

Work out the answers to these on your own ...
Do it mentally if you can
Then jot down how you worked it out ...

**Add 10 to
92**

$99 + 99 + 98$

Double 76

$35 + 36$

Halve 56

**Subtract
100 from
634**

$2016 - 1999$

10×13

$51 - 25$

25×9

**$1 + 2 + 3 + 4$
 $+ 5 + 6 + 7 +$
 $8 + 9 + 10$**

16×12

Conceptualising fluency as a spectrum of proficiency



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Basic building blocks for grades 3 & 4



“Computational
fluency”

“Feel for
numbers”

Fluency ...

“Mental agility”

“Mental maths
strategies”

What are we aiming for?

NOT pure RECALL, ROTE memorisation, or use of algorithms

FLUENCY with UNDERSTANDING

However, want some of these to become:
Habituated
Automated
Recall of facts

What should be automatic?

- Askew's 'basic facts'

adding or subtracting a single digit number to any number

counting on or back in 1s from any starting number

counting on or back in 2s, 10s, or 5s from any starting number

adding a multiple of 10 or 100 to any number

knowing what to add to a number to make it up to a multiple of 10 or 100

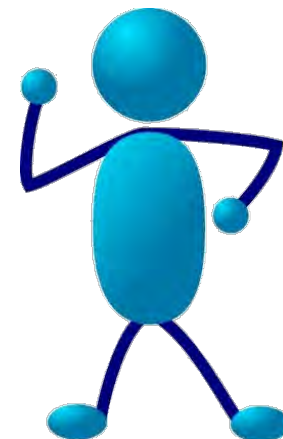
multiplying any number by 5 (by multiplying by 10 and halving)

Multiplying any number by 10

Doubling or halving any number

An example: add 10 to 92

- * The cards labelled **A to G** show the types of answers we have received from learners for this question
- * In your groups:
 - * Look at the methods used and discuss
 - * Place the methods along this spectrum
 - * Where do the methods used by your group fit?



Concrete
Slow
Inefficient

Efficient
Flexible
Habituated (where appropriate)

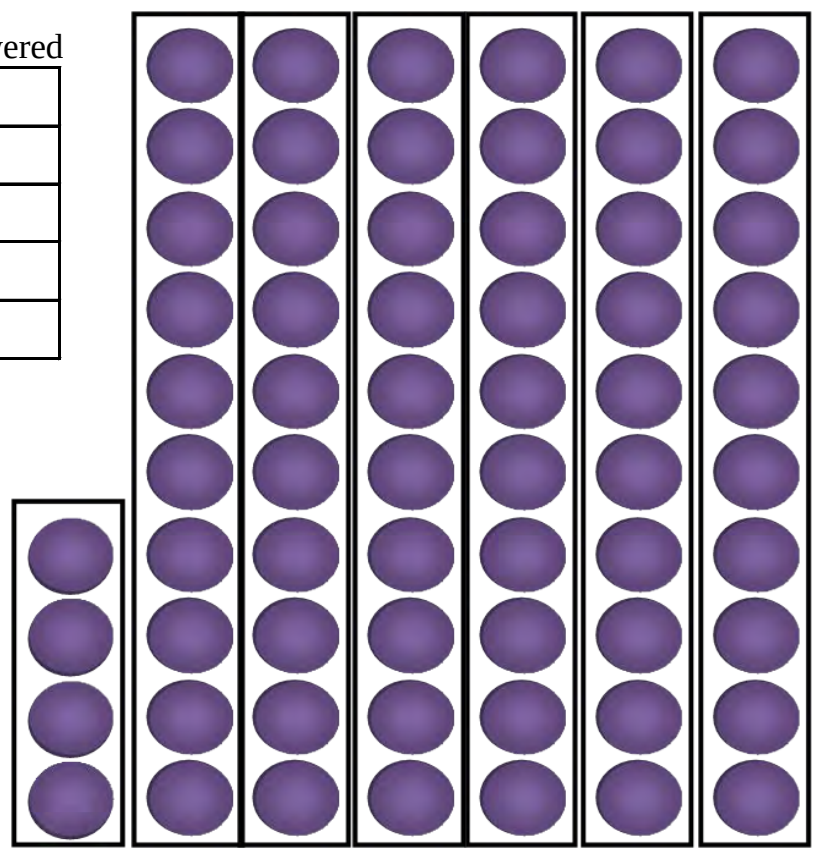
Another example: incrementing tens

Counting with incrementing tens

[Use pink strip cards. Show strip (a) then add others for steps b to e. Ask] *How many dots are there altogether?*

	Note Answer & How Answered
(a) The 'four dot' strip	
(b) Add a 'ten dot' strip to the right	
(c) Add another 10 to make 24	
(d) Add another 20 to make 44	
(e) Add another 30 to make 74	

As you watch the following video, think about the difference in the way the learners answer and where their methods might fit on a fluency spectrum.



An example: incrementing tens

- Less efficient: count the dots each time a new strip is added including the 4 dot strip
- Slightly more efficient : count the first 10 strip in ones or twos and then count by touching each strip (in tens) as they are laid down
- Slightly more efficient: count the first 10 strip in ones or twos and then mentally add 10 each time a strip is laid down.
- more efficient method: mentally count the dots on 4 and the 10 strip and then count on in groups of 10 e.g. $44 + 30$ is 74 (knowing 40 and 30 is 70)

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- ❖ some learners counted in ones from the beginning to get 74, accurately & correctly
- ❖ To say they have no procedural fluency would do no justice to fact that they performed the skill of counting in ones accurately.
- ❖ But to say the basic skill of one-to-one counting is fluency is problematic

SPECTRUM FOR
incrementing 10s

Rudimentary /
constrained
skill

count the dots
each time a new
strip is added

physically count the
first 10 strip in ones or
twos and then count
each strip as they are
laid down

physically count the first
10 strip in ones or twos
and then mentally add
10 each time a strip is
laid down

Elaborated /
flexible fluency

mentally count the
dots on the 10 strip
and then count in
groups of 10 e.g. 44 +
30 is 74 (knowing 40
and 30 is 70)

What methods did you use to answer these questions?

✓ Add 10
to 92

$99 + 99 + 98$

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In your classroom:

- * Many learners 'trapped' in concrete one to one counting or dependence on algorithms without understanding
 - * the result is an absence of flexibility and fluency with operations
- * Encourage you to assess your own learners work in terms of a spectrum of fluency
- * Design your own spectrums

We've given you a number of key resources...

- * Grocotts (especially 8 and 9)
- * Dice
- * Cards
- * 100 grids and number lines
- * Homework books
- * Readings:
 - * Choose examples carefully for developing fluency (see **'Adding up in Chunks'** example on handout from Sherry Parrish)
 - * Mike Askew **"Right from the Start"** article (Teach Primary Magazine, January 2012)
- * How could you develop fluency using these resources?

