Take feedback from the homework, asking for examples of children's statements. • Recap that $^{45}/100 < {}^{5}/10$ from day 4. Write 4 $^{45}/100$, 3 $^{5}/10$ on the board. **Q** Which is the larger mixed number? Discuss then record that 4 $^{45}/100 > 3\ ^{5}/10$ emphasising that when comparing mixed numbers, the whole number part is the most significant. • Provide other pairs of mixed numbers, asking children to identify the larger and record on whiteboards.

Main Teaching

Objectives and Vocabulary	Teaching Activities
Order a set of fractions such as 2, 2 ¾ , 1 ¾ , 1 ½ and position them on a number line. VOCABULARY improper fraction mixed number RESOURCES Activity sheet 4.4 OHT 4.6	• Show the first number line on OHT 4.6. Indicate the ½ position and ask which fraction it represents, then ask children to estimate the position of other fractions such as ¼, ¾ , $^{1}/_{8}$, $^{3}/_{8}$, $^{5}/_{8}$, $^{7}/_{8}$. Record below the line. • Uncover the second number line. **Q** What fraction does the first line represent? Repeat with other divisions and record the fractions. **Q** Where does $^{1}/5$ fit on this line? Confirm that it corresponds to the $^{2}/10$ position. Repeat with other fifths, recording them on the line. • Compare the two lines on OHT 4.6 to show where different fifths and tenths correspond to fractions on the first line. • Uncover the third line. **Q** Which type of fractions would we place on this line? Establish that it is appropriate for improper fractions of mixed numbers. • Ask children to complete Activity Sheet 4.4. Ask them to consider which number line is the most appropriate for each fraction before recording it on one of the lines.

Plenary

Teaching Activities/Focus Questions
• Use the third number line on OHT 4.6. **Q** Which fractions did you place on this line? Why? Confirm that fractions greater than one cannot be placed on the other lines on the sheet. • Record the mixed numbers and the improper fractions on the line with prompts from the children. • Ask children to suggest other fractions which could be placed on the line, including mixed numbers. **By the end of the lesson the children should be able to:** • **Order related sets of fractions and position them on number lines;** • **Identify fractions greater then, less than or equal to ½ ;** • **Order simple mixed numbers.** (Refer to supplement of examples, section 6, page 23).

Strategy Cards

Doubles 18 + 18 = 36 36 – 18 = 18 **Near Doubles** 18 + 19 = 37 37 – 18 = 19	**Partitioning** 23 + 45 = 68 (20 + 40) + (3+5) 60 + 8 68 – 45 = 23 (60 – 40) + (8 – 5) 20 + 3
Subtracting by counting on 92 – 89 = 3	**Using nearest 10 and adjusting** 84 – 19 = 65 32 + 49 = 81

$\frac{2}{9}$ $\frac{6}{8}$ $\frac{4}{4}$ $\frac{2}{16}$

$\frac{5}{5}$

$\frac{25}{100}$ $\frac{13}{3}$ $\frac{3}{4}$

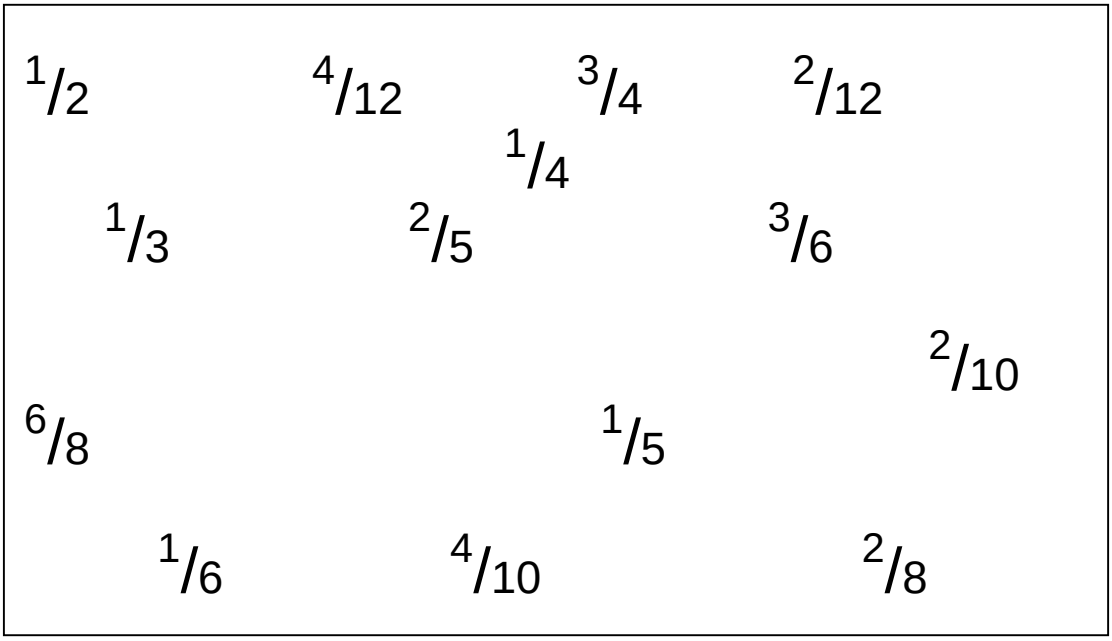
$\frac{25}{5}$

$\frac{16}{4}$ $\frac{3}{5}$ $\frac{10}{10}$ $\frac{9}{2}$

$\frac{7}{7}$ $\frac{16}{2}$ $\frac{14}{7}$

Write these fractions in the correct columns.

Proper Fraction (less than 1)	**Equal to 1**	**Improper Fractions** (greater than 1)

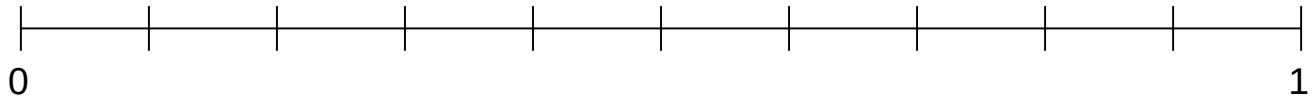


Join, with a line, pairs of fractions which are of equivalent value.

Use the fraction wall diagram to help you.

$\frac{2}{10}$	$\frac{30}{100}$	$\frac{10}{100}$
$\frac{50}{100}$	$\frac{2}{5}$	$\frac{3}{10}$
	$\frac{1}{5}$	
$\frac{1}{10}$	$\frac{4}{10}$	$\frac{1}{2}$

Place the fractions on a number line:



$3\frac{1}{2}$ $\frac{2}{8}$ $\frac{1}{3}$

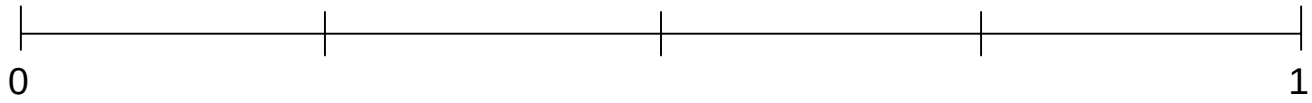
$\frac{3}{4}$ $\frac{4}{6}$

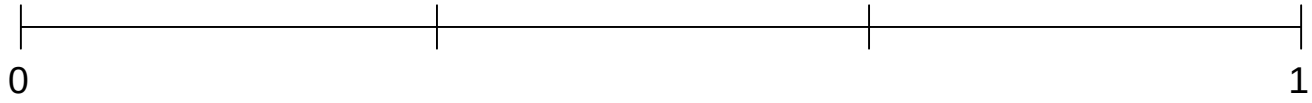
$\frac{5}{8}$ $\frac{7}{2}$

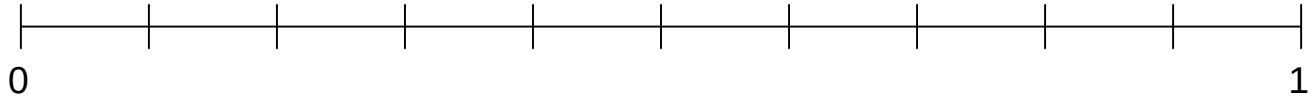
$1\frac{1}{4}$

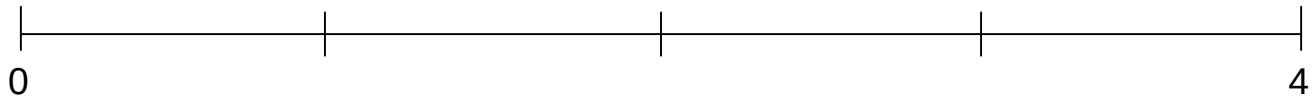
$2\frac{3}{4}$ $\frac{7}{10}$ $\frac{1}{2}$

Place the fractions on a number line:



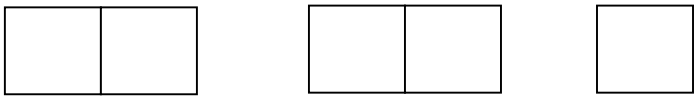


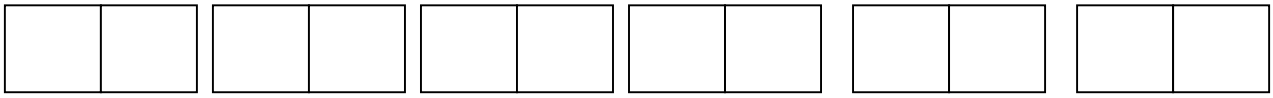


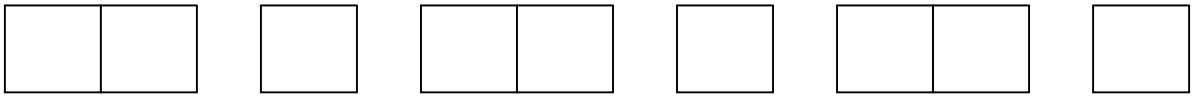


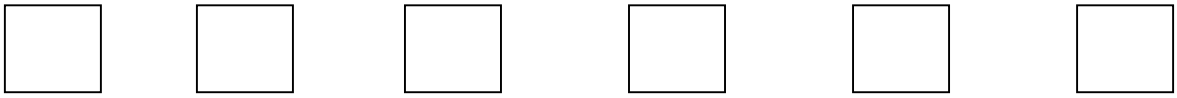
Proper Fractions	Equal to 1	Improper Fractions		Mixed Numbers

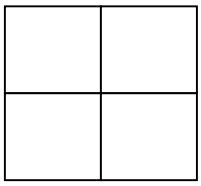
Whole chocolate bar



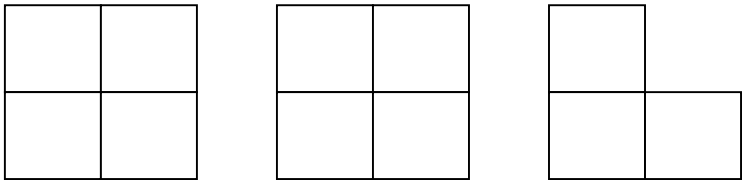


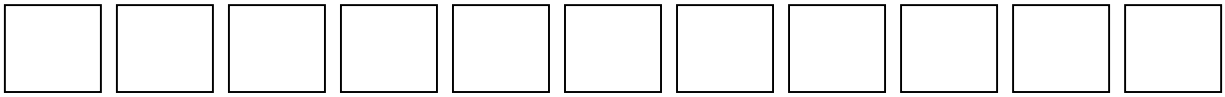


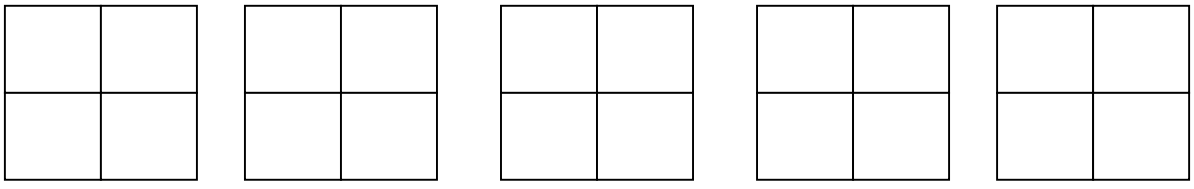


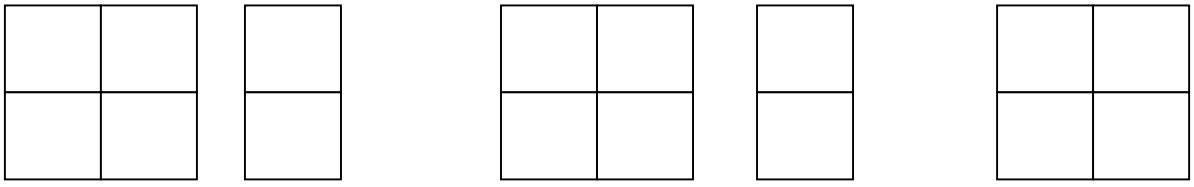


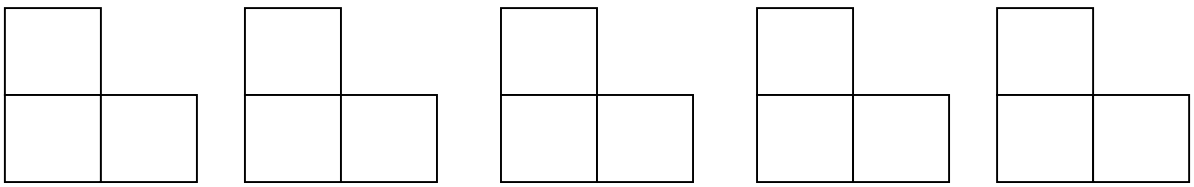
Whole chocolate bar



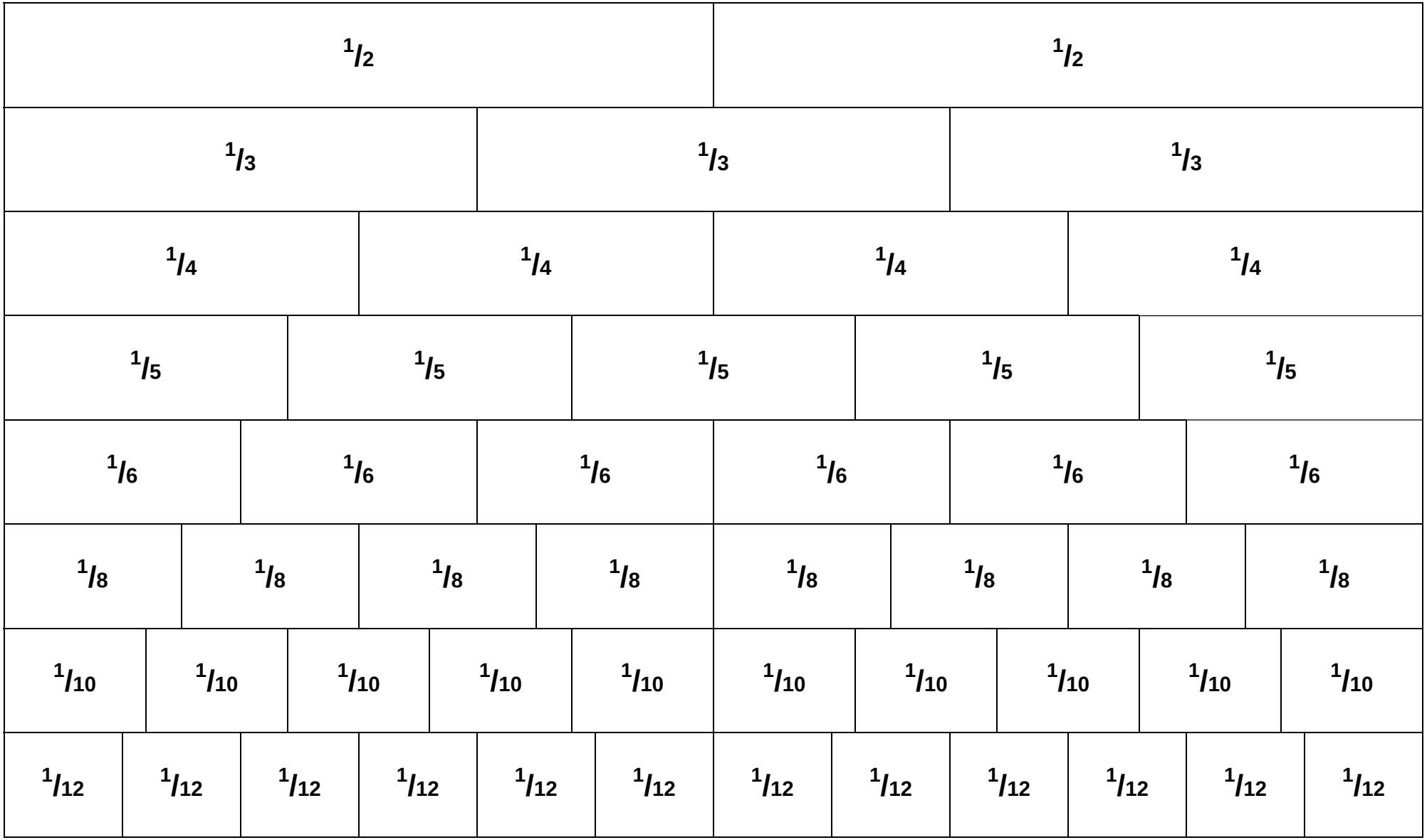








Unit 4 Year 5 (Autumn Term) **OHT 4.4**



One quarter is half of one half.

One fifth is half of one tenth.

One eighth is half of one quarter.

One sixth is half of one third.

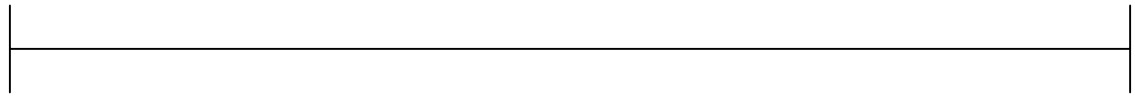
One third is half of one sixth.

One tenth is half of one fifth.

One tenth is double one fifth.

One twentieth is half of one tenth.

Which of these statements are true?



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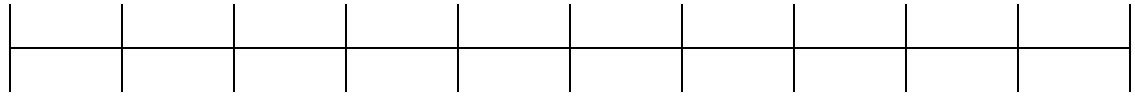

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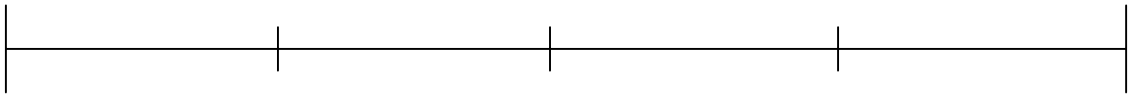

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