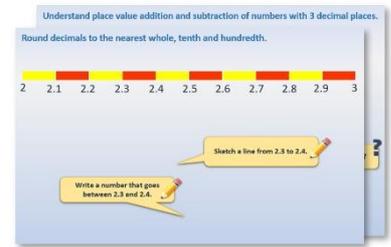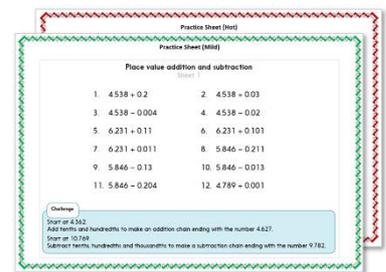# Year 4: Week 6, Day 2
## Factors

**Each day covers one maths topic. It should take you about 1 hour or just a little more.**
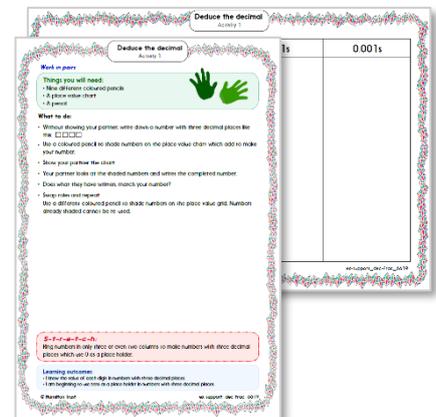
1. Start by reading through the **Learning Reminders**.
   They come from our *PowerPoint* slides.

2. Tackle the questions on the **Practice Sheet**.
   There might be a choice of either Mild (easier) or
   Hot (harder)!
   Check the answers.

3. Finding it tricky? That's OK… have a go with a
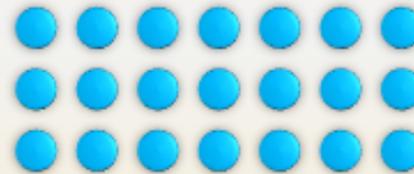   grown-up at **A Bit Stuck?**

4. Think you've cracked it? Whizzed through the Practice Sheets?
   Have a go at the **Investigation**…

# Learning Reminders

**Find factors of numbers up to 40.**

How many factors does **21** have?
Draw the different possible arrays for 21 counters.

3 x 7

1 x 21

**21** has just **4 factors** in 2 pairs, 1 and 21 and 3 and 7.

# Learning Reminders



Find factors of numbers up to 40.

Now try 16.
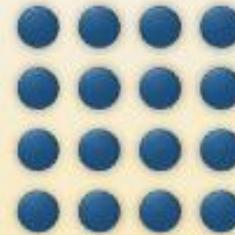
1 x 16

2 x 8

4 x 4

16 has 5 factors, 1, 2, 4, 8 and 16.

4 is paired with itself so we don't have to count it twice.

# Practice Sheet Mild
## Matching factors

Match each number to its factors.
Add the number itself to the list of factors,
e.g. 15 has 15 as a factor, so 15 must be added to 1, 3 and 5.

### Section A

| | |
|---|---|
| 15 | 3, 7, 1 |
| 6 | 2, 3, 1 |
| 21 | 3, 1, 5 |
| 10 | 2, 4, 3, 6, 12, 8, 1 |
| 12 | 1, 5, 2 |
| 24 | 2, 3, 4, 1, 6 |

### Section B

| | |
|---|---|
| 22 | 2, 1, 6, 9, 3 |
| 31 | 3, 1 |
| 9 | 2, 11, 1 |
| 36 | 5, 1, 2, 3, 15, 6, 10 |
| 18 | 1 |
| 30 | 1, 4, 2, 18, 9, 3, 6, 12 |

**Challenge**

Most of the numbers you investigated had an even number of factors, but some had an odd number of factors.
I wonder what makes these numbers special?

Can you find any other numbers with an odd number of factors?

# Practice Sheet Hot
## Matching factors

Match each number to its factors.
Add the number itself to the list of factors,
e.g. 15 has 15 as a factor, so 15 must be added to 1, 3 and 5.

### Section C

| | |
|---|---|
| 34 | 1, 4, 2 |
| 4 | 2, 17, 1 |
| 16 | 3, 2, 4, 8, 12, 6, 16, 1, 24 |
| 39 | 4, 2, 1, 5, 10, 8, 20 |
| 48 | 3, 1, 13 |
| 40 | 8, 4, 1, 2 |
| 25 | 7, 1 |
| 49 | 4, 2, 16, 1, 8 |
| 32 | 1, 5 |

**Challenge**

Which has more factors: 99 or 100 or 101? Guess then test!

# Practice Sheets Answers

## Matching factors (mild)

**Section A**
15: 1, 3, 5, 15
6: 1, 2, 3, 6
21: 1, 3, 7, 21
10: 1, 2, 5, 10
12: 1, 2, 3, 4, 6, 12
24: 1, 2, 3, 4, 6, 8, 12, 24

**Section B**
22: 1, 2, 11, 22
31: 1, 31
9: 1, 3, 9
36: 1, 2, 3, 4, 6, 9, 12, 18, 36
18: 1, 2, 3, 6, 9, 18
30: 1, 2, 3, 5, 6, 10, 15, 30

**Challenge**

9 and 36 should be ringed. These are both square numbers.
For another number with an odd number of factors, accept any square number,
i.e. 1, 4, 16, 25, 49, 64, 81, 100 …

## Matching factors (hot)

**Section C**
34: 1, 2, 17, 34
4: 1, 2, 4
16: 1, 2, 4, 8, 16
39: 1, 3, 13, 39
48: 1, 2, 3, 4, 6, 8, 12, 16, 24, 48
40: 1, 2, 5, 8, 10, 20, 40
25: 1, 5, 25
49: 1, 7, 49
32: 1, 2, 4, 8, 16, 32

**Challenge**

100 has more factors than 99 or 101.

*Work in pairs*

**Things you will need:**
• 50 counters
• A pencil

**What to do:**

# 14, 16, 24, 27, 29, 32, 36

• Choose a number.
Take this number of counters.
Arrange the counters into an array (rectangle).
Write the matching multiplication.

• Now rearrange them into as many different
arrays as you can.
Write the matching multiplication each time.

• Score one point for each multiplication
you write.

• Choose another number and do the same.
Try to score as many points as you can.

• Carry on choosing different numbers and
making as many arrays as you can.
Write the matching multiplication each time.

• Which numbers do you think will score lots of points?
Which number do you think won't score many points?

<u>14</u>
1 x 14
2 x 7

**S-t-r-e-t-c-h:**
Find the number between 40 and 50 with the greatest number of
factors, i.e. the greatest number of possible arrays.

**Learning outcomes:**
• I can make different arrays for a given number and write the matching multiplications.
• I understand that multiplication works both ways, e.g. 4 x 6 = 6 x 4.
• I am beginning to identify pairs of factors.

# Investigation
## Factor facts



Explore the factors of numbers up to 40.

Find
a) which number has most factors
b) which numbers have an odd number of factors
c) which numbers only have two factors, themselves and 1.

If you had to guess, which number between 40 and 100 do you think.....

- might have most factors?
  Why?

- could have an odd number of factors?
  Why?

- is the largest number less than 100 with just 2 factors?
  Why?

Now investigate to check.....