

## MENTALS

How do you use mental in your classroom? Do you use it at all? What should students be able to do mentally?  $52 \times 23$ ? 16.5% of \$80? Can you use mental as a lead in to a lesson? What about investigative mental? How can you teach through mental? The first 10 minutes of your lesson may be the most valuable part of that lesson. The kids are not usually asleep yet. How can this time best be used?

### Which of these can you do mentally?

1.  $52 \times 23$
2. 161% of \$70
3.  $1.6 \times 35$
4.  $89 \div 23$
5.  $8 + 12 + 7.5 + 11$
6.  $\frac{5}{8}$  of 96
7.  $54\,000 \times 200$
8.  $8100 \div 90$
9.  $1.1 \times 0.9$
10. square root of 75

### Why do mental?

- It's an orderly start to the lesson.
- Mental makes great revision.
- It can be used to enable discovery learning.
- It is fabulous for diagnostic assessments.
- It makes good skills practice.
- It is a real alternative to PPAs– which are history.
- Mental strategies are derived from real deep understandings of number.
- It provides the opportunity to practice estimating.
- Mental skills impress the oldies.
- These skills may actually be useful in students' private and/or public lives.

### A few words about PPAs (Pen and paper algorithms)

“Classical PPA instruction is doomed to relative failure in a world where arithmetic is almost universally done with calculators and where even the dimmest child will see that attaining skill in PPA has almost no value in non-academic pursuits.”

Ralston, A. 1999. Let's abolish pencil-and-paper arithmetic, *Journal of Computers in Mathematics and Science Teaching*, 18, 2, 173-194

### Orderly start to lesson

1.  $8 \times 5$
2.  $12 \times 6$

3.  $9 \times 9$
4.  $11 \times 12$
5.  $5 \times 8$

Question: *How important is it to know your times tables these days?*

Strategy: *Allow students to have their tables in front of them when they do mental. Then go fast!*

### Great revision

1.  $(x + 2)(x - 4)$
2.  $5(2m - 6)$
3.  $-5(2m - 6)$
4. 25 cents is how many dollars?
5. To rent a drinks machine costs a flat \$20 and 25 cents per drink sold. Write the equation for  $c$  – the total cost – in terms of  $n$  - the number of drinks sold.

Question: *What mental Algebra skills should your students have?*

### Discovery learning

- 16.5% of \$70
- 10% of \$70
- 5% of \$70
- 1% of \$70
- 0.5% of \$70

Question: *Does doing things mentally mean you cannot write anything down?*

Strategy: *Ask students to share their strategies. The kids who catch on faster make great role models for the weaker kids.*

### Diagnostic assessment

Write numerically:

1. Five thousand and twenty
2. Five thousand and two
3. Five thousand two hundred
4. Twelve thousand and thirty
5. Twelve thousand three hundred
6. Which is larger: 0.5 or 0.50?
7. 106, 107, 108, 109, ... write the next two numbers
8. What is  $\frac{1}{2}$  of 60?
9. What is 0.5 of 60?
10. What is 50% of 60?

Question: *What would you do if your students did poorly on these questions?*

### Skills practice

Write in decimal notation

1.  $3.05 \times 10^2$
2.  $5.2 \times 10^4$
3.  $9.002 \times 10^2$
4.  $5.3 \times 10^{-3}$
5.  $4 \times 10^{-6}$

Question: *What couldn't you revise using mental?*

### Alternative to PPAs

1.  $1.99 \times 5$
2.  $8.99 \times 5$
3.  $83 \times 20$
4.  $375 - 225$
5.  $62 - 44$

Question: *Doing these types of 'problems' is hard – perhaps harder than doing them using a PPA - but does that mean we should not be doing them?*

### Strategies from deep understandings of number

1.  $52.1 \times 23$
2.  $50 + 2$
3.  $100 \div 2$
4.  $100 \times 23$
5.  $2300 \div 2$

Question (might be a bit uncomfortable): *How often do you use these strategies yourself? How deep is your understanding of number, partitioning, etc?*

### Estimating

1. Square root of 75
2.  $0.23 \times 880$
3.  $112 \div 9.87$
4.  $\$562\,879.32 \div 9$
5.  $\frac{1}{11}$  of 23

Question: *Realistically, how often do you need a precise answer (the sort that a calculator can provide)? How do people usually calculate in their private lives?*

### Impressing the oldies

1. 5 hrs 10 mins = \_\_\_\_ mins
2. £8 6s 2d + £3 8s 11d
3.  $5\frac{3}{8}$  yds @ £1 6s 2  $\frac{1}{2}$ d per yd
4. 564 miles @ 40 miles per hour
5.  $9\frac{3}{4}$  chains = \_\_\_\_ yds

Question: *Do these represent the Good Old Days?*

### Usefulness

1. Can I afford to rent this computer for 1 year?
2. Is it worth travelling 12km to save 2c/L for fuel?
3. How much wood do I need for my pergola?
4. How long will it take me to mark these exams @ 23 minutes per paper?
5. How many mini-frankfurters do I need for my son's party?

Question: *What Maths skills do people mostly use in their private lives?*

Strategy: *Get the kids to write questions for you to use – or let them present the day's mental.*