

# ASSESSMENT

## Prime Numbers

Multiplication and Division 28 Patterns and Algebra 33

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.

**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**

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

$37 \div 4 = 9 \text{ r}1$        $\frac{1}{4}$  of  $37 = 9 \text{ r}1$   
 $20 + 17$        $20 + 17$   
 $16 + 1$        $16 + 1$   
 $20 \div 4 = 5$        $\frac{1}{4}$  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 thirds**

$16 \div 3 = 5 \text{ r}1$        $\frac{1}{3}$  of  $16 = 5 \text{ r}1$   
 $9 + 7$        $9 + 7$   
 $6 + 1$        $6 + 1$   
 $9 \div 3 = 3$        $\frac{1}{3}$  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**

$37 \div 5 = 7 \text{ r}2$        $\frac{1}{5}$  of  $37 = 7 \text{ r}2$   
 $20 + 17$        $20 + 17$   
 $15 + 2$        $15 + 2$   
 $20 \div 5 = 4$        $\frac{1}{5}$  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**

$71 \div 9 = 7 \text{ r}8$        $\frac{1}{9}$  of  $71 = 7 \text{ r}8$   
 $27 + 44$        $27 + 44$   
 $36 + 8$        $36 + 8$   
 $27 \div 9 = 3$        $\frac{1}{9}$  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**

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

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

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

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- 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**

$93 \times 74 = 6882$

90	3
6300	360
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**

$9.3 \times 74 = 688.2$

9	30	36
+	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 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 times as big.  
When we divide by 4, we are multiplying by a quarter.  
We are multiplying by a fraction when we divide.

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

**MD 28 PA 33 Prime Numbers**

Only 1 array.  
Prime number

More than 1 array.  
Not a prime number

**MD 25 Divide decimals by whole numbers and powers of 10**

$35.7 \div 4 = 8.925$

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.

$0.1 \div 4 = \frac{1}{4} \times 0.1 = \frac{1}{4} \times \frac{1}{10} = \frac{1}{40}$   
 $\frac{1}{10} \div 4 = \frac{1}{4} \times \frac{1}{10} = \frac{1}{40}$   
 $\frac{10}{100} \div 4 = \frac{1}{4} \times \frac{10}{100} = \frac{1}{40}$   
 $\frac{100}{1000} \div 4 = \frac{25}{1000} = \frac{1}{40}$   
 $\frac{1}{4} \times \frac{100}{1000} = \frac{25}{1000} = 0.025$

$8 + 0.9 + 0.025 = 8.925$

## PRE - ASSESSMENT

### Divide into an Array, Record Division and Multiplication Number Sentences

1. Select some counters.
2. Divide the counters into an array.
3. Record the array.
4. Record 2 division number sentences.
5. Record 2 multiplication number sentences.

$$12 \div 6 = 2$$

$$12 \div 2 = 6$$





$$2 \times 6 = 12$$

$$6 \times 2 = 12$$



**Divide into an Array, Record Division and Multiplication Number Sentences**

1. Select some counters.
2. Divide the counters into an array.
3. Record the array.
4. Record 2 division number sentences.
5. Record 2 multiplication number sentences.

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

**Prime Numbers**

1. Have some counters.
2. Construct all possible arrays of equal rows.
3. Record each array.
4. Is your number prime or composite?
5. Why?.