**Fractions Policy**

Fraction strips: Blank (bar) rectangles (on plain paper) and get used to dividing the bars into halves, thirds, quarters etc:

**Shading fractions of shapes:**

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Concrete**  To calculate, concretely, how many parts to shade, use objects to share and find the fraction | **Pictorial**  Shade ¾ of this shape   |  |  |  |  | | --- | --- | --- | --- | | ¼ | ¼ | ¼ | ¼ |     Shade ¾ of this shape:   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |   Calculate ¾ of 20  so, shade 15 parts   |  |  | | --- | --- | | IIIII | IIIII | | IIIII | IIIII |   Shade ¼ of this shape:  http://content.doublestruck.eu/getPicture.asp?sub=K2_MATHS&CT=Q&org=669f04a9d1ac6f9dcc766c17d6840db7&folder=Q12A09_files&file=Image_003.png | **Abstract**  20 ÷4 = 5  5 x 3 = 15  12 ÷4 = 3  Shade 3 triangles |

**Fractions of amounts:**

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Concrete**  To calculate fractions of amounts, concretely, , use objects to share and find the fraction | **Pictorial**  Calculate a fraction of a quantity by first drawing the fraction in the bar, showing the length of the bar to be the quantity and then calculating the length of the shaded part:  Calculate ½ of 10:   |  |  | | --- | --- | | I I I I I | I I I I I |   10  Calculate 1/5 of 20 = 4  ?   |  |  |  |  |  | | --- | --- | --- | --- | --- | | 4 | 4 | 4 | 4 | 4 |     20  Calculate 3/5 of 20 = 12  ?   |  |  |  |  |  | | --- | --- | --- | --- | --- | | 4 | 4 | 4 | 4 | 4 |     20  Calculate 3/7 of 420 = 180  ?  420 ÷ 7 = 60  60 x 3 = 180  Once the pupils are calculating with larger numbers, they are likely to be able to work straight in the abstract context  **‘divide by denominator, multiply by numerator’**   |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | | 60 | 60 | 60 | 60 | 60 | 60 | 60 |     420 | **Abstract**  20 ÷ 5 = 4  4 x 3 = 12  20 ÷ 5 = 4  ½ of 10 = 5 |

**Equivalent fractions**

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Concrete**  Fraction strips: Blank (bar) rectangles (on plain paper) and get used to dividing the bars into halves, thirds, quarters etc to see equivalences | **Pictorial**  Which fraction is equivalent to 2/5?   |  |  |  |  |  | | --- | --- | --- | --- | --- | |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | |  |  |  |  |  |  |  |  |  |  |   2/5 = 4/10  Which fraction is equivalent to 2/6?   |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | |  |  |  |  |  |  |  |  |  |  | | --- | --- | --- | |  |  |  |   2/6 = 1/3 | **Abstract**  Link equivalences to times tables knowledge |

**Simplifying fractions:**

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Concrete** | **Pictorial**  Give 4/6 in its simplest form:   |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | |  |  |  |  |  |  |      |  |  |  | | --- | --- | --- | |  |  |  |   How can we remove some of the vertical lines to make fewer equal sized pieces?  **4/6 = 2/3**  Give 9/12 in its simplest form:   |  |  |  |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | |  |  |  |  |   **9/12 = ¾** | **Abstract**  9 ÷ 3 = 3  12 ÷ 3 = 4  **Link to times tables knowledge and common factors**  Think of a common factor of both 9 and 12? 3 |

**Ordering fractions**

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Concrete**  Fraction strips: Blank (bar) rectangles (on plain paper) and get used to dividing the bars into halves, thirds, quarters etc to compare size of fractions and order them | **Pictorial**  Which is greater 2/3 or ¾?   |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | |  | |  | |  | | |  |  | |  | |  | | **Abstract**  Find a common denominator: (see equivalent fractions part of this policy)  2/3 = 8/12 ¾ = 9/12 |

**Adding fractions (same denominator)**

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Concrete**  Use half, quarter cups/ thirds, fifths, sevenths cards to add concretely | **Pictorial**  ¼ + 2/4 = ¾   |  |  |  |  | | --- | --- | --- | --- | |  |  |  |  |   OR  ¼  +  2/4  =  ¾   |  |  |  |  | | --- | --- | --- | --- | |  |  |  |  |      |  |  |  |  | | --- | --- | --- | --- | |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | |  |  |  |  |   Using this model will prepare pupils for working with fractions where the denominators are different | **Abstract**  ¼ + 2/4 = ¾ |

**Adding fractions (with different denominators)**

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Concrete**  Use half, quarter cups/ thirds, fifths, sevenths cards to add concretely | **Pictorial**  1/3 + 3/6 =   |  |  |  | | --- | --- | --- | |  |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | |  |  |  |  |  |  |   We need to turn the thirds into sixths (the common denominator)  2/6  +  3/6  = 5/6   |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | |  |  |  |  |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | |  |  |  |  |  |  |   So, 1/3 + 2/6 = 5/6 | **Abstract**  **find the common denominator**  1/3 + 2/4 =  The common denominator is 12  4/12 + 6/12 = 10/12  \* this can be shown in a bar model too |

**Use the same process for subtraction with fractions**

**Multiplying fractions**

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Concrete**  **Use cups, cards** | **Pictorial**  1/3 x 4 =  = 4/3   |  |  |  |  | | --- | --- | --- | --- | | 1/3 | 1/3 | 1/3 | 1/3 |     1/3 x 3/4= 3/12   |  |  |  |  | | --- | --- | --- | --- | |  |  |  |  | |  |  |  |  | |  |  |  |  |   Having shaded in 1/3 in the orange and ¾ in the green, the yellow is the overlap of colours. This indicates the answer. | **Abstract**  **multiply the numerator and then the denominator** |

**Dividing with fractions**

**Dividing whole numbers by a fraction**

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Concrete**  3 ÷ 1/2 =  Exchange the 3 whole ‘cups’ into half cups and divide into piles of ½ | **Pictorial**  3 ÷ 1/2 =   |  |  |  | | --- | --- | --- | |  |  |  |   (divide each part of the bar, each whole, in half)   |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | |  |  |  |  |  |  |   So, 3 ÷ 1/2 = 6  Or represent as:   |  |  | | --- | --- | |  |  |  |  |  | | --- | --- | |  |  |  |  |  | | --- | --- | |  |  | | **Abstract** |

**Dividing fractions by fractions**

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Concrete** | **Pictorial**  2/3 ÷ 1/6 =   |  |  |  | | --- | --- | --- | |  |  |  |      |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | |  |  |  |  |  |  |   So, 2/3 ÷ 1/6 = 4 | **Abstract** |