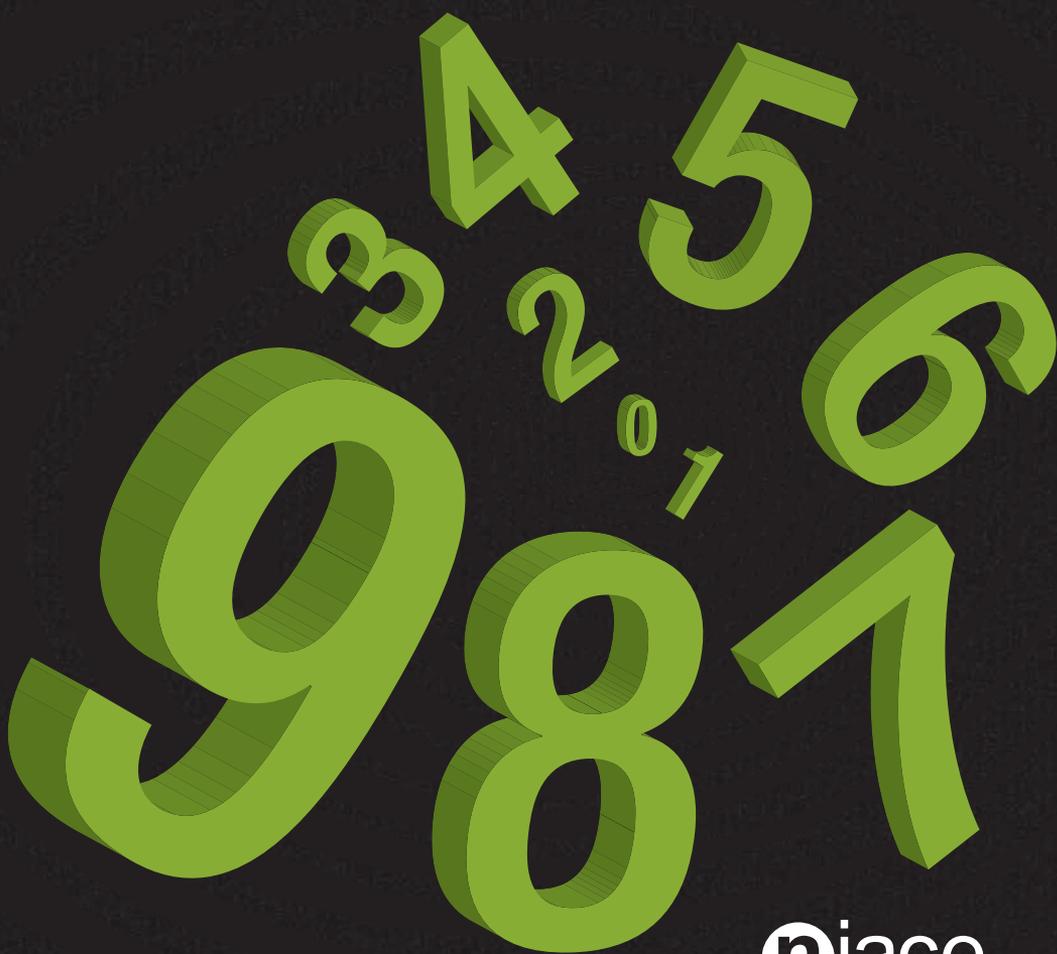


# Maths4Prisons

## Whole Numbers



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## Section 1 – The Maths Mentor project

### About the Maths Mentor project

You've been trained to act as a maths mentor through a project established by the National Institute of Adult Continuing Education (NIACE) and funded by the Department for Business, Innovation & Skills.

The Maths Mentor project is part of a wider initiative called Maths4us, which trains maths champions inside and outside prisons to promote the benefits of learning maths and encourage others to 'get maths-active'. Maths mentors do this but also go further: you have been trained to support others to handle some everyday maths situations, tackle some maths topics, become more confident mathematically and make the most of formal and informal maths education opportunities.

### Getting started as a maths mentor

We know from our pilots that prisoners may notice your Maths4us t-shirt and ask for help with personal budgeting (for example, with the 'canteen sheet') or with reading dates and times. They may say that they'd like to get better at the times tables, adding or other topics. They may just say that they'd like to be able to help their children with maths. Or they might say they're thinking of joining a maths class but have concerns about it. So your starting point may be just an informal conversation.

### Choosing an activity

If your mentee has talked about a particular topic, look at the first page of the 'route map' in the *Maths Mentor Handbook* and then find a suitable activity. If your mentee has just said something like 'I want to get better at maths' or 'I want to be able to help my children' you could browse the route map together or look through the activities in the booklets to find something that looks relevant. You don't have to work through all the activities or do them in a set order; it's better to start with something that looks interesting.

There are four learning activities booklets:

**Whole Numbers**

**Money**

**Time and Distance**

**Mathematical Magic**

### **Deciding what to do next**

When you and your mentee have done an activity and discussed how it went, decide together what to do next. You could use the route map in the handbook or just browse through the booklets to help with this. You don't have to work through all the activities in a booklet, or do them in any particular order, though the route map does make some suggestions. It's important to remember that the activities booklets are not textbooks that you need to work through from beginning to end. They don't cover all the maths an adult might want to know about; they're just starting points to get things moving.

In addition, you can support your mentee to think about joining a maths class; you could perhaps talk about your own experience of being in a class, or use some of the materials from your *Maths Mentor Handbook* to help your mentee think about what it would be like to be in a class, and what the benefits might be. Remember to use active listening skills during this conversation; your mentee is trying to make a decision and may want to talk things through with you in detail.

## Section 2 – Learning activities

### Adding in your head

#### Part 1

---

**Do** For this activity you need to choose Card Set A, B, C, D, E or F (see Appendix). (A is easiest; and D, E and F are much harder than the others.) Spread out the cards, face up. Have a tape measure handy so that you can use that as a number line. Have a calculator handy, and some counters.

---

**Say** *We're going to practise mental addition.*

*Pick two cards. Now add them. For example if you've picked '4' and '6' you could say '4 plus 6 equals 10' or '4 and 6 makes 10' or '6 add 4 gives 10'. Write down the sum you've created.*

*Use the number line or think of the numbers as pence if that helps. Or use some counters.*

---

**Check** Your mentee should have written down something like:  
6 and 4 makes 10, or  $6 + 4 = 10$ .

Or something like:

$$\begin{array}{r} 6 \\ + 4 \\ \hline 10 \end{array}$$

If you're working with a harder card set your mentee may have written something like  $50 + 40 = 90$  or  $99 + 396 = 495$ .

Sometimes you and your mentee will be confident immediately that an answer is correct. Point out that he/she can check answers on a calculator or on the number line.

You might also want to encourage your mentee to 'check backwards', by saying '10 take away 6 equals 4' or '10 take away 4 equals 6'.

---

**Discuss** When your mentee has added two cards correctly, invite him/her to pick two more cards.

Keep going for as long as seems sensible; this activity could go on for a very long time!

If some cards are too difficult, leave them aside for now; you can always come back to them later.

If the card set you've chosen is too easy, pick a different set.

---

**Reflect and record** Reflect on how this activity went. Record the name of the activity your mentee has just done, say how it went and invite your mentee to add comments. Discuss what you want to do at your next session; make a note of this and, if possible, arrange a time and place for the next session.

You might decide to start the next session by repeating the activity, or doing the activity with a harder card set. But don't expect or demand perfection; it's ok to go on to a harder activity even if your mentee still finds an easier one a bit difficult. Practising will help, and you should encourage this, but most mentees will find it discouraging if you ask them to 'repeat until perfect' before going on to something else.

---

## Adding in your head

### Part 2

**Do** For this activity you need to choose Card Set A, B, C, D, E or F (see Appendix). (A is easiest; and D, E and F are much harder than the others.) Spread out the cards, face up. Have a tape measure handy so that you can use that as a number line. Have a calculator handy, and some counters.

**Say** *We're going to practise mental addition.*

*Pick a card. Now think of two numbers that add up to the card you've chosen. For example if you've chosen the card with 7 on it, you could say '3 plus 4 equals 7' or '3 and 4 makes 7'. Write down the sum you've created.*

*Use the number line or think of the numbers as so many pence if that helps. Or use some counters.*

**Check** Your mentee should have written down something like:

3 and 4 makes 7, or  $3 + 4 = 7$ .

Or something like:

$$\begin{array}{r} 3 \\ + 4 \\ \hline 7 \end{array}$$

Or if their card has 80 on it, your mentee may have said 40 plus 40 equals 80.

If your mentee has found this very difficult, you might want to switch to an easier card set.

Sometimes you and your mentee will be confident immediately that an answer is correct. Point out that he/she can check answers on a calculator or on the number line.

You might also want to encourage your mentee to 'check backwards', by saying '7 take away 4 equals 3' or '7 take away 3 equals 4'.

**Discuss** When your mentee has got one pair of numbers correct, ask if he/she can find two more to add up to the number on the card. (For example, 5 and 2 also add up to 7, or 62 plus 18 adds up to 80).

Then pick another card and do the activity again.

Keep going for as long as seems sensible; this activity could go on for a very long time!

If some cards are too difficult, leave them aside for now; you can always come back to them later.

---

**Reflect and record** Reflect on how this activity went. Record the name of the activity your mentee has just done, and which card set you used, say how it went and invite your mentee to add comments. Discuss what you want to do at your next session; make a note of this and, if possible, arrange a time and place for the next session. You might simply decide to start the next session by repeating this activity, or do the activity with a harder card set.

---

## Adding in your head

### Part 3

---

**Do** Lay out Card Set A and Card Set D (see Appendix), face down, in separate piles. Have a tape measure, a calculator and some counters handy.

---

**Say** *We're going to work on mental addition.*  
*Pick one card from each pile and add them. Use a number line if that helps, or think about the numbers as so many pence.*

---

**Check** Sometimes you and your mentee will be confident immediately that an answer is correct. Point out that he/she can check answers mentally or on a calculator or by 'working backwards'.

---

**Discuss** If this seems very easy, use two different card sets with bigger numbers. If it seems too difficult, try using Card Set A and Card Set B.

If your mentee is adding numbers like 67 and 9, you could suggest they do it like this; 67 pence and 3 pence would make 70 pence; add the extra 6 pence and you get to 76 pence. You could show this on the number line; start at 67, move 3 to the right to arrive at 70 and then move 6 more to the right to arrive at 76.

Or you might start at 67, move 10 to the right to land on 77, and then move back 1 space, to arrive at 76.

---

**Reflect and record** Reflect on how this activity went. Record the name of the activity your mentee has just done (and which card sets you used), say how it went and invite your mentee to add comments. Discuss what you want to do at your next session; make a note of this and, if possible, arrange a time and place for the next session. You might want to repeat the activity, but with harder or easier card sets.

---

## Adding tens

### Part 1

---

**Do** Give your mentee Card Set C (see p. 47). Have a tape measure and a calculator handy, and some counters.

---

**Say** *We're going to work on adding tens.*

*I'll start you off with the number 10. Can you add ten to that? Find a card with the answer on it and put it on the table.*

*Now add another ten. Find the right card and put it on the table.*

*Keep going until you've got all your cards spread out on the table in a line.*

*If you get stuck, we can use a calculator or a number line or some counters, though the aim is to help you to do this kind of activity in your head eventually.*

---

**Check** Has the mentee got them in the right order?

---

**Discuss** Talk it over with your mentee. Does he/she want something easier or harder, or want more practice at this level? You might encourage him/her to keep adding in tens, making up new 'cards' as needed.

---

**Reflect and record** Reflect on how this activity went. Record the name of the activity your mentee has just done, say how it went and invite your mentee to add comments. Discuss what you want to do at your next session; make a note of this and, if possible, arrange a time and place for the next session.

You might want to start the next session by repeating this activity. To make things more challenging, you might want to try the same activity, but with a different card set.

---

## Adding tens

### Part 2

---

**Do** Make sure your mentee has a pen and some paper.

---

**Say** *We're going to make up some new 'adding ten' problems.*

*This time **you** choose a number to start with. Choose a number as small or as large as you like.*

*Write it down.*

*Then add ten and write down the answer.*

*Keep going as far as you like.*

*If you get stuck, we can use a calculator or a number line or some counters, though the aim is for you to be able to do this in your head eventually.*

---

**Check** Has the mentee added tens successfully?

---

**Discuss** Talk it over with your mentee. Sort out any problems. Remind the mentee to practise adding tens on his/her own later.

---

**Reflect and record** Reflect on how this activity went. Record the name of the activity your mentee has just done, say how it went and invite your mentee to add comments. Discuss what you want to do at your next session; make a note of this and, if possible, arrange a time and place for the next session.

---

## Making ten

**Do** Have a number line and ten counters handy.

Give your mentee Card Set A (see p. 45).

**Say** *We're going to practise adding to ten.*

*Can you show me two cards that add up to 10? Put those on the table, face up.*

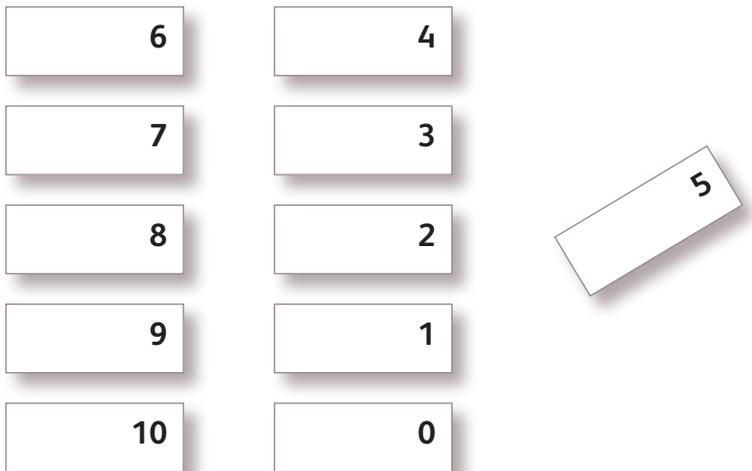
*Now show me two more than add to 10.*

*Keep going until you've used all the cards.*

**Check** Has your mentee chosen five pairs of cards correctly?

**Discuss** If your mentee finds this difficult, encourage him/her to use their fingers, or a number line or counters, or other objects. Any objects will do; they don't need to be the same kinds of objects.

With your mentee, arrange the cards so that they look like the picture below and invite your mentee to notice the pattern in the left-hand and right-hand columns.



---

Say *There's one number that's not in the pattern yet, the 5. Can you think of a way of including it in the pattern?* Be ready to create an extra 'card' with 5 on it.

Shuffle the cards on the table and ask your mentee to recreate the pattern. Point out again that each pair adds up to ten.

---

**Reflect  
and  
record**

Reflect on how this activity went. Record the name of the activity your mentee has just done, say how it went and invite your mentee to add comments. Discuss what you want to do at your next session; make a note of this and, if possible, arrange a time and place for the next session.

---

## Making ten again

---

**Do** Have Card Set A ready (see p. 45).  
Have a number line and ten counters handy.  
Hold up one of the cards.

---

**Say** *We're going to practise adding to ten.*  
*Look at the card I'm holding up. What number would you need to add to make 10? Pick the right card.*  
Repeat with a few other cards.

---

**Check** If your mentee finds this difficult, encourage him/her to use his/her fingers or a number line, counters or other objects. Any objects will do; they don't need to be the same kind of objects.

---

**Discuss** Encourage your mentee to practise this elsewhere; every time he/she sees a number, they could ask themselves what number needs to be added to make ten.

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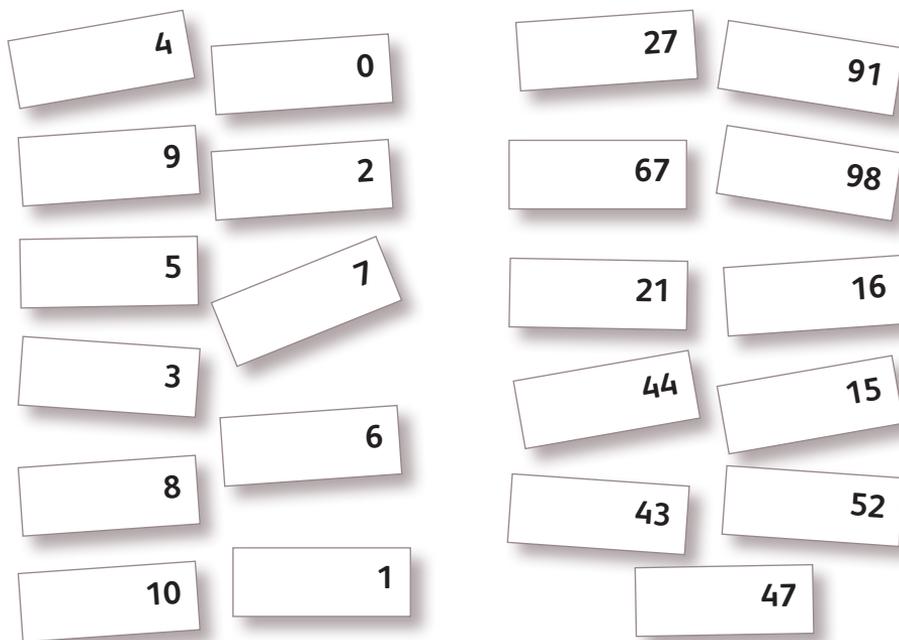
**Reflect and record** Reflect on how this activity went. Record the name of the activity your mentee has just done, say how it went and invite your mentee to add comments. Discuss what you want to do at your next session; make a note of this and, if possible, arrange a time and place for the next session.

---

## Making tens

**Do** Have a number line handy.

Give your mentee Card Set A and Card Set D (see Appendix). Lay them out, face up, in two separate areas on the table – like the picture below.



Pick up one of the bigger numbers, e.g. 47.

**Say** *We're going to practise adding to tens; we're using numbers bigger than ten this time. I've got 47. What card would you need to add to make 50?*

(Obviously you'll have to say 50 or 60 or 100, etc. – rounding up from the card you've chosen.)

**Check** Has your mentee shown you the '3' card? Repeat with other cards, always asking the mentee to add 'to the next ten'.

**Discuss** You can vary this activity.

Pick two cards that add to a 'round 10'. For example, pick up 21 and 9, and ask your mentee *What do these add up to?* Or pick 43 and 7.

After you've done a few like this, ask your mentee to pick up any two cards that add up to a number ending in zero.

You might want to encourage your mentee to check the answers on a calculator, or on the number line.

Invite your mentee to practise this activity outside your session; for example, if he/she sees the number 48 somewhere, how many need to be added to reach 'the next ten', i.e. 50?

---

**Reflect and record** Reflect on how this activity went. Record the name of the activity your mentee has just done, say how it went and invite your mentee to add comments. Discuss what you want to do at your next session; make a note of this and, if possible, arrange a time and place for the next session.

You might want to practise this activity again, or try a similar, harder activity using Card Set F, where the mentee has to aim for 'the next hundred'.

---

## The nine times table at your fingertips

**Do** Practise this one before you try it with a mentee!

And practise showing it to somebody else first!

**Say** *I'm going to show you a trick for doing the nine times table, like nine fives, or seven nines. You can do it on your fingers or on paper. Here's the fingers method.*

*Hold up your hands like mine and imagine your fingers are labelled from 1 to 9.*

*I'm going to work out seven nines.*

*Find your seventh finger and tuck it down.*

*How many fingers have you to the left of the seventh finger – the one you've tucked down? Make sure you look at both hands. Six? That's right.*

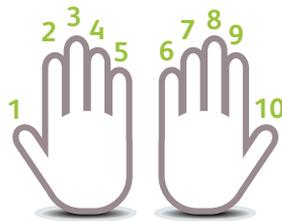
*Now look at how many fingers you have to the right of the seventh finger. Three? That's right.*

*So you've got 6 to the left and 3 to the right. If you write that down it looks like this: 6 3*

*And that's the answer to seven nines.*

*Seven nines are sixty-three.*

*Would you like to try another one, like eight nines?*



**Check**

1. Things can get very muddled if you and your mentee are sitting opposite each other for this activity; you'll both get your lefts and rights mixed up. It will work much better if you sit alongside each other.
  2. Decide whether to work with your palms facing you, or away from you. Get your mentee to do the same.
  3. Start by mentally labelling your fingers from one to ten and get your mentee to do the same. That makes sure everybody's counting in the same direction.
  4. Take it gently; give your mentee time to do the counting and tucking down of the fingers.
- 

**Discuss**

If your mentee does not want to use his/her fingers, look at 'The nine times table – look, no hands!' activity.

Suggest to your mentee that he/she should try to show the trick to somebody else, as 'homework'.

Remind your mentee that this 'trick' only works for the nine times table.

Think with your mentee about why this trick works. If you want some clues, try the 'Nine times tables patterns' activities on pages 20–25.

---

**Reflect  
and  
record**

Reflect on how this activity went. Record the name of the activity your mentee has just done, say how it went and invite your mentee to add comments. Discuss what you want to do at your next session; make a note of this and, if possible, arrange a time and place for the next session.

---

## The nine times table – look, no hands!

---

**Do** Have pen and paper handy.

---

**Say** *If you'd like to do the nine times table but don't want to use your fingers, you can use any ten letter phrase instead. Here's one I prepared earlier; any ten letter phrase would do, but you mustn't have any spaces.*

**ILOVENINES**

*To work out 6 nines, count along ILOVENINES until you get to the sixth letter, the 'N', and score that one out.*

**ILOVENINES**

*Then count how many letters there are to the left of the N you scored out; there are 5.*

*And how many are there to the right? 4.*

*So 6 nines are 54.*

*Ready to try another one?*

---

**Check** Make sure there are no spaces in the phrase ILOVENINES.

---

**Discuss** Remind your mentee that this trick only works for the nine times table. Think with your mentee about why this trick works. If you want some clues, try the 'Nine times tables patterns' activities that follow.

---

**Reflect and record** Reflect on how this activity went. Record the name of the activity your mentee has just done, say how it went and invite your mentee to add comments. Discuss what you want to do at your next session; make a note of this and, if possible, arrange a time and place for the next session.

---

## Nine times tables

### Pattern 1

---

**Do** Have pen and paper handy, and a copy of the unfinished nine times table (see p. 25).

---

**Say** *We're going to look at some patterns in the nine times table. Exploring these patterns will help you remember the nine times table.*

*First we're going to write down the whole of the nine times table. I've made a start. Can you fill in the missing answers? Use the fingers method or the ILOVENINES method if you like.*

---

**Do and say** Run your finger **up** the right hand side of the list of answers – the units column – and ask *Do you notice anything?* The mentee should be able to say 0, 1, 2, 3, etc.

Then run your finger **down** the tens column and ask *What do you notice?* The mentee will probably see that the tens column runs 9, 8, 7, 6, etc.

---

**Check** Make sure that your mentee sees that the numbers in the tens column and the units column run 'the opposite way'. Encourage the mentee to describe the pattern using the words 'tens' and 'units' and 'column'.

---

**Discuss** At this stage it may be enough just to notice this pattern. Later activities explore why it works.

---

**Reflect and record** Reflect on how this activity went. Record the name of the activity your mentee has just done, say how it went and invite your mentee to add comments. Discuss what you want to do at your next session; make a note of this and, if possible, arrange a time and place for the next session.

---

## Nine times tables

### Pattern 2

---

**Do** Have pen and paper handy and a copy of the finished nine times table from Pattern 1.

---

**Say and do** *Can you remember the first pattern we looked at?*

If not, ask the mentee to run his/her finger up the units column and down the tens column.

Encourage your mentee to describe the way the numbers run from 0 to 9.

*Now let's look again at one of the answers. The answer to seven nines starts with a six. The answer to eight nines starts with a seven. Can you see a pattern?*

---

**Check** Has your mentee noticed that the answer always starts with a digit which is one less than the number you're multiplying by? Say *So what does six nines start with? What does  $8 \times 9$  start with?*

---

**Discuss** Encourage your mentee to describe this pattern in his/her own words, and perhaps to write down his/her thinking.

---

**Reflect and record** Reflect on how this activity went. Record the name of the activity your mentee has just done, say how it went and invite your mentee to add comments. Discuss what you want to do at your next session; make a note of this and, if possible, arrange a time and place for the next session.

---

## Nine times tables

### Pattern 3

---

**Do** Have pen and paper handy and a copy of the finished nine times table from Pattern 1.

---

**Say** *We've seen Pattern 1 and Pattern 2. Now we're going to look at another pattern.*

*Look at each answer in the nine tables table.*

*What do the two digits add up to?*

---

**Check** Has your mentee noticed that in each answer the digits add up to 9?

---

**Say and do** *So the digits in the answers always add up to 9.*

Cover the nine times table so that the mentee can't see the answers and say *So if I ask somebody what's seven nines and they tell me 64, I know straightaway that they're wrong. How do I know?*

Try out a few more 'wrong' examples, like

Is 9 times 9 equal to 80?

Is 4 times 9 equal to 35?

Is 3 times 9 equal to 28?

Finally, explore what would happen if you tried 11 nines, 12 nines, etc.

---

**Reflect and record** Reflect on how this activity went. Record the name of the activity your mentee has just done, say how it went and invite your mentee to add comments. Discuss what you want to do at your next session; make a note of this and, if possible, arrange a time and place for the next session.

---

## Nine times tables

### Pattern 4

---

**Do** Have pen and paper handy and a copy of the finished nine times table from Pattern 1.

---

**Say** *We know that the digits in the answers to the nine times table always add up to 9; for example 72 is one of the answers, and the digits 7 and 2 add up to 9.*

*And we also know that the answer to each question starts with a digit that's one less than the question. What I mean is that the answer to 8 nines starts with a 7, and 6 nines starts with a 5, etc.*

*We're going to use those patterns to make sure you always get the right answers.*

---

**Check** Make sure your mentee understands both patterns. Ask *What does 4 nines start with?* and *What does 3 nines start with?* *Could 72 be one of the answers?* *Could 26 be one of the answers?*

---

**Say and do** Point at the 4 times 9 line of the table, and say *So 4 nines starts with a 3. The tens digit is 3. And you know that the two digits of the answer have to add up to 9. So what will the other digit be, to make sure that the two of them add up to 9? Yes, it must be a 6. So the two digits must be 3 and 6; the answer is 36. It can't be anything else, because the two digits have to add up to 9.*

Then encourage your mentee to try the same thing for 7 nines or 8 nines, etc.

---

**Discuss** Encourage your mentee to explain this pattern in words and for 'homework' ask him/her to show this trick to somebody else.

---

**Reflect and record** Reflect on how this activity went. Record the name of the activity your mentee has just done, say how it went and invite your mentee to add comments. Discuss what you want to do at your next session; make a note of this and, if possible, arrange a time and place for the next session.

---

## The nine times table

$$1 \times 9 = 9$$

$$2 \times 9 = 18$$

$$3 \times 9 =$$

$$4 \times 9 =$$

$$5 \times 9 = 45$$

$$6 \times 9 = 54$$

$$7 \times 9 =$$

$$8 \times 9 =$$

$$9 \times 9 =$$

$$10 \times 9 = 90$$

## Tackling the tables

### Taking stock

---

**Do** Give your mentee a blank multiplication chart (see p. 51).

---

**Say** *It's very handy to know your tables, like 5 tens or 4 times 3. Most people have difficulty with some of them, but you probably know more than you realise. We're going to find out which ones you're ok on and which you want to work on.*

*Can you give me an example of when you might need to know your times tables?*

*Are there any you're fairly sure about? Maybe 2 fives? Maybe all the twos? Maybe 5 tens? Maybe all of the tens?*

*On the multiplication chart, write in the ones you're pretty sure of. Don't worry if you leave plenty undone!*

---

**Check** Has your mentee been able to think of an example of when knowing the tables is useful? If not, can you supply some?

Does your mentee understand how to fill in the grid?

Has your mentee filled in a few multiplication facts that he/she is sure of?

---

---

**Discuss** If your mentee has filled in  $2 \times 5$  by finding 2 along the top and 5 along the side, they may not realise they could also find 2 along the side and 5 along the top (see the example on the chart). That way they can fill in two answers for the price of one, because  $2 \times 5 = 5 \times 2$ . Encourage your mentee to get two for the price of one!

Take stock and decide which bits of the grid are easiest and which are most difficult. The most difficult ones are probably in the bottom right hand corner. You might want to ask your mentee to make a list of the multiplication facts he/she finds most difficult. Be careful though; if it's a very long list it may be discouraging at this stage! It might be best just to notice on the multiplication chart where the easy and difficult ones are.

If your mentee hasn't filled in any of the nines, you might like to work on 'The nine times table – look, no hands!' in the next few sessions.

---

**Reflect and record** Reflect on how this activity went. Record the name of the activity your mentee has just done, say how it went and invite your mentee to add comments. Discuss what you want to do at your next session; make a note of this and, if possible, arrange a time and place for the next session. You might want to try 'Tackling the tables – the tricky ones' next.

---

## Tackling the tables

### The tricky ones

---

**Do** Ask your mentee to bring along the partly completed multiplication chart and perhaps a list of the multiplication facts he/she finds most difficult. You might like to have a copy of the fully completed grid handy as well.

---

**Say** *We're going to tackle the multiplication facts you find most difficult. There are many methods you can use.*

Then introduce one or two of these methods in each of your sessions with your mentee. **Don't introduce too many at once** and do ask your mentee at each session if the method introduced in earlier sessions helped.

- 1. Write down each of the tricky ones on a Post-it note, and stick them up somewhere where you'll see them often. Or if there are too many, work on them in small batches.*
  - 2. Make a fresh copy of the times table grid and just write in the answers to the tricky ones. Stick this table up somewhere you can't miss it.*
  - 3. If the only ones you're worried about are in the bottom right-hand corner, fold your tables grid along the diagonal and stick up the triangle. This reminds you that the task may only be half as big as you think.*
  - 4. Set yourself a task to learn a couple of new facts each week. Learn them by practising them. For example, if you're trying to learn 6 eights, you might find it useful to think '2 eights are 16, double that is 32, add another 16, that's 48'. Or you might think '6 tens is 60, take off 6 twos, that's 48'. Or '6 sixes is 36, add two more sixes, that's 48'. Or you might visualize 6 trays with 8 chocolate bars on each. Or you might have another way of getting to the answer. It doesn't matter really; you're flexing your arithmetical muscles, and you'll probably get quicker with time.*
-

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5. *Learn the tricky ones by using them.*

- *For instance as you go about your business, if you see eight of something, try to imagine 6 batches of eight laid out in a rectangle.*
- *Or if you are laying bricks, think about 6 batches of eight bricks.*
- *Or if you're playing chess, look at the board and find a rectangle which is six by eight.*

*In other words, try to see numbers everywhere.*

6. *Find somebody else who is tackling the tricky ones and quiz each other.*

There are quizzes and games you can use; see for example [www.bbc.co.uk/skillswise](http://www.bbc.co.uk/skillswise) and search for 'times tables'.

---

**Check** Did your mentee choose a method to try before the next session?

---

**Discuss** Discuss whether your mentee really needs to have instant recall of all of the multiplication facts. It may be good enough to have strategies which get him/her to the answers reasonably quickly, even if not instantly. Discuss whether your mentee feels satisfied with being able to do 6 eights using the 'counting on' methods described above. If this is reasonably fast, it may be good enough.

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**Reflect and record** Reflect on how this activity went. Record the name of the activity your mentee has just done, say how it went and invite your mentee to add comments. Discuss what you want to do at your next session; make a note of this and, if possible, arrange a time and place for the next session.

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## Subtracting

**Do** Spread Card Set A on the table, face up.

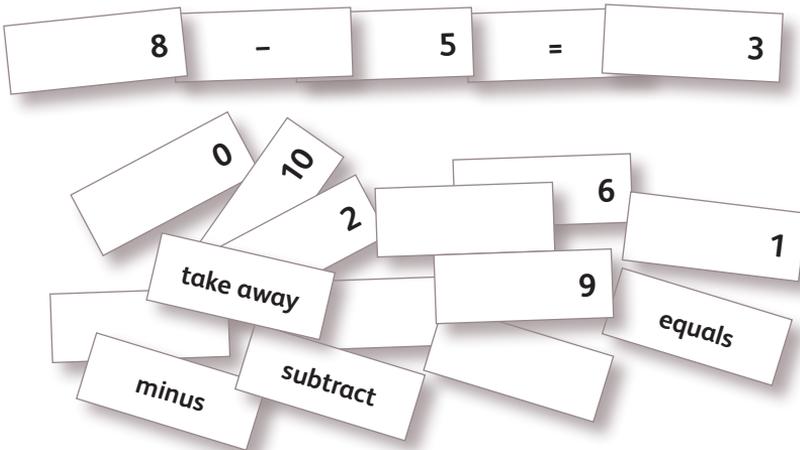
From Card Set G: Maths words and symbols, choose the cards that relate to subtracting (subtract, minus, take away,  $-$ ) and place them on the table, face up.

Have a number line handy.

**Say  
and  
do**

*We're going to practise subtracting. That's another word for 'take away' or 'minus'.*

Select the 8, 5, 3 and  $-$  cards, and make a sentence like the one in the picture below. Say *'For example, eight minus five is three.'*



*Can you make mathematical sentences using some of the cards?*

**Check** Has your mentee made sentences that make sense?

---

**Discuss** Ask your mentee how they know the sentence is correct and encourage them to check by adding, e.g.  $3 + 5 = ?$

Use a calculator if necessary.

Your mentee may want to practise spelling the words. Encourage him/her to look for these words in newspapers, books, etc. after the session.

---

**Reflect and record** Reflect on how this activity went. Record the name of the activity your mentee has just done, say how it went and invite your mentee to add comments. Discuss what you want to do at your next session; make a note of this and, if possible, arrange a time and place for the next session.

---

## Ten less

---

**Do** Spread Card Sets A and B (see Appendix) out on the table, face up, in two piles.

---

**Say** *Can you find a pair of cards where one card is ten less than the other? Now can you find other pairs like that?*

---

**Check** Has your mentee sorted all the cards correctly?

---

**Discuss** You could extend this activity in various ways. For example:

Using Card Set C, ask your mentee to find pairs of numbers where one is ten less than the other. Or ask your mentee to find pairs of numbers where one is 20 less than the other.

Encourage your mentee to practise subtraction after this session.

---

**Reflect and record** Reflect on how this activity went. Record the name of the activity your mentee has just done, say how it went and invite your mentee to add comments. Discuss what you want to do at your next session; make a note of this and, if possible, arrange a time and place for the next session.

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## Subtracting nines

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<b>Do</b>	Have a number line ready.
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<b>Say and do</b>	<p><i>We're going to work on subtracting whole numbers. I'm going to show you a handy way of subtracting 9 from anything.</i></p> <p><i>To take away 9 from a number you can take away 10 and then add 1. So to take away 9 from 83 you could take away 10, which brings you to 73, and then add one, so your answer is 74. (Show how this works on a number line if that helps.)</i></p> <p><i>Then say Here's another way of looking at it. If you have £83 and you owe me £9 you could give me a £10 note and ask for £1 back. How much will you have now?</i></p> <p><i>Can you subtract 9 from 74 using this method? Or 9 from 37?</i></p> <p><i>Can you make up some more like this?</i></p>
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<b>Check</b>	Can your mentee can make up some more examples and answer them correctly? Can they check the answers by adding or by using a calculator? For example, if they did 83 take away 9 and got 72, they could check by adding 72 and 9; does it come back to 83? Where have they gone wrong?
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<b>Discuss</b>	Remind your mentee that this 'take away 10 and add 1' method works only for taking away 9. But then you might try some similar questions where you're taking away 8 by taking away 10 and adding 2.
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<b>Reflect and record</b>	Reflect on how this activity went. Record the name of the activity your mentee has just done, say how it went and invite your mentee to add comments. Discuss what you want to do at your next session; make a note of this and, if possible, arrange a time and place for the next session.
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## Subtracting in stages

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**Do** Have a number line ready.

---

**Say** *We're going to work on subtracting in stages.*

*If you want to take away 7 from 83 you could do it in two stages; first take away 3, which brings you to 80 (a nice round number), and then take away 4 from 80, which brings you to 76. So you've taken away 3 and then you've taken away 4. The idea is to break up the 7 in your head into two numbers so that you can subtract in stages by landing first on the nearest 10.*

It will probably be helpful to show this on the number line.

*Can you take away 7 from 63 using this method? Or 6 from 95?*

---

**Check** Does your mentee find the number line helpful? Can he/she make up some new questions and get them right?

---

**Discuss** Remind your mentee that it's useful to practise this kind of mental arithmetic after the session, just by looking out for numbers in newspapers, leaflets and books and taking them away.

---

**Reflect and record** Reflect on how this activity went. Record the name of the activity your mentee has just done, say how it went and invite your mentee to add comments. Discuss what you want to do at your next session; make a note of this and, if possible, arrange a time and place for the next session.

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## Subtracting awkward numbers

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**Do** Have a number line and calculator handy.

---

**Say and listen** *We're going to work on subtracting some awkward numbers, like  $93 - 28$ . There are various ways of doing this in your head. Have you got any handy methods?*

Your mentee may already know one of the following methods. If so, encourage them to practise that method, but be very cautious about 'teaching' a different method; that may just create confusion!

For example, your mentee might say:

*28 is 20 and 8; so I take 20 away from 93, which brings me to 73, and then I take away the 8, which brings me to 65.*

OR

*I think of 28 as 23 and 5. I take 23 away from 93, which brings me to 70, and then I take away the 5, which brings me to 65.*

---

**Check** Your mentee can check the answers by adding, or using a calculator.

---

**Discuss** Make sure that you invite your mentee to describe his/her own method first; don't 'teach' a new method unless he/she is completely stuck.

---

**Reflect and record** Reflect on how this activity went. Record the name of the activity your mentee has just done, say how it went and invite your mentee to add comments. Discuss what you want to do at your next session; make a note of this and, if possible, arrange a time and place for the next session.

---

## Rounding things off

### Part 1

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**Do** You don't need any apparatus for this activity.

---

**Say** *We're going to work on 'rounding to the nearest'. What I mean is, sometimes you don't need to have exact answers, rough ones will do. For example, if something costs £7.99, that's roughly £8. I've rounded the price to the nearest pound.*

*Can you round these to the nearest pound?*

**£14.99    £16.99    £79.99    £99.99**

*Can you make up some more examples?*

---

**Check** Has your mentee rounded these correctly? (£15, £17, £80, £100)

Can they make up some more examples?

---

**Discuss** You and your mentee can make this activity as easy or as difficult as you like; for example, could you round 99p? Or £999.99?

---

**Reflect and record** Reflect on how this activity went. Record the name of the activity your mentee has just done, say how it went and invite your mentee to add comments. Discuss what you want to do at your next session; make a note of this and, if possible, arrange a time and place for the next session.

---

## Rounding things off

### Part 2

**Do** Have a number line handy.

**Say** *We're going to work on 'rounding to the nearest'. This time we're going to round to the nearest ten.*

*For example, £37 rounded to the nearest ten pounds is £40. And £31 rounded to the nearest tenner is £30.*

*You might like to show this on a number line. Find 37 on the number line and then show that it's physically nearer to £40 than to £30.*

*Can you round these to the nearest tenner?*

<b>£67</b>	<b>£68</b>	<b>£62</b>	<b>£61</b>	<b>£84</b>	<b>£91</b>
<b>£32</b>	<b>£56.90</b>	<b>£18.70</b>	<b>£17.99</b>	<b>£13.99</b>	

**Check** Has your mentee rounded these correctly? (£70, £70, £60, £60, £80, £90, £30, £60, £20, £20, £10.)

**Discuss** Now ask *How would you round £65 to the nearest tenner?* If you're asked to round £65 to the nearest tenner, you might decide to go either way, depending if you owe money or somebody owes you money! £65 is halfway between £60 and £70, so things could go either way. But if you're talking 'pure maths' the usual thing is to 'round up', so you'd round to £70.

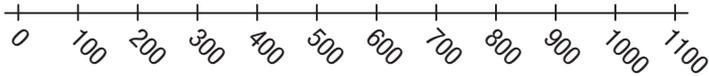
Make up some more examples, and encourage your mentee to make up more and to practise this skill after the session by rounding numbers in newspapers, leaflets and books.

**Reflect and record** Reflect on how this activity went. Record the name of the activity your mentee has just done, say how it went and invite your mentee to add comments. Discuss what you want to do at your next session; make a note of this and, if possible, arrange a time and place for the next session.

## Rounding things off

### Part 3

**Do** If you have a number line with hundreds on it, have it handy. If not, you could sketch a number line showing 0, 100, 200, 300, 400, 500, 600, 700, 800, 900, 1000. See the picture below for an example.



**Say** *We're going to work on rounding to the nearest hundred.*

*If you want to round a number to the nearest hundred you have to work out which hundred it's nearest to. For example, £699 is very near to £700. £683 is nearer to £700 than to £600. £523 is nearer to £500 than to £600. Use the number line if that helps.*

*Can you think of something that would cost around £700?*

*Can you round these to the nearest hundred pounds?*

**£499    £475    £423    £512    £783    £1234**

*Can you think of some more numbers and round them to the nearest hundred?*

**Check** Has your mentee rounded these correctly? (£500, £500, £400, £500, £800, £1200). Can he/she make up other examples?

---

**Discuss** Remind your mentee that if he/she wants to ‘round to the nearest ten’ the answer should be in tens, e.g. 20, 120, 430, etc. If you say the answers aloud you can hear that the answers end in ‘tens’ – twenty, one hundred and twenty, four hundred and thirty.

Similarly, if your mentee is rounding to the nearest hundred, the answer should be in hundreds, e.g. 700, 1200. If you say the answers aloud you can hear that the answers end in ‘hundred’ – five hundred, four hundred, twelve hundred.

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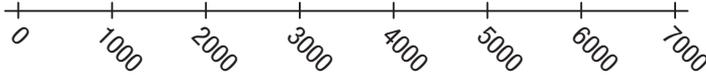
**Reflect and record** Reflect on how this activity went. Record the name of the activity your mentee has just done, say how it went and invite your mentee to add comments. Discuss what you want to do at your next session; make a note of this and, if possible, arrange a time and place for the next session.

---

## Rounding things off

### Part 4

**Do** If you have a number line with thousands on it, have it handy. If not, you could sketch a number line showing 0, 1000, 2000, 3000, 4000, 5000, 6000, 7000, 8000, 9000. See the picture below for an example.



**Say** *We're going to work on rounding to the nearest thousand.*

*If you want to round a number to the nearest thousand you have to work out which thousand it's nearest to. For example, £6999 is very near to £7000. £6813 is nearer to £7000 than to £6000. £1265 is nearer to £1000 than to £2000. Use the number line if that helps.*

*Can you think of something that would cost around £7000?*

*Can you round these to the nearest thousand pounds?*

**£4999    £4750    £4237    £5128    £7813    £1234**

*Can you think of some more numbers and round them to the nearest thousand?*

**Check** Has your mentee rounded these correctly?

(£5000, £5000, £4000, £5000, £8000, £1000)

Can they make up more examples?

**Discuss** Remind your mentee that it usually helps if they say the answers aloud; they can hear that the numbers should end in 'thousand', e.g. five thousand, eight thousand.

---

**Reflect  
and  
record**

Reflect on how this activity went. Record the name of the activity your mentee has just done, say how it went and invite your mentee to add comments. Discuss what you want to do at your next session; make a note of this and, if possible, arrange a time and place for the next session.

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## The 100 chart – spotting patterns

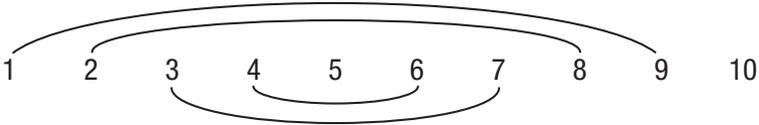
**Do** Have several copies of the ‘100 Chart’ ready (see p. 52). Coloured pens are also useful.

In this activity you and your mentee are going to play with the numbers and find patterns. Here are a few suggestions; you may find plenty more once you get going! Sometimes you will find it helpful to use a calculator; other times you’ll be able to do things mentally. Often you’ll find neat ways of doing things – see examples below.

**Say** *We’re going to look at some number patterns. Look at the first row on the card. What do the numbers (1 + 2 + 3 + 4 etc.) add up to?*

**Check** Has your mentee got 55? What method did he or she use?

**Discuss** If you want to show your mentee a neat way of adding these numbers, say *Here’s a neat way of adding the numbers 1, 2, 3, 4, 5, 6, 7, 8, 9, 10.*



*In the picture, the numbers have been looped together to make tens. For example, 8 and 2 are looped together, and 7 and 3. How many ‘looped’ tens do you have altogether? Yes, four tens. And don’t forget the ‘loose’ 5 and ‘loose’ 10; so that’s 55 altogether.*

*Now try adding up the second row on the ‘100 chart’. Try to find a neat way of doing it. Now try the third row. What do you see?*

**Reflect  
and  
record**

Reflect on how this activity went. Record the name of the activity your mentee has just done, say how it went and invite your mentee to add comments. Discuss what you want to do at your next session; make a note of this and, if possible, arrange a time and place for the next session.

In later sessions you could explore the columns or the diagonals instead of the rows.

Other ideas:

*How many sevens are there on the card?*

*Find all the sevens and mark them. Do you see a pattern or a shape?*

*How many eights are there?*

*If you mark all the eights, is there a pattern?*

*Are there as many sevens as there are eights or fives?*

*How many ones are there on the card altogether?*

*Find all the multiples of 10; numbers like 10, 20, 30 etc. Mark them.  
Is there a pattern?*

*Find all the multiples of 5. Is there a pattern? How does this pattern compare with the pattern for multiples of ten?*

## Maths words and symbols

---

**Do** Have Card Set G: Maths words and symbols ready (see p. 53).

---

**Do and say** *We're going to work on mathematical words and symbols. For example, there are many ways of reading and writing 'add'.*

*Can you find the 'add' symbol? Can you find any other words about adding? Write on some blank cards if you can think of more words.*

*Can you make up some mathematical sentences about adding?*

---

**Check** Has your mentee suggested some correct sentences? For example '5 add 4 = 9' or 'If I have £20 and you give me £5 more, I've got £25 altogether'. Note that this activity might take more time than you think, especially if your mentee has to learn new words or symbols.

---

**Discuss** Sort all the words and symbols into matching sets; group all the words and symbols relating to adding into one pile, and all the words about subtracting in another. Make up sentences using the words and symbols.

---

**Reflect and record** Reflect on how this activity went. Record the name of the activity your mentee has just done, say how it went and invite your mentee to add comments. Discuss what you want to do at your next session; make a note of this and, if possible, arrange a time and place for the next session.

---

**Appendix****Card Set A**

0	1	2
3	4	5
6	7	8
9	10	

## Card Set B

<b>10</b>	<b>11</b>	<b>12</b>
<b>13</b>	<b>14</b>	<b>15</b>
<b>16</b>	<b>17</b>	<b>18</b>
<b>19</b>	<b>20</b>	

## Card Set C

10	20	30
40	50	60
70	80	90
100		

## Card Set D

15	16	21
27	43	44
47	52	67
91	98	

## Card Set E

110	120	130
140	150	160
170	180	190
200	210	220

## Card Set F

<b>92</b>	<b>99</b>	<b>115</b>
<b>116</b>	<b>191</b>	<b>199</b>
<b>396</b>	<b>499</b>	<b>543</b>
<b>598</b>	<b>891</b>	<b>999</b>

## Multiplication chart

x	1	2	3	4	5	6	7	8	9	10
1										
2					10					
3										
4										
5		10								
6										
7										
8										
9										
10										

## The 100 chart

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

## Card Set G: Maths words and symbols

<b>add</b>	<b>plus</b>	<b>+</b>
<b>and</b>	<b>subtract</b>	<b>minus</b>
<b>take away</b>	<b>—</b>	<b>×</b>
<b>÷</b>	<b>share</b>	<b>divide</b>
<b>lots of</b>	<b>multiply</b>	<b>times</b>
<b>equals</b>	<b>=</b>	<b>total</b>
<b>altogether</b>		









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