Pre-assessment
of, for, and as learning

Embedded Assessment
of, for, and as learning

Post-assessment
of (and for, and as) learning
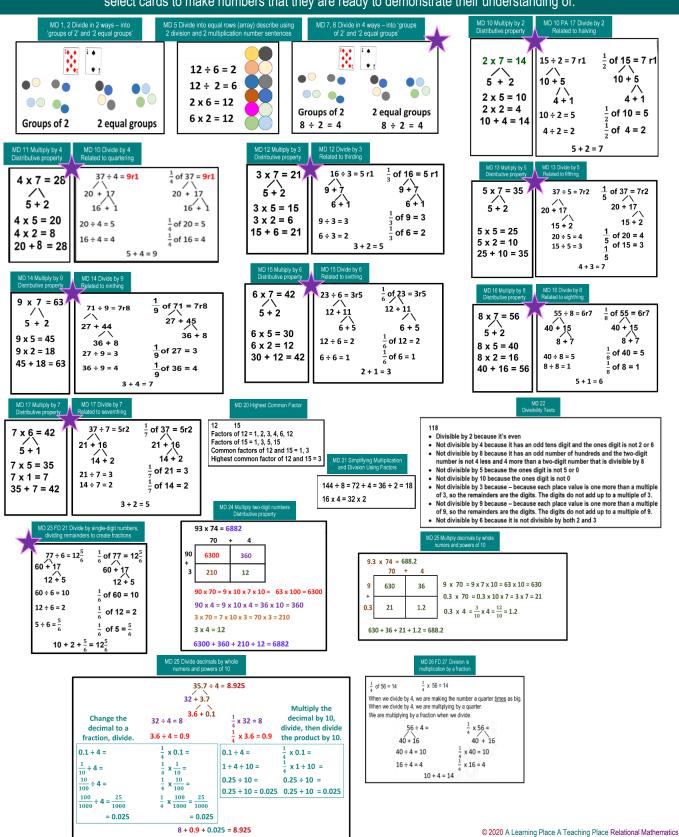
Differentiation
Integration
Intervention

ASSESSMENT

Division is Multiplication by a Fraction
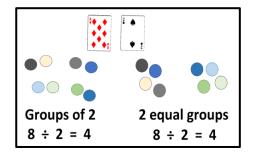Multiplication and Division 26 Fractions and Decimals 27

We have included the starred Levels with a logical basis to the grade Level, in this assessment, allowing children to demonstrate their highest Level of understanding. If children are familiar with models other than these, they may demonstrate their understanding using those.

Only 1 example of division / finding a fraction using the distributive property is given in the assessment, but children may select cards to make numbers that they are ready to demonstrate their understanding of.

MD 1, 2 Divide in 2 ways – into 'groups of 2' and '2 equal groups'

Groups of 2   2 equal groups

MD 5 Divide into equal rows (array) describe using 2 division and 2 multiplication number sentences

$12 \div 6 = 2$
$12 \div 2 = 6$
$2 \times 6 = 12$
$6 \times 2 = 12$

MD 7, 8 Divide in 4 ways – into 'groups of 2' and '2 equal groups'

Groups of 2   2 equal groups
$8 \div 2 = 4$ $8 \div 2 = 4$

MD 10 Multiply by 2 Distributive property

$2 \times 7 = 14$
$5 + 2$
$2 \times 5 = 10$
$2 \times 2 = 4$
$10 + 4 = 14$

MD 10 PA 17 Divide by 2 Related to halving

$15 \div 2 = 7 r1$ $\frac{1}{2}$ of $15 = 7 r1$
$10 + 5$ $10 + 5$
$4 + 1$ $4 + 1$
$10 \div 2 = 5$ $\frac{1}{2}$ of $10 = 5$
$4 \div 2 = 2$ $\frac{1}{2}$ of $4 = 2$
$5 + 2 = 7$

MD 11 Multiply by 4 Distributive property

$4 \times 7 = 28$
$5 + 2$
$4 \times 5 = 20$
$4 \times 2 = 8$
$20 + 8 = 28$

MD 10 Divide by 4 Related to quartering

$37 \div 4 = 9r1$ $\frac{1}{4}$ of $37 = 9r1$
$20 + 17$ $20 + 17$
$16 + 1$ $16 + 1$
$20 \div 4 = 5$ $\frac{1}{4}$ of $20 = 5$
$16 \div 4 = 4$ $\frac{1}{4}$ of $16 = 4$
$5 + 4 = 9$

MD 12 Multiply by 3 Distributive property

$3 \times 7 = 21$
$5 + 2$
$3 \times 5 = 15$
$3 \times 2 = 6$
$15 + 6 = 21$

MD 12 Divide by 3 Related to thirding

$16 \div 3 = 5 r1$ $\frac{1}{3}$ of $16 = 5 r1$
$9 + 7$ $9 + 7$
$6 + 1$ $6 + 1$
$9 \div 3 = 3$ $\frac{1}{3}$ of $9 = 3$
$6 \div 3 = 2$ $\frac{1}{3}$ of $6 = 2$
$3 + 2 = 5$

MD 13 Multiply by 5 Distributive property

$5 \times 7 = 35$
$5 + 2$
$5 \times 5 = 25$
$5 \times 2 = 10$
$25 + 10 = 35$

MD 13 Divide by 5 Related to fifthing

$37 \div 5 = 7r2$ $\frac{1}{5}$ of $37 = 7r2$
$20 + 17$ $20 + 17$
$15 + 2$ $15 + 2$
$20 \div 5 = 4$ $\frac{1}{5}$ of $20 = 4$
$15 \div 5 = 3$ $\frac{1}{5}$ of $15 = 3$
$4 + 3 = 7$

MD 14 Multiply by 9 Distributive property

$9 \times 7 = 63$
$5 + 2$
$9 \times 5 = 45$
$9 \times 2 = 18$
$45 + 18 = 63$

MD 14 Divide by 9 Related to ninthing

$71 \div 9 = 7r8$ $\frac{1}{9}$ of $71 = 7r8$
$27 + 44$ $27 + 45$
$36 + 8$ $36 + 8$
$27 \div 9 = 3$ $\frac{1}{9}$ of $27 = 3$
$36 \div 9 = 4$ $\frac{1}{9}$ of $36 = 4$
$3 + 4 = 7$

MD 15 Multiply by 6 Distributive property

$6 \times 7 = 42$
$5 + 2$
$6 \times 5 = 30$
$6 \times 2 = 12$
$30 + 12 = 42$

MD 15 Divide by 6 Related to sixthing

$23 \div 6 = 3r5$ $\frac{1}{6}$ of $23 = 3r5$
$12 + 11$ $12 + 11$
$6 + 5$ $6 + 5$
$12 \div 6 = 2$ $\frac{1}{6}$ of $12 = 2$
$6 \div 6 = 1$ $\frac{1}{6}$ of $6 = 1$
$2 + 1 = 3$

MD 16 Multiply by 8 Distributive property

$8 \times 7 = 56$
$5 + 2$
$8 \times 5 = 40$
$8 \times 2 = 16$
$40 + 16 = 56$

MD 16 Divide by 8 Related to eighthing

$55 \div 8 = 6r7$ $\frac{1}{8}$ of $55 = 6r7$
$40 + 15$ $40 + 15$
$8 + 7$ $8 + 7$
$40 \div 8 = 5$ $\frac{1}{8}$ of $40 = 5$
$8 \div 8 = 1$ $\frac{1}{8}$ of $8 = 1$
$5 + 1 = 6$

MD 17 Multiply by 7 Distributive property

$7 \times 6 = 42$
$5 + 1$
$7 \times 5 = 35$
$7 \times 1 = 7$
$35 + 7 = 42$

MD 17 Divide by 7 Related to seventhing

$37 \div 7 = 5r2$ $\frac{1}{7}$ of $37 = 5r2$
$21 + 16$ $21 + 16$
$14 + 2$ $14 + 2$
$21 \div 7 = 3$ $\frac{1}{7}$ of $21 = 3$
$14 \div 7 = 2$ $\frac{1}{7}$ of $14 = 2$
$3 + 2 = 5$

MD 20 Highest Common Factor

12   15
Factors of 12 = 1, 2, 3, 4, 6, 12
Factors of 15 = 1, 3, 5, 15
Common factors of 12 and 15 = 1, 3
Highest common factor of 12 and 15 = 3

MD 21 Simplifying Multiplication and Division Using Factors

$144 \div 8 = 72 \div 4 = 36 \div 2 = 18$
$16 \times 4 = 32 \times 2$

MD 22 Divisibility Tests

118
- Divisible by 2 because it's even
- Not divisible by 4 because it has an odd tens digit and the ones digit is not 2 or 6
- Not divisible by 8 because it has an odd number of hundreds and the two-digit number is not 4 less and 4 more than a two-digit number that is divisible by 8
- Not divisible by 5 because the ones digit is not 5 or 0
- Not divisible by 10 because the ones digit is not 0
- Not divisible by 3 because – because each place value is one more than a multiple of 3, so the remainders are the digits. The digits do not add up to a multiple of 3.
- Not divisible by 9 because – because each place value is one more than a multiple of 9, so the remainders are the digits. The digits do not add up to a multiple of 9.
- Not divisible by 6 because it is not divisible by both 2 and 3

MD 23 FD 21 Divide by single-digit numbers, dividing remainders to create fractions

$77 \div 6 = 12\frac{5}{6}$ $\frac{1}{6}$ of $77 = 12\frac{5}{6}$
$60 + 17$ $60 + 17$
$12 + 5$ $12 + 5$
$60 \div 6 = 10$ $\frac{1}{6}$ of $60 = 10$
$12 \div 6 = 2$ $\frac{1}{6}$ of $12 = 2$
$5 \div 6 = \frac{5}{6}$ $\frac{1}{6}$ of $5 = \frac{5}{6}$
$10 + 2 + \frac{5}{6} = 12\frac{5}{6}$

MD 24 Multiply two-digit numbers Distributive property

$93 \times 74 = 6882$

	70	+	4
90 +	6300		360
3	210		12

$90 \times 70 = 9 \times 10 \times 7 \times 10 = 63 \times 100 = 6300$
$90 \times 4 = 9 \times 10 \times 4 = 36 \times 10 = 360$
$3 \times 70 = 7 \times 10 \times 3 = 70 \times 3 = 210$
$3 \times 4 = 12$
$6300 + 360 + 210 + 12 = 6882$

MD 25 Multiply decimals by whole numbers and powers of 10

$9.3 \times 74 = 688.2$

	70	+	4
9 +	630		36
0.3	21		1.2

$9 \times 70 = 9 \times 7 \times 10 = 63 \times 10 = 630$
$0.3 \times 70 = 0.3 \times 10 \times 7 = 3 \times 7 = 21$
$0.3 \times 4 = \frac{3}{10} \times 4 = \frac{12}{10} = 1.2$
$630 + 36 + 21 + 1.2 = 688.2$

MD 25 Divide decimals by whole numbers and powers of 10

$35.7 \div 4 = 8.925$
$32 + 3.7$
$3.6 + 0.1$

Change the decimal to a fraction, divide.

$32 \div 4 = 8$
$3.6 \div 4 = 0.9$

$\frac{1}{4} \times 32 = 8$
$\frac{1}{4} \times 3.6 = 0.9$

Multiply the decimal by 10, divide, then divide the product by 10.

$0.1 \div 4 =$	$\frac{1}{4} \times 0.1 =$
$\frac{1}{10} \div 4 =$	$\frac{1}{4} \times \frac{1}{10} =$
$\frac{10}{100} \div 4 =$	$\frac{1}{4} \times \frac{10}{100} =$
$\frac{100}{1000} \div 4 = \frac{25}{1000}$	$\frac{1}{4} \times \frac{100}{1000} = \frac{25}{1000}$
$= 0.025$	$= 0.025$

$0.1 \div 4 =$	$\frac{1}{4} \times 0.1 =$
$1 \div 4 \div 10 =$	$\frac{1}{4} \times 1 \div 10 =$
$0.25 \div 10 =$	$0.25 \div 10 =$
$0.25 \div 10 = 0.025$	$0.25 \div 10 = 0.025$

$8 + 0.9 + 0.025 = 8.925$

MD 26 FD 27 Division is multiplication by a fraction

$\frac{1}{4}$ of $56 = 14$ $\frac{1}{4} \times 56 = 14$

When we divide by 4, we are making the number a quarter <u>times</u> as big.
When we divide by 4, we are multiplying by a quarter.
We are multiplying by a fraction when we divide.

$56 \div 4 =$ $\frac{1}{4} \times 56 =$
$40 + 16$ $40 + 16$
$40 \div 4 = 10$ $\frac{1}{4} \times 40 = 10$
$16 \div 4 = 4$ $\frac{1}{4} \times 16 = 4$
$10 + 4 = 14$

Select the Level that allows you to demonstrate your highest understanding.
If you are unable to multiply and divide using these strategies, you may use your own strategy.

Divide in 2 ways

1. Select cards to make a number to divide and a number to divide by.
2. Collect the number of counters.
3. Divide by making 'groups of …'.
4. Record the division number sentence.
5. Divide by making '… equal groups'.
6. Record the division number sentence.

Groups of 2
$8 \div 2 = 4$

2 equal groups
$8 \div 2 = 4$

Divide and Find a Fraction of a Number

1. Select cards to make a number to divide and a number to divide by.
2. Record the number sentence.
3. Divide using the distributive property and find a fraction of the number.

$$37 \div 7 = 5r2 \qquad \frac{1}{7} \text{ of } 37 = 5r2$$

$$21 + 16 \qquad\qquad 21 + 16$$

$$14 + 2 \qquad\qquad 14 + 2$$

$$21 \div 7 = 3 \qquad \frac{1}{7} \text{ of } 21 = 3$$
$$14 \div 7 = 2 \qquad \frac{1}{7} \text{ of } 14 = 2$$

$$3 + 2 = 5$$

Divide and Find a Fraction of a Number, Dividing the Remainder to Create a Fraction

1. Select cards to make a number to divide and a number to divide by.
2. Record the number sentence.
3. Divide using the distributive property and find a fraction of the number.
4. Divide the remainder to create a fraction.

$$77 \div 6 = 12\frac{5}{6} \qquad \frac{1}{6} \text{ of } 77 = 12\frac{5}{6}$$

$$60 + 17 \qquad\qquad 60 + 17$$

$$12 + 5 \qquad\qquad 12 + 5$$

$$60 \div 6 = 10 \qquad \frac{1}{6} \text{ of } 60 = 10$$

$$12 \div 6 = 2 \qquad \frac{1}{6} \text{ of } 12 = 2$$

$$5 \div 6 = \frac{5}{6} \qquad \frac{1}{6} \text{ of } 5 = \frac{5}{6}$$

$$10 + 2 + \frac{5}{6} = 12\frac{5}{6}$$

Divide in 2 ways

1. Select cards to make a number to divide and a number to divide by.
2. Collect the number of counters.
3. Divide by making 'groups of …'.
4. Record the division number sentence.
5. Divide by making '… equal groups'.
6. Record the division number sentence.

Groups of 2   2 equal groups

$8 \div 2 = 4$ $8 \div 2 = 4$

Divide and Find a Fraction of a Number

1. Select cards to make a number to divide and a number to divide by.
2. Record the division number sentence and the fraction number sentence.
3. Divide using the distributive property and find a fraction of the number.

$37 \div 7 = 5r2$ $\frac{1}{7}$ of $37 = 5r2$

$21 + 16$ $21 + 16$

$14 + 2$ $14 + 2$

$21 \div 7 = 3$ $\frac{1}{7}$ of $21 = 3$

$14 \div 7 = 2$ $\frac{1}{7}$ of $14 = 2$

$3 + 2 = 5$

Divide and Find a Fraction of a Number, Dividing the Remainder to Create a Fraction

1. Select cards to make a number to divide and a number to divide by.
2. Record the number sentence.
3. Divide using the distributive property and find a fraction of the number.
4. Divide the remainder to create a fraction.

$77 \div 6 = 12\frac{5}{6}$ $\frac{1}{6}$ of $77 = 12\frac{5}{6}$

$60 + 17$ $60 + 17$

$12 + 5$ $12 + 5$

$60 \div 6 = 10$ $\frac{1}{6}$ of $60 = 10$

$12 \div 6 = 2$ $\frac{1}{6}$ of $12 = 2$

$5 \div 6 = \frac{5}{6}$ $\frac{1}{6}$ of $5 = \frac{5}{6}$

$10 + 2 + \frac{5}{6} = 12\frac{5}{6}$

Divide is Multiplication by a Fraction

1. Select cards to make a number to divide and multiply by a fraction.
2. Record the division number sentence and the fraction number sentence.
3. Divide and multiply by a fraction using the distributive property.

$\frac{1}{4}$ of $56 = 14$ $\frac{1}{4}$ x $56 = 14$

When we divide by 4, we are making the number a quarter <u>times</u> as big.
When we divide by 4, we are multiplying by a quarter.
We are multiplying by a fraction when we divide.

$56 \div 4 =$ $\frac{1}{4}$ x $56 =$

$40 + 16$ $40 + 16$

$40 \div 4 = 10$ $\frac{1}{4}$ x $40 = 10$

$16 \div 4 = 4$ $\frac{1}{4}$ x $16 = 4$

$10 + 4 = 14$