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| **Year 7 Spring 2 Lesson 3: Improper Fractions and Mixed Numbers** | |
| **Objective** | To change mixed numbers into improper fractions and vice versa. |
| **Aim** | This lesson moves on from baguettes to numberlines as a representation of mixed numbers and improper fractions. This leads on directly from the previous lesson and is therefore essential that all concepts from lesson 2 are fully understood before moving on. It starts with a review of what was learnt last lesson.  Again, this seems like a slow lesson, but the concepts are ones that remain confusing higher up the school if glossed over now. |
| **Resources** | [Powerpoint](https://bluecoatmaths.files.wordpress.com/2017/02/lesson-3-improper-fractions-and-mixed-numbers.pptx) |

**Key words: Proper, improper, mixed number**

**Settler: Numeracy Ninjas (max 10 mins)**

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| **Activity 1:**  Sharing ideas from last lesson.  Using the exit tickets from last lesson pupils should discuss then share their answers.  Discuss with the class the conclusion from last lesson that to have an improper fraction the number/dividend (numerator) must be greater than or equal to the divisor (denominator) and show the representations of this based on the baguettes from last lesson. | |
| **Little progress** | Pupil answers do not give an improper fraction. |
| Questions for progression | * *Think about your situation, what fraction of a baguette would you get? Is this an improper fraction?* * *What needs to be true to get an improper fraction?* |
| **Some progress** | Have filled in the numbers but not the representation |
| Questions for progression | * *How can you show this using a diagram?* * *Is there another way?* |
| **Substantial progress** | Can give an answer and more than one representation |
| Questions for progression | * *What needs to be true about the numbers, could you give an algebraic rule for the relationship between the numbers?* |

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| **Activity 2:**  Number line representations of improper fractions. Students quickly answer on their whiteboards.  Bring class back together to discuss their answers. The number line with the class relating it back to the baguette representation, what is the same? What is different?  Focus on C and D, how else could we write 4 thirds? How much of a baguette would this be? | |
| **Little progress** | Can only write A as a fraction or are confused by the diagram. |
| Questions for progression | *What does the diagram show? What are the points already labelled?*  *How many pieces is 1 split up into? What is the number at A?*  *How could we write B as a fraction? What type of fraction is it? Is there another way?* |
| **Some progress** | Can see A is ⅓ and B is 1 but are struggling to label C and D or have given C as ⅓ too. |
| Questions for progression | *How many pieces are there between 1 and 2?*  *What fraction is the whole number line split up into?*  *What fraction is C? Can it be the same as A? C is bigger than 1.*  *How many thirds is C? D?* |
| **Substantial progress** | Can give all 4 points as a fraction. |
| Questions for progression | *How else could we write C and D?* |

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| **Activity 3:**  Mixed numbers to improper fractions using representations. Go through the slides 7 and 8 with examples of representations of mixed numbers and how to convert to an improper fraction, if pupils think they have spotted the procedure encourage them to explain/show if/why they think it will **always work**. It is important that the representations are the focus initially rather than the procedure.  Students then work on their own in their books on the questions from slides 9 (slide 10 is hidden, but can be used as a challenge if anyone finishes much quicker than anyone else – print off)  Go over answers from slide 9 as a class.  Use slides 10 and 11 to check understanding as a class using mini whiteboards. Ask students how they got their answers, which representations would be good, and compare right and wrong answers, checking for reasoning. | |
| **Little progress** | Can draw a representation but then do not know how this will help them convert to a mixed number |
| Questions for progression | * *How many 5th’s make a whole one?* * *Can you label 0 and 1 etc on your representation?* * *How many whole numbers do you have?* * *What is left over?* |
| **Some progress** | Can show using representations what the correct mixed numbers are. |
| Questions for progression | * *What do you notice about the answers in each column?* * *Can you explain why the patterns occur in this way?* |
| **Substantial progress** | Are able to explain why the patterns occur. |
| Questions for progression | * *Give the challenge questions from hidden slide 10.* * *They can also make up their own similar questions.* |

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| **Activity 4:**  Improper fractions to mixed numbers using representations. Go through the slides 13 and 14 with examples of representations of improper fractions and how to convert to a mixed number. Again, if pupils think they have spotted the procedure encourage them to explain/show if/why they think it will **always work**. It is important that the representations are the focus initially rather than the procedure.  Students then answer the questions on slide 15 (challenge on slide 16) in their books. | |
| **Little progress** | Can draw a representation but then do not know how this will help them convert to a mixed number |
| Questions for progression | * *How many 3rd’s make a whole one?* * *Can you label 0 and 1 etc on your representation?* * *How many whole numbers do you have?* * *What is left over?* |
| **Some progress** | Answer the numerical questions correctly |
| Questions for progression | * *Look at the challenge, can you explain/show what would happen with any number.* |
| **Substantial progress** | Is able to give a convincing description of how to convert a/b into a mixed number. |
| Questions for progression | * *Give the challenges from slide 16.* |

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| **Activity 5:**  True or false. This task could be used as an exit ticket or an extended reasoning problem. It is important pupils explain their answers as otherwise there is the potential they have just guessed the answers with no understanding | |
| **Little progress** | Are struggling to answer or have just guessed |
| Questions for progression | * *What is an improper fraction? What is a proper fraction?* * *What does greater than mean?* * *Is this always true? How do you know?* |
| **Some progress** | Have given true for the second question and the justification listing examples including 5/5 |
| Questions for progression | * *What is a proper fraction?* * *Are all of your examples proper fractions?* |
| **Substantial progress** | Have given an answer for all but not shown any reasoning. |
| Questions for progression | * *How do you know? Please explain.* * *Can you list all of the examples for q2?* * *Can you draw a representation to show why this is true?* * *Can you give examples of proper fractions, improper fractions and mixed numbers.* |

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