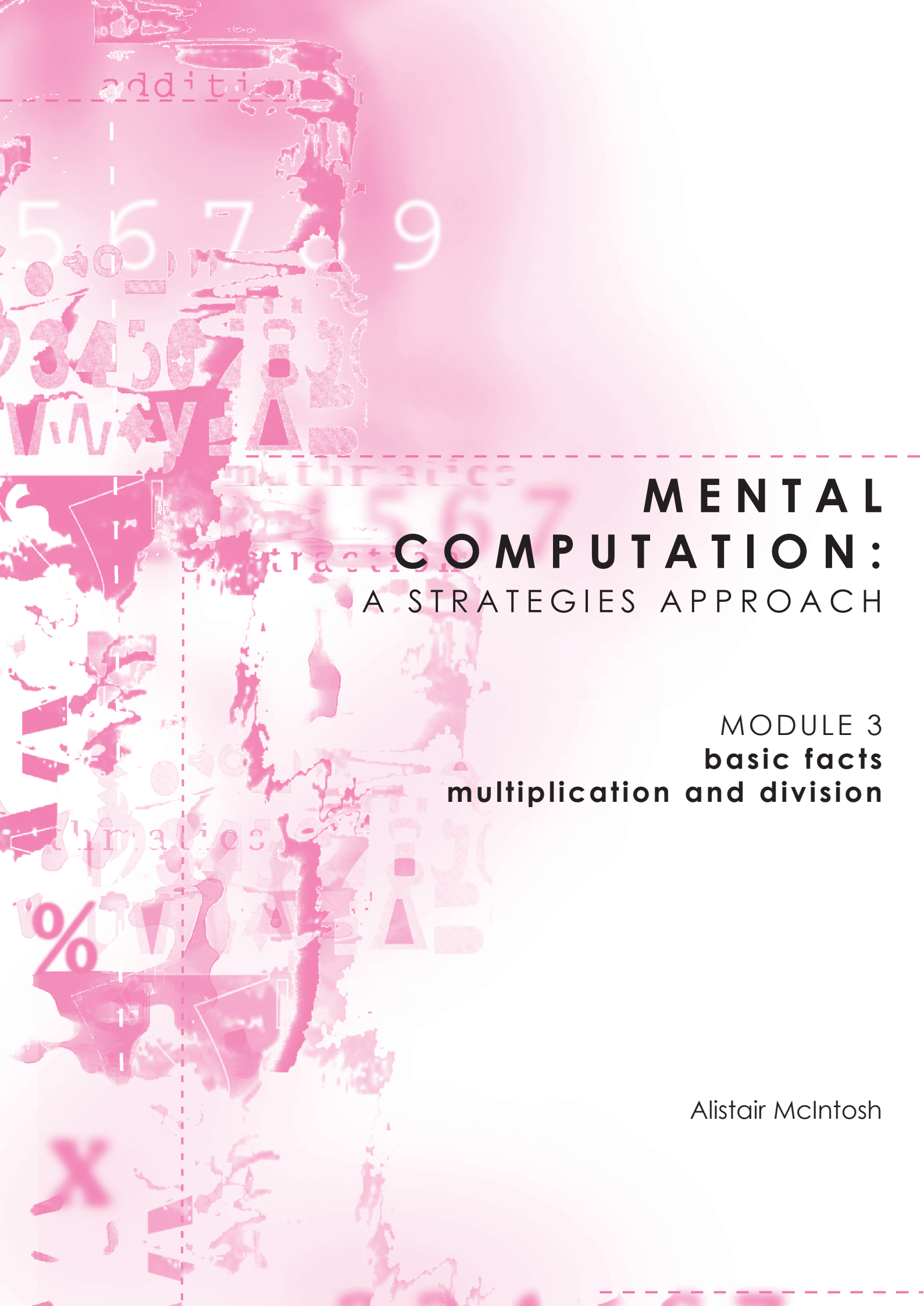

MENTAL COMPUTATION:
A STRATEGIES APPROACH

MODULE 3
basic facts
multiplication and division

Alistair McIntosh

Mental Computation: A strategies approach

Module 3 Basic facts multiplication and division

Alistair McIntosh

This is one of a set of 6 modules providing a structured strategies approach to mental computation.

Module 1 Introduction
Module 2 Basic facts addition and subtraction
Module 3 Basic facts multiplication and division
Module 4 Two-digit whole numbers
Module 5 Fractions and decimals
Module 6 Ratio and percent

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AIMS

Module 3 has two aims, both equally important:

1. To develop instant recall or swift calculation of the basic (i.e. single-digit) multiplication and related division facts; and
2. To develop proficiency in using specific mental computation strategies.

SUMMARY OF GENERAL APPOACH

- Concentrate on understanding, then strategies, then memorisation.
- Minimise use of 'counting by ones'.
- Deliberately practice the suggested strategies, but also continually ask 'How did you work that out?' so that students realise that there is more than one way of arriving at the answer.
- Continually reinforce use of commutativity (swap round), e.g. 3 lots of 4 can be done as 4 lots of 3, and deal with both together.
- Use 1 – 100 board and arrays.
- Encourage and discuss 'connections'.
- Encourage skip counting starting from first multiple (e.g. 3, 6, 9… not 0, 3, 6, 9…)
- Don't get students to memorise anything they can't recreate through efficient strategies.
- Give small memorisation challenges.
- Don't rush students into memorising. It should not become a chore, but should remain an acceptable and enjoyable challenge.
- Keep returning to explanations of strategies even for students who 'know' the facts.
- Ask questions such as:
    - Tell me how to work out 4 x 7.
    - If you forgot 6 x 4, can you tell me two ways of working it out?
    - What is 5 x 7?
    - Skip count in 3s starting from 3 (to 15) (to 30).
    - Count back in 4s from 40.

'THE TABLES'

The phrase 'The Tables' is so ingrained in us that it is difficult for us to separate 'knowing the basic multiplication and division facts' from 'learning the tables'. It is as though the one automatically implies the other. But this is not so. 'Knowing the basic multiplication and division facts' is clearly a significant goal: but the table form is not necessarily needed. The recitation of tables 'Three ones are three, three twos are six…' involves a quite unnecessary number of words. In fact, the critical words here are 'three, six' coupled with the knowledge that these are the first and second multiples of three. In this module 'skip counting' replaces recitation of the tables, and 'multiples' replaces 'the tables'. For example, 'skip counting the first five multiples of 3' means 'saying quickly and fluently 3, 6, 9, 12, 15.' The structure is not that different from that of 'reciting the tables', but it is more economical.

LANGUAGE

Throughout the module, '3 x 4' is read as either '3 lots of 4' or '3 times 4' and is taken to mean '4 + 4 + 4'. The phrase 'multiplied by' is not used, since '3 multiplied by 4' implies '3 + 3 + 3 + 3'.

Still less is the phrase '3 timesed by 4' used, since it is not English, no matter who uses it. Stamp it out!
The language associated with symbols needs to be built up carefully. For example:

- 3 x 4 = 12 may be read as: *'Three lots of four makes twelve', ' Three lots of four equals twelve', 'Three times four is equal to twelve'.*
- 3 x _ = 12 may be read as: *'Three lots of what/how many make twelve?', Three times what makes/equals/is equal to twelve?'*
- 12 ÷ 3 = 4 may be read initially as: *'Twelve shared among/between three gives four each', or 'Twelve put in groups of three makes four groups'; but it is best to move as quickly as possible to the more correct 'Twelve divided by three equals/is equal to four'.*

Whatever language is used, it is important that students are easily able to translate from symbols into words.

THE SEQUENCES

Basic Multiplication Facts

The sequence for the basic multiplication facts in this module (see page 8) separates the first five and the second five multiples of each number, on the basis that one endpoint of each Activity is the memorisation of the facts. Memorising five results is a reasonable challenge for almost all students whereas memorising ten facts all at one time is a big ask for many. Another reason is that separating the ten multiples into two separate sets allows for revisiting the relevant strategy a second time, thus allowing for consolidation. However the teaching sequence on page 8 shows the first five and second five multiples in parallel columns, so that if you wish to deal with all ten multiples at once you can deal with the two Activities in each row together.

Basic Division Facts

Students do not in general commit to memory the basic division facts. The most common strategy that they use to solve a basic division fact problem is to turn it into a multiplication. For example 28 ÷ 4 becomes 4 x ? = 28 *('Four times what equals twenty-eight?'*). As this strategy is applied for any multiple, a separate activity for each division set is not provided. Instead, practice in changing a division problem into a multiplication is included in the extension section of each Activity. You may decide to include this activity for all students with each set of multiples, or to deal with multiplication first and then to return and introduce the related division facts.

IMPORTANCE OF DEVELOPING STRATEGIES

Connections.

'The most important aspect of learning multiplication facts is the way each fact is related to a whole lot of others. Knowing '3 fours are 12' for example, should give rapid access to '6 fours' by doubling. As it appears to be easier to remember '7 sevens' than '8 sevens', adding one more seven onto 49 will be a better strategy than reciting the whole 'table' in the hope of jogging the memory. Making connections among the facts will not only minimize the number of facts to be learned, but will encourage strategies that will reduce the working in later calculations. Doubling and halving are important preparations and, as soon as a few facts are learned, the emphasis can be transferred to all the connected facts that can be derived…Understanding how to make links is as important as memorizing the facts.'

From Anghileri, (2000, pp.78-79)

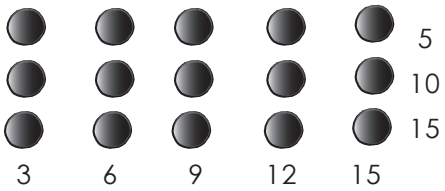
The sequence of activities in this module is based on the development of important strategies, which are linked to particular multiples. Even if students know the multiplication facts in a particular set, it is important that they meet and develop competence in the strategies associated with that set, as these will form the foundation of their mental calculation of multiplication and division of larger numbers.

Most activities are aimed at the development of one specific strategy. However, students should be continually encouraged to develop and explain flexible use of strategies, so that they do not feel constrained to associate any particular calculation with one 'correct' strategy. For example, in this section '6 x 7' is approached as 'five lots of seven add one lot of seven', that is '(5 x 7) + 7'. However, some students may use other strategies, for example 'double 3 x 7'. The purpose of this section is to ensure that the student is introduced to at least one way of calculating each basic fact, without suggesting that is the correct way.

DESCRIPTION OF INDIVIDUAL STRATEGIES

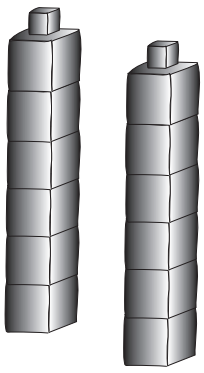
• Commutativity (swap round)

For example, 3 x 5 = 5 x 3. Students often know some multiples, but do not realise that this gives them knowledge of others. Many students may know 7 x 8, but find 8 x 7 difficult. It is an example of the importance of making connections at every opportunity. A useful visual image is the rectangular array, focusing on rows or columns: the diagram shows three rows of five, and also five columns of three.



• Doubling

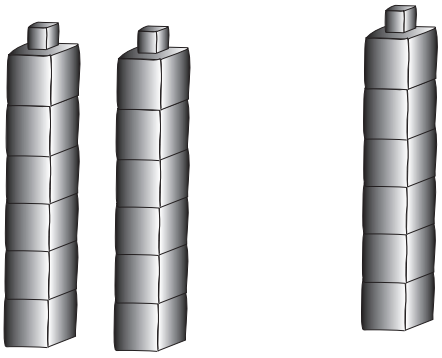
For example, 2 x 8 = 'double 8'. This is the students' first introduction to multiplication, and they appear to gain control of this long before they can perform other multiplications. The strategy has already been developed in Section 2, as a strategy for computing, for example, 8 + 8. It is yet another example of the power gained by making connections. A useful visual image is two columns of unifix or other linked cubes:



2 x 6

• Adding one lot (two lots)

For example, 3 x 6 = Double 6, and add one more 6. It is valuable to introduce this strategy here with small numbers, as it is used frequently when computing mentally with larger numbers. For example 3 x 35 can easily be computed as 70 (2 x 35) + 35. This also makes use of a relationship between (multiples of 2 and multiples of 3 are related). A useful visual image is columns of unifix or other linked cubes, for example, 3 x 6 = Double 6, add one more 6:



2 x 6 + 6

• Skip counting

For example, 3, 6, 9, 12… Skip counting is, for many students, the easiest way of finding an answer to a single digit multiplication. It is much quicker and less encumbered with unnecessary words than working through the 'table'. Students need only to remember the 'answers' (3, 6, 9…) and to have a way of keeping track where they are in the list of multiples. Some students do this by keeping track with their fingers: others, by using rhythm (3, 6, 9, 12, 15, 18…), often accompanied by movements of their head. Others keep track by knowing, for example, that 5 x 3 will end in 5. A useful visual image

is the 1-100 board. Activities A and B below show two distinct stages in understanding skip counting:

Activity A

On 1 – 100 board, place red counters on 1, 2, 3 (How many counters in all? What number is the last red counter on?), then place blue counters on 4, 5, 6 (How many counters in all? What number is the last blue counter on?) and so on…

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

Activity B

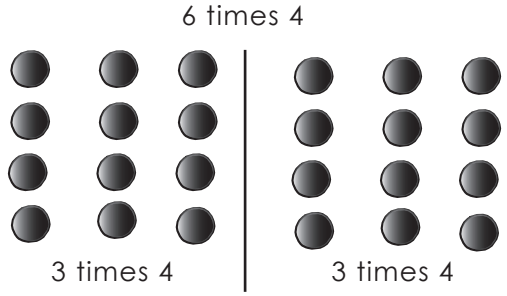
On 1 – 100 board, place counter on every third number and record the numbers covered (3, 6, 9…)

1	2	3	4	5	6	7	8	9	10
	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

Omitting Activity A, or moving too quickly to Activity B, results in some students losing sight of the vital connection between 'saying every third number' and 'counting collections of 3'.

• ***Factors***

For example, 6 x 7 = double 3 x 7. The traditional approach using recitation of tables completely ignores this connection between multiples, and yet it gives enormous power. For example, if you know two or three times a number, then by doubling you have four times or six times the number. A useful visual image is the rectangular array, for example, '6 times 4' = "2 times '3 times 4'".



A large rectangular array is provided in **BLM 3.10**. Students can use this to cut out or draw round smaller rectangular arrays.

STRUCTURE OF THE LEARNING ACTIVITIES

THE NINE STEPS FOR EACH ACTIVITY

For each Activity, the same development is followed. A variety of activities is given under each of the nine steps in the development. You do not need to deal with every step for every Activity. If you are confident that a step is sufficiently familiar to students, then omit it.

1. Check understanding
2. Make up contexts
3. Strategy development
4. Challenge: instant strategy use
5. Develop skip counting
6. Challenge: instant skip counting
7. Practice and Consolidation
8. Connections
9. Extensions

Steps 1 and 2 check understanding. Steps 3 and 4 develop the strategy associated with the set of multiples. Steps 5 and 6 develop skip counting. Steps 7 and 8 consolidate and make connections. Step 9 extends the ideas to larger numbers and to division, for those students ready for these.

TWO ASPECTS OF MULTIPLES COMBINED

You will find that, in every case, the Learning Activity develops two complementary aspects of the multiples. For example the multiples of 3 can be viewed in two ways: 'Three lots of 1, 2, 3…' and '1, 2, 3…lots of three'. If you look at Learning Activity 3.2, you will see that the nine steps of the Learning Activity develop each of these as follows:

1. *Check understanding*
2. *Make up contexts*

These two steps develop both aspects. The rectangular array in particular links the two aspects.

3. *Strategy development*
4. *Challenge: instant strategy use*

These two steps always develop a strategy based on the first aspect: '3 lots of…'.

5. *Develop skip counting*
6. *Challenge: instant skip counting*

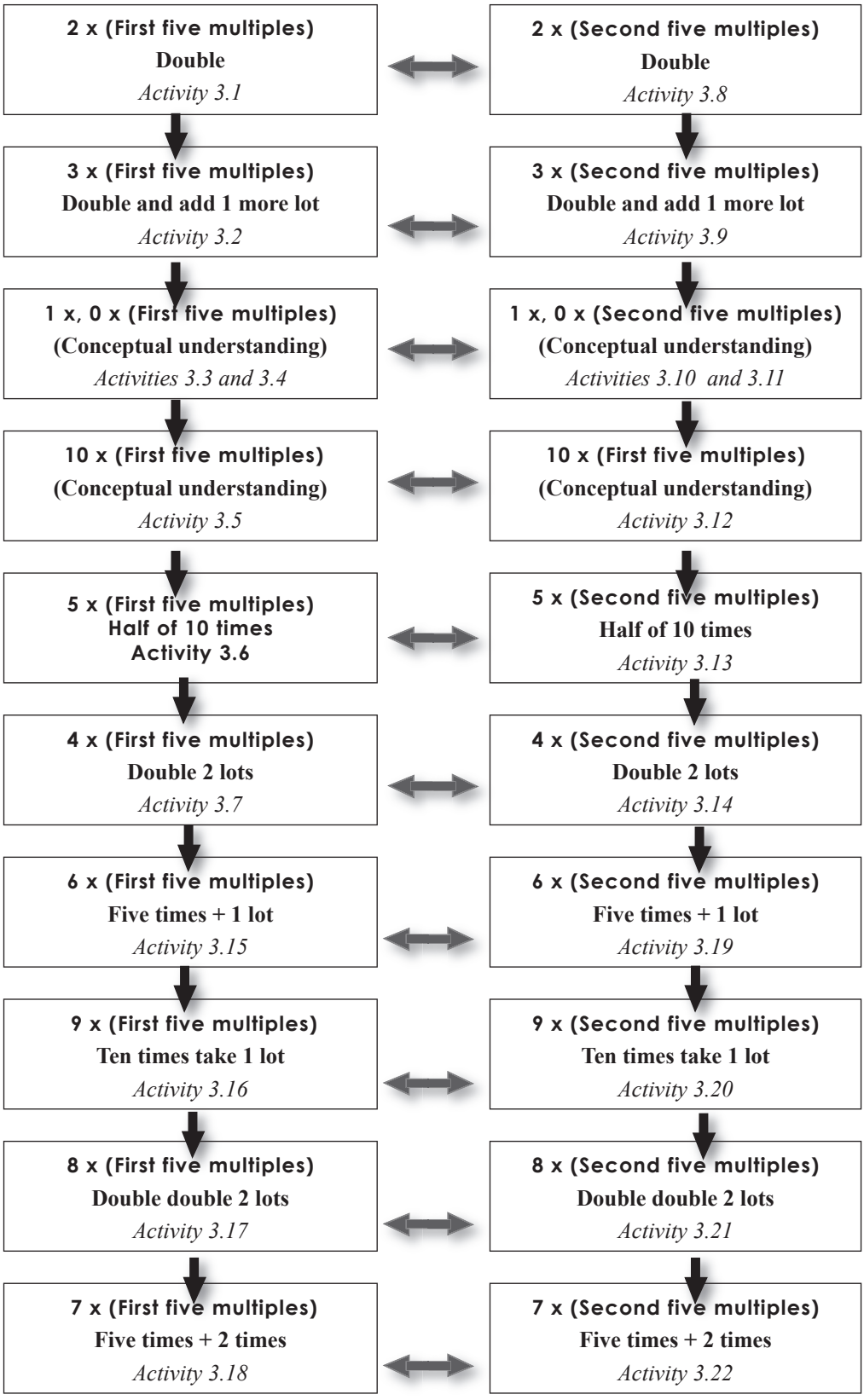
These two steps always develop a strategy based on the second aspect: '…lots of 3'.

7. *Practice and Consolidation*
8. *Connections*
9. *Extensions*

These three steps develop and extend both aspects.

FLOW CHART OF THE TEACHING SEQUENCE

The second and third rows in each box show the specific strategy practiced for each multiple.



ACTIVITY 3.1 TWO (FIRST FIVE MULTIPLES)

Double			Skip count	
2 x 1	Two ones	and	1 x 2	Two
2 x 2	Two twos	and	2 x 2	Four
2 x 3	Two threes	and	3 x 2	Six
2 x 4	Two fours	and	4 x 2	Eight
2 x 5	Two fives	and	5 x 2	Ten

MATERIALS

Counters, cubes, calculators **BLM 3.4** and **BLM 3.5**.

TEACHING SEQUENCE

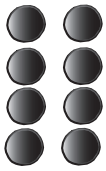
1.Check understanding

- Using counters, have the students put out '2 lots of…' and '… lots of 2'

'2 lots of 3' '3 lots of 2'

- Using counters or cubes, have the students make rectangular arrays preferably on squared paper, and describe them in both rows and columns. For example:

2 x 4 = two lots of four = 4 + 4



4 x 2 = four lots of two = 2 + 2 + 2 + 2

2. Make up contexts

- Challenge the students to make up stories involving '2 lots of…' and '… lots of 2'. For example:
  2 x 4 (2 lots of 4): *Two chairs with four legs each, eight chair legs altogether.*

  4 x 2 (4 lots of 2): *Four bicycles with two wheels each, eight wheels in all.*

- Ask: *Make me up a story involving children: a story in the kitchen; a story involving ants; a holiday story…* Ensure that the contexts are varied and are not limited to the common topics of money and lollies, or to male or female stereotypes.

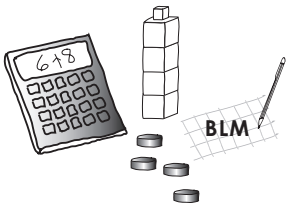
3. Strategy development (Doubling)

Students should be able to double a number up to five as this is covered in Module 2

- Go round the class in order, asking *'double 1, double 2, double 3..., twice 1, twice 2...*
- Write the numbers 1 to 5 randomly round the blackboard. As you point to a number, the class calls out the double as quickly as they can.

4. Challenge: instant strategy use

- Invite individual members of the class to double any number up to 5.



5. Develop skip counting (2, 4, 6, 8,10)

• Using the 1-to-50 or 1-to-100 board, have the students place counters or cubes on the board in each of these arrangements and describe what they have done. *I put red counters on the first two numbers, then blue on the next two numbers and red counters on the next two… It shows that three lots of two make six. I put a counter on every second number. I put my third counter on 6. It shows that 3 times 2 is 6.*

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

2, 4, 6, 8, 10

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

• From 3.1 to 3.14, both these activities on the 1 – 100 board are suggested. From 3.15 onwards, only the second activity is given. In addition strategies are suggested for developing the skip counting sequence without counting in ones. For example, to develop skip counting in nines, 'add 10, subtract 1' is suggested and rehearsed.

6. Challenge: instant skip counting

• Invite individual students to say the first five multiples of 2 as quickly as possible: 2, 4, 6, 8, 10.

• *Now say the first 3 multiples… the first 4 multiples. What is the 2nd multiple? What is 2 x 2? What is the 5th multiple? What is 5 x 2...?*

7. Practice and Consolidation

• Can students count in twos quickly to 10?

• Give copies of Set A test (**BLM 3.1**) to students to practise. This can be given as homework.

8. Connections

• Make a connection chart (**BLM 3.9**) for one of the multiples, for example: 3 x 2. *Write 3* x *2 in the middle of the chart. Now think of six things you know connected with 3* x *2 and write them at the end of the lines.*

Students will need prompting initially and you may wish to model an example. The connections could include stories, diagrams, drawings of objects, '6 x 2 is twice 3 x 2', '4 x 2 is 2 more than 3 x 2'… The intention is to encourage connections and lateral thinking rather than be prescriptive.

9. Extensions

• Larger numbers
Can you use the 'Double' strategy to work out 2 x *13? 2* x *16?*
What other numbers can you double?

• Counting forward and back
How far can you count forward in twos? Use the calculator as a check. Key in '0 + 2 ='. Now as you press =, =, =, the calculator will count in twos.
Can you count back in twos from 10?
Can you count back in twos from 20?

• Division
Eight children stand in pairs. How many pairs?
'Two choc-bars for $1'. How much does it cost for six choc-bars?
How many twos in ten?

ACTIVITY 3.2 THREE (FIRST FIVE MULTIPLES)

Double + one lot			Skip count	
3 x 1	**Three ones**	**and**	**1 x 3**	**One three**
3 x 2	**Three twos**	**and**	**2 x 3**	**Two threes**
3 x 3	**Three threes**	**and**	**3 x 3**	**Three threes**
3 x 4	**Three fours**	**and**	**4 x 3**	**Four threes**
3 x 5	**Three fives**	**and**	**5 x 3**	**Five threes**

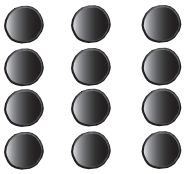
MATERIALS

Counters, cubes, calculators, **BLM 3.4** and **3.5**.

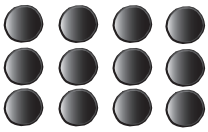
TEACHING SEQUENCE

1. Check understanding

- Using counters, have the students put out '3 lots of…' and '… lots of 3'

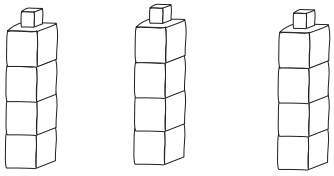


'3 lots of 4'

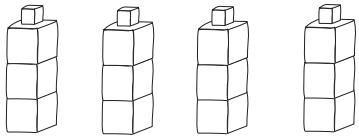


'4 lots of 3'

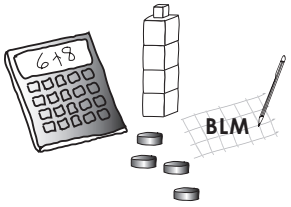
- Using counters or cubes, have the students make rectangular arrays preferably on squared paper, and describe them in both rows and columns.



3 x 4 = Three lots of four = 4 + 4 + 4



4 x 3 = Four lots of three = 3 + 3 + 3 + 3



2. Make up contexts

- Challenge the students to make up stories involving '3 lots of…' and '… lots of 3'. For example:
  3 x 4 (3 lots of 4): *Three cars with four wheels each, twelve wheels altogether.*
  4 x 3 (4 lots of 3): *Four stools with three legs each, twelve legs in all.*

- Challenge the students to make up stories relevant to particular contexts, for example the garden, at the beach, on the bus. Ensure that the contexts are varied and are not limited to the common topics of money and lollies, or to male or female stereotypes.

3. Strategy development (Double + one lot)

- Demonstrate with objects and symbols:
- *Here are 3 five-dollar notes. How much altogether? We can say two notes, double five, ten dollars, and one more five-dollar makes fifteen dollars.*
  3 x 5 = (2 x 5) + 5
- *On a multiplication square look at the first three rows:*

1	2	3	4	5
2	4	6	8	10
3	6	9	12	15

In any column, add the numbers in the first and second rows.
For example 2 + 4 = 6. The answer is always the number in the third row in

that column. Why? The first row shows 'one times', the second row shows 'two times', and the third row shows 'three times'.
- Practice with other examples: 3 times 4 = Double 4, add 4.

4. Challenge: instant strategy use
- Individual students should be able to quickly calculate the first five multiples of 3 by doubling and adding.

5 Develop skip counting (3,6,9,12,15)
Using the 1-to-50 or 1-to-100 board, have the students place counters or cubes on the board in each of these arrangements and describe what they have done.
- *I put red counters on the first three numbers, then blue on the next three numbers and red counters on the next three… It shows that five lots of three make fifteen.*
- *I put a counter on every third number. I put my fifth counter on 15. It shows that 5 times 3 is 15.*

3 + 3 + 3 + 3 + 3

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

3, 6, 9, 12, 15

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

6. Challenge: instant skip counting
- Invite individual students to say the first five multiples of 3 as quickly as possible: 3, 6, 9, 12, 15.
- *Now say the first 3 multiples… the first 4 multiples. What is 2 x 3? 5 x 3...?*

7. Practice and Consolidation
- Can you count in threes quickly to 15?
- Can you make a calculator count in threes? (Press 0 + 3 = = = …)
- Give copies of Set B test (**BLM 3.1**) to students to practise. This can be given as homework.

8. Connections
- Make a connection chart (**BLM 3.9**) for one of the multiples, for example: 4 x 3. *Write 4 x 3 in the middle of the chart. Now think of six things you know connected with 4 x 3 and write them at the end of the lines*.

Students will need prompting initially and you may wish to model an example. The connections could include stories, diagrams, drawings of objects, '4 x 3 is double 2 x 3', '5 x 3 is 3 more than 4 x 3'… The intention is to encourage connections and lateral thinking rather than be prescriptive.

9. Extensions
- Larger numbers
  Can you use the 'Double + one lot' strategy to work out 3 x *12? 3* x *15? What other numbers can you multiply by 3?*
- Counting forward and back
  How far can you reach counting in threes? Use the calculator as a check. Key in '0 + 3 ='. Now as you press =, =, =, the calculator will count in threes. Can you count back in threes from 15? Can you count back in threes from 30?
- Division
  Nine tricycle wheels. How many tricycles?
  Three oranges for $1. How much for twelve oranges?
  How many threes in fifteen?

ACTIVITY 3.3 ONE (FIRST FIVE MULTIPLES)

(One lot of)			(Counting)	
1 x 1	**One one**	**and**	**1 x 1**	**One one**
1 x 2	**One two**	**and**	**2 x 1**	**Two ones**
1 x 3	**One three**	**and**	**3 x 1**	**Three ones**
1 x 4	**One four**	**and**	**4 x 1**	**Four ones**
1 x 5	**One five**	**and**	**5 x 1**	**Five ones**

MATERIALS
Counters, cubes, calculators.

TEACHING SEQUENCE
1. Check understanding
- Using counters, have the students put out '1 lot of …' and ' … lots of 1'

'1 lot of 4'

'4 lots of 1' 

- Using counters or cubes, have the students make rectangular arrays preferably on squared paper, and describe them in both rows and columns. For example:

1 x 5 = One lot of 5 = 5 

5 x 1 = Five lots of 1 = 1 + 1 + 1 + 1 + 1

2. Make up contexts
5 x 1: *There were five plates with a cake on each. Five cakes in all.*
1 x 5: *My left hand has five fingers.*

- Challenge the students to make up stories relevant to particular contexts

3. Strategy development (One lot of)
No strategy needed if understanding is there.

4. Challenge: instant strategy use
Not needed.

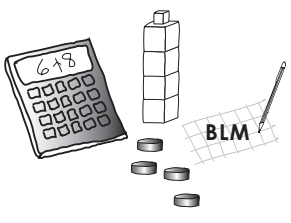
5. Develop skip counting (1, 2, 3, 4, 5)
Not needed if students see it is equivalent to counting.

6. Challenge: instant skip counting
Not needed if students see it is equivalent to counting.

7. Practice and Consolidation
- Can you count back in ones quickly from 5?
- Can you count back in ones quickly from 10?
- Give copies of Set C test (**BLM 3.1**) to students to practice. This can be given as homework.

8. Connections
- Make a connection chart (**BLM 3.9**) for 3 x 1.

9. Extensions
- Can you work out 1 x 13? 28 x 1?
- What other numbers can you multiply by 1?
- How many $1 coins for $5?



ACTIVITY 3.4 ZERO (FIRST FIVE MULTIPLES)

(No lots of)			(Lots of nothing)	
0 x 1	**No ones**	**and**	**1 x 0**	**One zero**
0 x 2	**No twos**	**and**	**2 x 0**	**Two zeros**
0 x 3	**No threes**	**and**	**3 x 0**	**Three zeros**
0 x 4	**No fours**	**and**	**4 x 0**	**Four zeros**
0 x 5	**No fives**	**and**	**5 x 0**	**Five zeros**

MATERIALS
None

TEACHING SEQUENCE
1. Check understanding
0 x 3 = No lots of 3 = 0
3 x 0 = Three lots of 0 = 0

2. Make up contexts
• 3 x 0: *I had 3 money boxes without coins in any of them. I had no money.*
• 0 x 3: *The musical trio didn't arrive, so there were no musicians.*

3. Strategy development (zero lots)
• No strategy needed if understanding is there.

4. Challenge: instant strategy use
• Not needed.

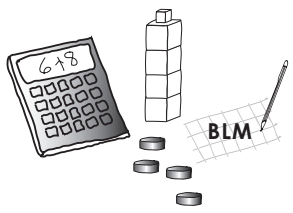
5. Develop skip counting
Irrelevant or boring (0, 0, 0, 0, 0!).

6. Challenge: instant skip counting
Irrelevant or boring (0, 0, 0, 0, 0!).

7. Practice and Consolidation
• Can you explain why 0 x 5 = 0? Why 4 x 0 = 0?

8. Connections
• Make a connection chart (**BLM 3.9**) for 0 x 3.

9. Extensions
• Can you work out 0 x 15? 24 x 0?
• What other numbers can you multiply by 0?
• (Division by zero is too complex to introduce at this stage)



ACTIVITY 3.5 TENS (FIRST FIVE MULTIPLES)

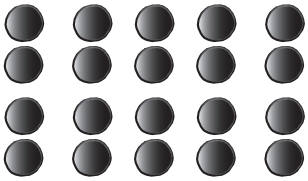
(Place Value)			Skip count	
10 x 1	**Ten ones**	**and**	**1 x 10**	**One ten**
10 x 2	**Ten twos**	**and**	**2 x 10**	**Two tens**
10 x 3	**Ten threes**	**and**	**3 x 10**	**Three tens**
10 x 4	**Ten fours**	**and**	**4 x 10**	**Four tens**
10 x 5	**Ten fives**	**and**	**5 x 10**	**Five tens**

MATERIALS

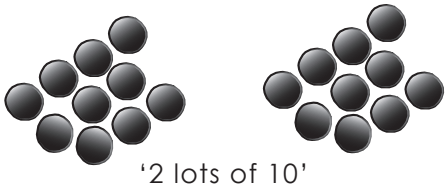
Counters, cubes, MAB, pop sticks, calculators, **BLM 3.4**

TEACHING SEQUENCE

1. Check understanding
- Using counters, have the students put out '10 lots of …' and '… lots of 10'

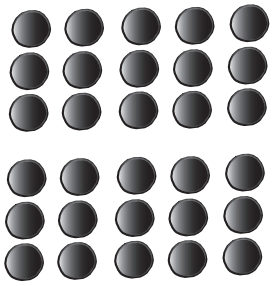


'10 lots of 2'

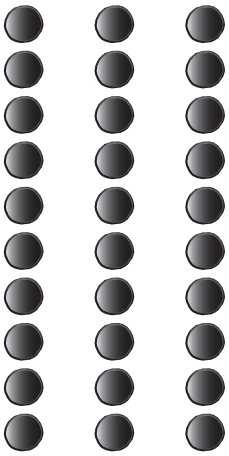


'2 lots of 10'

- Using counters or cubes, have the students make rectangular arrays (use **BLM 3.10**), and describe them in both rows and columns. For example:



10 X 3 = ten lots of three



3 X 10 = three lots of ten = 10 + 10 + 10

2. Make up contexts

- 10 x 3: There were 10 sets of triplets in the hospital, thirty babies in all.
- 3 x 10: I had three 10c coins: I had 30c.

3. Strategy development

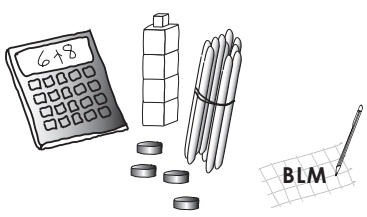
- No strategy needed if understanding is there.

4. Challenge: instant strategy use

Not needed.

5. Develop skip counting (10, 20, 30, 40, 50)

- Place counters or cubes on board if necessary. Also use MAB or popsticks bundled in tens.



10 + 10 + 10 + 10 + 10

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

10, 20, 30, 40, 50

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

6. Challenge: instant skip counting

- Invite individual students to say the first five multiples of 10 as quickly as possible: 10, 20, 30, 40, 50.
- *Now say the first 3 multiples… the first 4 multiples. What is 3* x *10? 10* x *5...?*

7. Practice and Consolidation

- Can you count in tens quickly to 50?
- Give copies of Set E test (**BLM 3.1**) to students to practice. This can be given as homework

8. Connections

- Make a connection chart (**BLM 3.9**) for 10 x 2.

9. Extensions

- Larger numbers
  Can you work out 10 x *12? 10* x *17?*
  What other numbers can you multiply by 10?
  Can you find a pattern to help multiply by 10?
- Counting forward and back
  How far can you reach counting in tens? Use the calculator as a check. Key in '0 + 10 ='. Now as you press =, =, =, the calculator will count in tens.
  Can you count back in tens from 50?
  Can you count back in tens from 100?
- Division
  How many 10c coins in 50c?
  Ten biscuits in a packet. How many packets for 30 biscuits?
  How many tens in forty?

ACTIVITY 3.6 FIVES (FIRST FIVE MULTIPLES)

Half of 10 times			Skip count	
5 x 1	**Five ones**	**And**	**1 x 5**	**One five**
5 x 2	**Five twos**	**And**	**2 x 5**	**Two fives**
5 x 3	**Five threes**	**And**	**3 x 5**	**Three fives**
5 x 4	**Five fours**	**And**	**4 x 5**	**Four fives**
5 x 5	**Five fives**	**And**	**5 x 5**	**Five fives**

MATERIALS

Counters, cubes, calculators, **BLM 3.4**.

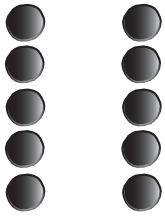
TEACHING SEQUENCE

1. Check understanding
- Using counters, have the students put out ' 5 lots of … ' and ' … lots of 5'

'2 lots of 5'

Using counters or cubes, have the students make rectangular arrays preferably on squared paper, and describe them in both rows and columns. For example:

5 x 2 = Two lots of five = 5 + 5



2 x 5 = Two lots of five = 2 + 2 + 2 + 2 + 2

2. Make up contexts

- Challenge the students to make up stories involving '5 lots of …' and ' … lots of 5'.

2 x 5: *I have five fingers on each hand, ten fingers in all.*
5 x 2: *Five two-dollar coins, ten dollars in all.*

- Challenge the students to make up stories relevant to particular contexts, for example the playground. Ensure that the contexts are varied and are not limited to the common topics of money and lollies, or to male and female stereotypes

3. Strategy development (Half of 10 times)

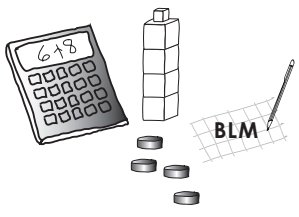
- Students know 'ten lots'. 'Five lots' is half this. Half of an even number of tens is easy. Half of 40 is 20, so 5 x 4 = 20.
- Ask students for ways of halving 30 or 50. For example half of 30 is 'half of 20 and add 5' OR 'half of 3 tens is one and a half tens, which is 10 + 5'.

4. Challenge: instant strategy use

- Individual students should be able to quickly calculate the first five multiples of 5 by halving the equivalent multiples of ten.

5. Develop skip counting (5, 10, 15, 20, 25)

- Place counters or cubes on board if necessary.



5 + 5 + 5 + 5 + 5

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

5, 10, 15, 20, 25

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

6. Challenge: instant skip counting

- Invite students to say the first five multiples of 5 as quickly as possible: 5, 10, 15, 20, 25.
- *Now say the first 3 multiples… the first 4 multiples. What is 3 x 5? 5 x 4? …*

7. Practice and consolidation

- Can you count in fives quickly to 25?
- *Explain how to use the 'half of ten times' strategy to calculate 5 x 3.*

- Use Set F (**BLM 3.1**) test.

8. Connections

- Make a connection chart (**BLM 3.9**) for 4 x 5.

9. Extensions

- Larger numbers
  Can you use the 'Half of 10 times' strategy to work out 5 x *12? 5* x *17?*
  What other numbers can you multiply by 5?
  Can you find a pattern to help multiply by 5?
- Counting forward and back
  How far can you reach counting in fives? Use the calculator as a check. Key in '0 + 5 ='. Now as you press =, =, =, the calculator will count in fives
  Can you count back in fives from 50?
  Can you count back in fives from 100?
- *Division*
  How many 5c coins in 20c?
  'Five fingers on a hand'. How many fingers have two people?
  How many fives in twenty-five?

ACTIVITY 3.7 FOURS (FIRST FIVE MULTIPLES)

Double 2 lots			Skip count	
4 x 1	**Four ones**	**and**	**1 x 4**	**One four**
4 x 2	**Four twos**	**and**	**2 x 4**	**Two fours**
4 x 3	**Four threes**	**and**	**3 x 4**	**Three fours**
4 x 4	**Four fours**	**and**	**4 x 4**	**Four fours**
4 x 5	**Four fives**	**and**	**5 x 4**	**Five fours**

MATERIALS

Counters, cubes, calculators, **BLM 3.4**.

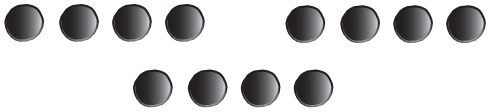
TEACHING SEQUENCE

1. Check understanding

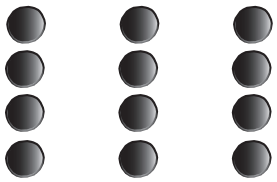
• Using counters, have the students put out ' 4 lots of … ' and ' … lots of 4'

'4 lots of 3'

'3 lots of 4



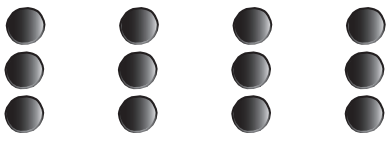
• Using counters or cubes, have the students make rectangular arrays preferably on squared paper, and describe them in both rows and columns. For example:



3 x 4 = Three lots of four = 4 + 4 + 4

2. Make up contexts

• 4 x 4: *My three friends and I have saved four dollars each. We have saved sixteen dollars.*



4 x 3 = Four lots of 3 = 3 + 3 + 3 + 3

3. Strategy development (Double 2 lots)

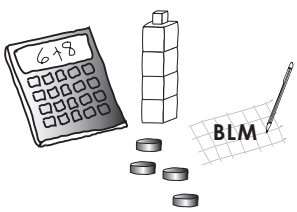
• If I double 2 lots I have 4 lots. 2 x 5 = 10, so 4 x 5 = Double 10 = 20.

4. Challenge: instant strategy use

• Individual students should be able to quickly calculate the first five multiples of 4 by doubling the doubles.

5. Develop skip counting (4, 8, 12, 16, 20)

• Place counters or cubes on board if necessary.



4 + 4 + 4 + 4

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20

4, 8, 12, 16, 20

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20

6. Challenge: instant skip counting

- Invite individual students to say the first five multiples of 4 as quickly as possible: 4, 8, 12, 16, 20.
- Now say the first 3 multiples… the first 4 multiples. What is 3 x 4? 4 x 4?

7. Practice and consolidation

- Can you count in fours quickly to 20?
- Explain how to use the 'double 2 lots' strategy to calculate 4 x 3.
- Give copies of Set G (**BLM 3.1**) to students to practice. This can be given as homework.

8. Connections

- Make a connection chart (**BLM 3.9**) for one of the multiples, for example: 4 x 4. Write 4 x 4 in the middle of the chart. Now think of six things you know connected with 4 x 4 and write them at the end of the lines.
  Students will need prompting initially and you may wish to model an example. The connections could include stories, diagrams, drawings of objects, '4 x 4 is double 2 x 4', the result of 4 x 4 can be shown as a square array. The intention is to encourage connections and lateral thinking rather than be prescriptive.

9. Extensions

- Larger numbers
  Can you use the 'Double two lots' strategy to work out 4 x *8? 4* x *15? What other numbers can you multiply by 4?*
- Counting forward and back
  How far can you reach counting in fours? Use the calculator as a check.
  Key in '0 + 4 ='. Now as you press =, =, =, the calculator will count in fours.
  Can you count back in fours from 40?
  Can you count back in fours from 80?
- Division
  Four wheels on a car. Twenty wheels: how many cars?
  'Sixteen table legs' How many tables each with four legs?
  How many fours in twelve?

ACTIVITY 3.8 TWOS (SECOND FIVE MULTIPLES)

Double			Skip count	
2 x 6	**Two sixes**	**and**	**6 x 2**	**Six twos**
2 x 7	**Two sevens**	**and**	**7 x 2**	**Seven twos**
2 x 8	**Two eights**	**and**	**8 x 2**	**Eight twos**
2 x 9	**Two nines**	**and**	**9 x 2**	**Nine twos**
2 x 10	**Two tens**	**and**	**10 x 2**	**Ten twos**

MATERIALS

Counters, cubes, calculators, **BLM 3.4**.

TEACHING SEQUENCE

1. Check understanding

• What does 2 x 7 mean?
• Draw a picture or diagram or use BLM 3.10 to show 6 x 2.

2. Make up contexts

• 2 x 8: *Two spiders with eight legs each, sixteen legs altogether.*
• 8 x 2: *Eight pairs of socks, sixteen socks in all.*

3. Strategy development (Double)

• Students should be able to double a number up to ten as this is covered in section 2.
• Go round the class asking in order 'double 1, double 2…double 9, double 10…twice 1, twice 2…twice 10'.
• Ask the students to double whichever number you say randomly from 1 to 10.

4. Challenge: instant strategy use

• Invite individual members of the class to respond instantly to these challenges.

5. Develop skip counting (2, 4, 6, 8, 10, 12, 14, 16, 18, 20)

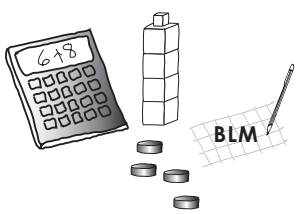
• Place counters or cubes on board if necessary.

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

2, 4, 6, 8, 10, 12, 14, 16, 18, 20

6. Challenge: instant skip counting

• Invite individual students to say the first ten multiples of 2 as quickly as possible.
• *Now stop at the seventh multiple… the ninth multiple…*



7. Practice and consolidation

- Can you count in twos quickly up to 10?
- Try the Times 2 Circuit (**BLM 3.11**). Place a number from 1 to 10 in the top left hand circle, and work round the circuit. Start each of the six circuits with a different number.
- Use Set H test (**BLM 3.2**).

8. Connections

- Make a connection chart (**BLM 3.9**) for one of the multiples, for example: 7 x 2. *Write 7* x *2 in the middle of the chart. Now think of six things you know connected with 7* x *2 and write them at the end of the lines* (They will need prompting and you may wish to model an example). The connections could include stories, diagrams, drawings of objects, '14 x 2 is twice 7 x 2', '8 x 2 is 2 more than 7 x 2' … the intention is to encourage connections and lateral thinking rather than be prescriptive.

9. Extensions

- Larger numbers
  Can you use the 'Double' strategy to work out 2 x *18? 2* x *45?*
  What other numbers can you multiply by 2?
  Can you find a pattern to help multiply by 2?
- Counting forward and back
  How far can you reach counting in twos? Use the calculator as a check. Key in '0 + 2 ='. Now as you press =, =, =, the calculator will count in twos.
  Can you count back in twos from 20? Use the calculator as a check. Key in 20 - 2 ='. Now as you press =, =, =, the calculator will count back in twos.
  Can you count back in twos from 40?
- Division
  Make these true: 2 x __ *= 12.*
  __ x *2 = 16.*
  Make these true: 12 ÷ 2 = __ .
  16 ÷ __ *= 2.*

ACTIVITY 3.9 THREES (SECOND FIVE MULTIPLES)

Double + one lot			Skip count	
3 x 6	**Three sixes**	**and**	**6 x 3**	**Six threes**
3 x 7	**Three sevens**	**and**	**7 x 3**	**Seven threes**
3 x 8	**Three eights**	**and**	**8 x 3**	**Eight threes**
3 x 9	**Three nines**	**and**	**9 x 3**	**Nine threes**
3 x 10	**Three tens**	**and**	**10 x 3**	**Ten threes**

MATERIALS
Counters, cubes, calculators, **BLM 3.4**.

TEACHING SEQUENCE
1. Check understanding
- What does 3 x 7 mean?
- Draw a picture or diagram or use **BLM 3.10** to show 8 x 3.

2. Make up contexts
- 3 x 6: *Three half-cartons of eggs, eighteen eggs in all.*
- 6 x 3: *Six triangles have eighteen sides.*

3. Strategy development (Double + one lot)
- *Three sevens? I know two sevens, twice 7 is 14, and 7 more is 21.*

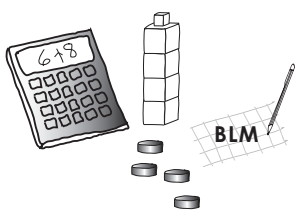
4. Challenge: instant strategy use
- Individual students should be able to quickly calculate the first ten multiples of 3 by doubling and adding.

5. Develop skip counting (3, 6, 9, 12, 15, 18, 21, 24, 27, 30)
- Place counters or cubes on board if necessary.

3, 6, 9, 12, 15, 18, 21, 24, 27, 30

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

6. Challenge: instant skip counting
- Invite individual students to say the first ten multiples of 3 as quickly as possible.
- *Now stop at the sixth multiple… the eighth multiple…*



7. Practice and consolidation

- Can you count in threes quickly up to thirty?
- Explain how to use the 'double + one lot' strategy to calculate 3 x 9.
- Try the Times 3 Circuit (**BLM 3.12**). Place a number from 1 to 10 in the top left hand circle, and work round the circuit. Start each of the six circuits with a different number.
- Try the Use Set I test (**BLM 3.2**).

8. Connections

- Make a connection chart (**BLM 3.9**) for 8 x 3.

9. Extensions

- Larger numbers

  Can you use the 'Double + one lot' strategy to work out 3 x *14? 3* x *25?*
  What other numbers can you multiply by 3?
- Counting forward and back

  How far can you reach counting in threes? Use the calculator as a check. Key in '0 + 3 ='. Now as you press =, =, =, the calculator will count in threes.
  Can you count back in threes from 30? Use the calculator as a check. Key in 30 - 3 ='. Now as you press =, =, =, the calculator will count back in threes.
  Can you count back in threes from 60?
- Division

  Make these true: 3 x __ *= 21.*
  __ x *3 = 27.*
  Make these true: 21 ÷ 3 = __ .
  27 ÷ __ *= 3.*

ACTIVITY 3.10 ONES (SECOND FIVE MULTIPLES)

(One lot of)			(Counting)	
1 x 6	**One six**	**and**	**6 x 1**	**Six ones**
1 x 7	**One seven**	**and**	**7 x 1**	**Seven ones**
1 x 8	**One eight**	**and**	**8 x 1**	**Eight ones**
1 x 9	**One nine**	**and**	**9 x 1**	**Nine ones**
1 x 10	**One ten**	**and**	**10 x 1**	**Ten ones**

MATERIALS

Counters, cubes, calculators.

TEACHING SEQUENCE

1. Check understanding

- What does 8 x 1 mean?
- Draw a picture or diagram or use **BLM 3.10** to show 1 x 7.

2. Make up contexts

- 1 x 10: *One ten-dollar note, worth ten dollars.*
- 10 x 1: *Ten one-dollar notes, worth ten dollars.*

3. Strategy development

- No strategy needed if understanding is there.

4. Challenge: instant strategy use

Not needed.

5. Develop skip counting

- Practice counting back in ones from 10.

(10, 9, 8, 7, 6, 5, 4, 3, 2, 1)

1	2	3	4	5	6	7	8	9	10

10	9	8	7	6	5	4	3	2	1

6. Challenge: instant skip counting

- Invite individual students to say the first ten multiples of 1 as quickly as possible.
- *Now stop at the ninth multiple… the sixth multiple…*

7. Practice and Consolidation

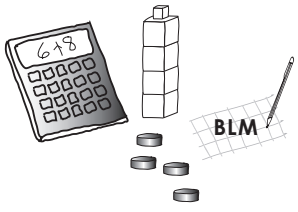
- Can you count back in ones quickly from ten?
- Use set J test (**BLM 3.2**).

8. Connections

- Make a connection chart (**BLM 3.9**) for 1 x 9.

9. Extensions

- Larger numbers
  Can you use these strategies to work out 1 x *28? 1* x *75?*
  What other numbers can you multiply by 1?
  Can you find a pattern to help multiply by 1?
- Counting forward and back
  How far can you reach counting in ones? Use the calculator as a check. Key in '0 + 1 ='. Now as you press =, =, =, the calculator will count in 1s. Can you count back in 1s from 20? Can you count back in 1s from 50?
- Division
  Make these true: 1 x __ = *9.*
  __ x *1 = 7.*
  Make these true: 9 ÷ 1 = __ .
  7 ÷ __ = *1.*



ACTIVITY 3.11 ZEROS (SECOND FIVE MULTIPLES)

(No lots of)			(Lots of nothing)	
0 x 6	**No sixes**	**and**	**6 x 0**	**Six zeros**
0 x 7	**No sevens**	**and**	**7 x 0**	**Seven zeros**
0 x 8	**No eights**	**and**	**8 x 0**	**Eight zeros**
0 x 9	**No nines**	**and**	**9 x 0**	**Nine zeros**
0 x 10	**No tens**	**and**	**10 x 0**	**Ten zeros**

MATERIALS
Counters, cubes, calculators.

TEACHING SEQUENCE
1. Check understanding
- What does 0 x 9 mean?
- Draw a picture or diagram to show 6 x 0.

2. Make up contexts
- 0 x 7: *No weeks left, no days left.*
- 7 x 0: *Seven empty cups, no tea.*

3. Strategy development
- No strategy needed if understanding is there.

4. Challenge: instant strategy use
- Not needed if understanding is there.

5. Develop skip counting
- Irrelevant or even more boring (0, 0, 0, 0, 0, 0, 0, 0, 0, 0).

6. Challenge: instant skip counting
Not needed.

7. Practice and Consolidation
- Can you explain why 0 x 6 = 0? Why 9 x 0 = 0?

8. Connections
- Make a connection chart (**BLM 3.9**) for 10 x 0.

9. Extensions
- What other numbers can you multiply by 0?

ACTIVITY 3.12 TENS (SECOND FIVE MULTIPLES)

(Place Value)			Skip count	
10 x 6	**Ten sixes**	**and**	**6 x 10**	**Six tens**
10 x 7	**Ten sevens**	**and**	**7 x 10**	**Seven tens**
10 x 8	**Ten eights**	**and**	**8 x 10**	**Eight tens**
10 x 9	**Ten nines**	**and**	**9 x 10**	**Nine tens**
10 x 10	**Ten tens**	**and**	**10 x 10**	**Ten tens**

MATERIALS

Counters, cubes, calculators, **BLM 3.4**.

TEACHING SEQUENCE

1. Check understanding

- What does 10 x 10 mean?
- Draw a picture or diagram or use **BLM 3.10** to show 6 x 10.

2. Make up contexts

- 10 x 7: *Ten weeks, seventy days.*
- 7 x 10: *Seven 10-packs of lemonade, seventy cans in all.*

3. Strategy development (Place Value)

- No strategy needed if understanding is there.

4. Challenge: instant strategy use

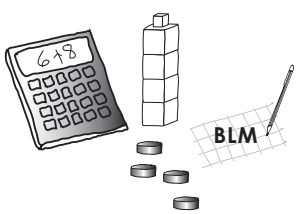
Not needed.

5. Develop skip counting (10, 20, 30, 40, 50, 60, 70, 80, 90, 100)

- Place counters or cubes on board if necessary.

10, 20, 30, 40, 50, 60, 70, 80, 90, 100

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



6. Challenge: instant skip counting

- Invite individual students to say the first ten multiples of 10 as quickly as possible.
- *Now stop at the seventh multiple… the sixth multiple…*

7. Practice and Consolidation

- Can you count in tens quickly to 100?
- Use Set L test (**BLM 3.2**).

8. Connections

- Make a connection chart (**BLM 3.9**) for 8 x 10.

9. Extensions

- Larger numbers
  Can you work out 10 x *18? 10* x *45?*
  What other numbers can you multiply by 10?
  Can you find a pattern to help multiply by 10?
- Counting forward and back
  How far can you reach counting in tens? Use the calculator as a check. Key in '0 + 10 ='. Now as you press =, =, =, the calculator will count in tens.
  Can you count back in tens from 100? Use the calculator as a check. Key in 100 - 10 ='. Now as you press =, =, =, the calculator will count back in tens.
  Can you count back in tens from 200?
- Division
  Make these true: 10 x __ *= 80.*
  __ x *10 = 100.*
  Make these true: 80 ÷ 10 = __ .
  100 ÷ __ *= 10.*

ACTIVITY 3.13 FIVES (SECOND FIVE MULTIPLES)

Half of 10 times			Skip count	
5 x 6	**Five sixes**	**And**	**6 x 5**	**Six fives**
5 x 7	**Five sevens**	**And**	**7 x 5**	**Seven fives**
5 x 8	**Five eights**	**And**	**8 x 5**	**Eight fives**
5 x 9	**Five nines**	**And**	**9 x 5**	**Nine fives**
5 x 10	**Five tens**	**And**	**10 x 5**	**Ten fives**

MATERIALS

Counters, cubes, calculators, **BLM 3.4**.

TEACHING SEQUENCE

1. Check understanding

- What does 5 x 9 mean?
- Draw a picture or diagram or use **BLM 3.10** to show 7 x 5.

2. Make up contexts

- 5 x 6: *Five six-sided dice, thirty sides.*
- 6 x 5: *Six feet, thirty toes.*

3. Strategy development

- Students know 'ten lots'. 'Five lots' is half this. Half of an even number of tens is easy. Half of 80 is 40, so 5 x 8 = 40. Ask students for ways of halving 70 or 90. For example half of 70 is 'half of 60 and add 5' OR 'half of 7 tens is three and a half tens, which is 30 + 5'.

4. Challenge: instant strategy use

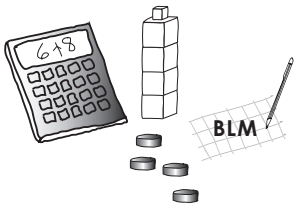
- Individual students should be able to quickly calculate the first ten multiples of 5 by halving the equivalent multiples of ten.

5. Develop skip counting (5, 10, 15, 20, 25, 30, 35, 40, 45, 50)

- Place counters or cubes on board if necessary.

5, 10, 15, 20, 25, 30, 35, 40, 45, 50

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



6. Challenge: instant skip counting

• Invite individual students to say the first ten multiples of 5 as quickly as possible.
• *Now stop at the ninth multiple… the seventh multiple…*

7. Practice and consolidation

• Can you count in fives quickly to fifty?
• Explain how to use the 'half of 10 times' strategy to calculate 5 x 9.
• Try the Times 5 Circuit (**BLM 3.14**). Place a number from 1 to 10 in the top left hand circle, and work round the circuit. Start each of the six circuits with a different number.
• Use set M test (**BLM 3.2**).

8. Connections

• Make a connection chart (**BLM 3.9**) for 5 x 8.

9. Extensions

• Larger numbers
Can you use the 'Half of 10 times' strategy to work out 5 x *16? 5* x *25?*
What other numbers can you multiply by 5?
Can you find a pattern to help multiply by 5?
• Counting forward and back
How far can you reach counting in fives? Use the calculator as a check. Key in '0 + 5 ='. Now as you press =, =, =, the calculator will count in fives.
Can you count back in fives from 50? Use the calculator as a check. Key in 50 - 5 ='. Now as you press =, =, =, the calculator will count back in fives.
Can you count back in fives from 100?
• Division
Make these true: 5 x __ *= 30.*
__ x *5 = 45.*
Make these true: 30 ÷ 5 = __ .
45 ÷ __ *= 5.*

ACTIVITY 3.14 FOURS (SECOND FIVE MULTIPLES)

Double 2 lots			Skip count	
4 x 6	**Four sixes**	**and**	**6 x 4**	**Six fours**
4 x 7	**Four sevens**	**and**	**7 x 4**	**Seven fours**
4 x 8	**Four eights**	**and**	**8 x 4**	**Eight fours**
4 x 9	**Four nines**	**and**	**9 x 4**	**Nine fours**
4 x 10	**Four tens**	**and**	**10 x 4**	**Ten fours**

MATERIALS

Counters, cubes, calculators, **BLM 3.4**.

TEACHING SEQUENCE

1. Check understanding

- What does 4 x 7 mean?
- Draw a picture or diagram or use **BLM 3.10** to show 6 x 4.

2. Make up contexts

- 4 x 9: *My brother is 9 years old. When he is 4 times as old as he is now, he will be 36.*
- 9 x 4: *Nine squares have thirty-six sides.*

3. Strategy development (Double 2 lots)

- If I double 2 lots I have 4 lots. 2 x 9 = 18, so 4 x 9 = Double 18 = 36.

4. Challenge: instant strategy use

- Individual students should be able to quickly calculate the first ten multiples of 4 by doubling the doubles.

5. Develop skip counting (4, 8, 12, 16, 20, 24, 28, 32, 36, 40)

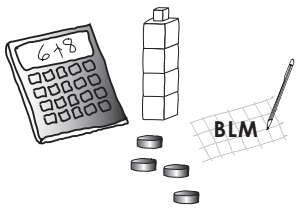
- Place counters or cubes on board if necessary.

4, 8, 12, 16, 20, 24, 28, 32, 36, 40

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

6. Challenge: instant skip counting

- Invite individual students to say the first ten multiples of 4 as quickly as possible.
- *Now stop at the eighth multiple… the sixth multiple…*



7. Practice and Consolidation

- Can you count in fours quickly to 40?
- Explain how to use the 'double two lots' strategy to calculate 4 x 8.
- Try the Times 4 Circuit (**BLM 3.13**). Place a number from 1 to 10 in the top left hand circle, and work round the circuit. Start each of the six circuits with a different number.
- Use Set N test (**BLM 3.2**).

8. Connections

- Make a connection chart (**BLM 3.9**) for 8 x 4.

9. Extensions

- What other numbers can you multiply by 4?
- How many 4s in 20? In 32? How can you do this quickly?
- Larger numbers
  Can you use the 'Double two lots' strategy to work out 4 x *15? 4* x *27?*
  What other numbers can you multiply by 4?
  Can you find a pattern to help multiply by 4?
- Counting forward and back
  How far can you reach counting in fours? Use the calculator as a check. Key in '0 + 4 ='. Now as you press =, =, =, the calculator will count in fours.
  Can you count back in fours from 40? Use the calculator as a check. Key in 40 - 4 ='. Now as you press =, =, =, the calculator will count back in fours.
  Can you count back in fours from 80?
- Division
  Make these true: 4 x __ *= 24.*
  __ x *4 = 32.*
  Make these true: 24 ÷ 4 = __ .
  32 ÷ __ *= 4.*

ACTIVITY 3.15 SIXES (FIRST FIVE MULTIPLES)

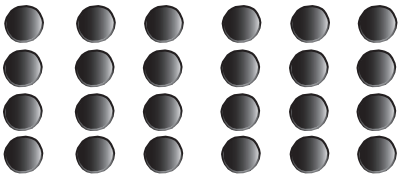
Five times + 1 lot			Skip count	
6 x 1	**Six ones**	**and**	**1 x 6**	**One six**
6 x 2	**Six twos**	**and**	**2 x 6**	**Two sixes**
6 x 3	**Six threes**	**and**	**3 x 6**	**Three sixes**
6 x 4	**Four sixes**	**and**	**4 x 6**	**Four sixes**
6 x 5	**Six fives**	**and**	**5 x 6**	**Five sixes**

MATERIALS

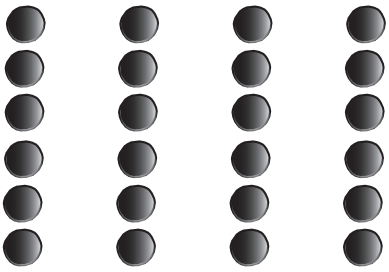
Counters, cubes, calculators, **BLM 3.4**.

TEACHING SEQUENCE

1. Check understanding



6 x 4 = 6 lots of four = 4+4+4+4+4+4



4 x 6 = Four lots of six = 6 + 6 + 6 + 6

2. Make up contexts

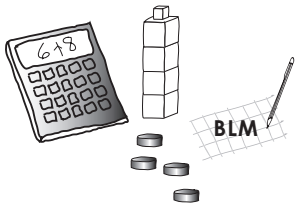
- 6 x 5: *Six five-dollar notes, thirty dollars.*
- 5 x 6: *Five sextets competed in the final. All thirty fitted in the one bus.*

3. Strategy development (5 times + one lot)

- Students tend to know multiples of five. To calculate 6 x 3, 5 threes are 15, so 6 threes are 3 more, 18.

4. Challenge: instant strategy use

- Individual students should be able to quickly calculate the first five multiples of 6 using the above strategy.



5. Develop skip counting (6, 12, 18, 24, 30)

• Place counters or cubes on board if necessary.

6, 12, 18, 24, 30

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

• Count in sixes. To calculate the next number in the sequence, DO NOT count on in ones. Either add six directly to the units, or, if it is easier, add 10 and subtract 4. For example for '18 + 6', think '18 + 10, 28, subtract 4, 24'.

6. Challenge: instant skip counting

• Invite students to say the first five multiples of 6 as quickly as possible: 6, 12, 18, 24, 30..

• *Now say the first 3 multiples… the first 4 multiples. What is 3* x *6? 6* x *4? …*

7. Practice and Consolidation

• Can you count in sixes quickly to 30?

• Explain how to use the '5 times + one lot' strategy to calculate 6 x 4.

• Use Set O test (**BLM 3.2**).

8. Connections

• Make a connection chart **(BLM 3.9**) for 3 x 6.

9. Extensions

• Larger numbers

Can you use the 'Five times + 1 lot' strategy to work out 6 x *12? 6* x *35?*
What other numbers can you multiply by 6?

• Counting forward and back

How far can you reach counting in sixes? Use the calculator as a check.Key in '0 + 6 ='. Now as you press =, =, =, the calculator will count in sixes.
Can you count back in sixes from 30?
Can you count back in sixes from 60?

• Division

Ponting hit 18 in sixes. How many sixes did he hit?
'Six eggs in a carton'. How many cartons for 24 eggs?
How many sixes in thirty?

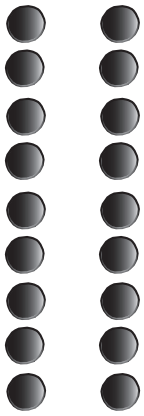
ACTIVITY 3.16 NINES (FIRST FIVE MULTIPLES)

Ten times take 1 lot			Skip count	
9 x 1	**Nine ones**	**and**	**1 x 9**	**One nine**
9 x 2	**Nine twos**	**and**	**2 x 9**	**Two nines**
9 x 3	**Nine threes**	**and**	**3 x 9**	**Three nines**
9 x 4	**Nine fours**	**and**	**4 x 9**	**Four nines**
9 x 5	**Nine fives**	**and**	**5 x 9**	**Five nines**

MATERIALS
Counters, cubes, calculators, **BLM 3.4**.

TEACHING SEQUENCE
1. Check understanding

9 x 2 = Nine lots of 2 = 2 + 2...



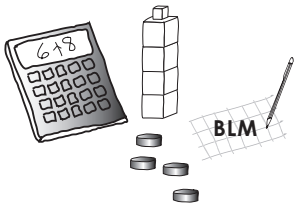
2 x 9 = Two lots of 9 = 9 + 9

2. Make up contexts
- 9 x 2: *Nine couples dancing, eighteen people on the dance floo*r.
- 2 x 9: *Two pizzas at nine dollars each, eighteen dollars to pay.*

3. Strategy development (Ten times less one lot)
- Ten times a number is easy, and nine times is one lot less. So to calculate 9 x 4, 10 times 4 is 40, so 9 times 4 is 4 less, 36.

4. Challenge: instant strategy use
- Individual students should be able to quickly calculate the first five multiples of 9 using the above strategy.

5. Develop skip counting (9, 18, 27, 36, 45)
- Place counters or cubes on board if necessary.



9, 18, 27, 36, 45

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

• Count in nines. To calculate the next number in the sequence, DO NOT count on in ones. Either add nine directly to the units, or, if it is easier, add 10 and subtract 1. For example for '18 + 9', think '18 + 10, 28, subtract 1, 27'.

6. Challenge: instant strategy use

• Invite students to say the first five multiples of 9 as quickly as possible: 9, 18, 27, 36, 45..
• *Now say the first 3 multiples… the first 4 multiples. What is 3* x *9? 9* x *4? …*

7. Practice and Consolidation

• Can you count in nines quickly to 45?
• Explain how to use the '10 times – one lot' strategy to calculate 9 x 4.
• Use Set P test (**BLM 3.2**).

8. Connections

• Make a connection chart **(BLM 3.9)** for 9 x 5

9. Extensions

• Larger numbers
Can you use the 'Ten times take 1 lot' strategy to work out 9 x *21? 9* x *32?*
What other numbers can you multiply by 9?
Can you find a pattern to help multiply by 9?
• Counting forward and back
How far can you reach counting in nines? Use the calculator as a check. Key in '0 + 9 ='. Now as you press =, =, =, the calculator will count in nines.
Can you count back in nines from 45?
Can you count back in nines from 90?
• Division
'Nine chocolate eggs in a packet'. How many packets for 36 eggs?
How many nines in twenty-seven?
How many nines in forty-five?

ACTIVITY 3.17 EIGHTS (FIRST FIVE MULTIPLES)

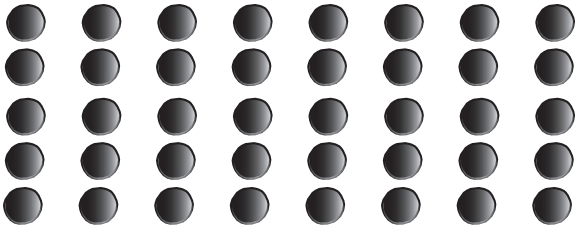
Double double 2 lots			Skip count	
8 x 1	**Eight ones**	**And**	**1 x 8**	**One eight**
8 x 2	**Eight twos**	**And**	**2 x 8**	**Two eights**
8 x 3	**Eight threes**	**And**	**3 x 8**	**Three eights**
8 x 4	**Eight fours**	**And**	**4 x 8**	**Four eights**
8 x 5	**Eight fives**	**And**	**5 x 8**	**Five eights**

MATERIALS

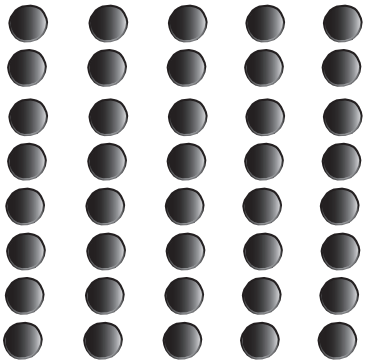
Counters, cubes, calculators, **BLM 3.4**.

TEACHING SEQUENCE

1. Check understanding



8 x 5 = Eight lots of five



5 x 8 = 5 lots of 8 = 8+8+8+8+8

2. Make up contexts

- 8 x 1: *Eight dogs need a bone each, we need eight bones.*
- 1 x 8: *One player kicked all eight goals, we scored eight goals.*

3. Strategy development (Double double double)

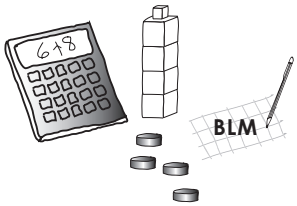
- 8 = 2 x 2 x 2. So 8 x 3: double 3 = 6, double 6 = 12, and double 12 = 24.

4. Challenge: instant strategy use

- Individual students should be able to quickly calculate the first five multiples of 8 using the above strategy.

5. Develop skip counting (8, 16, 24, 32, 40)

- Place counters or cubes on board if necessary.



8, 16, 24, 32, 40

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

• Count in eights. To calculate the next number in the sequence, DO NOT count on in ones. Either add eight directly to the units, or, if it is easier, add 10 and subtract 2. For example for '16 + 8', think '16 + 10, 26, subtract 2, 24'.

6. Challenge: instant skip counting

• Invite students to say the first five multiples of 8 as quickly as possible:
8, 16, 24, 32, 40.
• Now say the first 3 multiples… the first 4 multiples.
What is 3 x 8? 8 x 4? …

7. Practice and Consolidation

• Can you count in eights quickly to 40?
• Explain how to use the 'Double double 2 lots' strategy to calculate 8 x 3.
• Use Set Q test (**BLM 3.2**).

8. Connections

• Make a connection chart (**BLM 3.9**) for 2 x 8

9. Extensions

• Larger numbers
Can you use the 'Double double 2 lots' strategy to work out 8 x *12? 8* x *30?*
What other numbers can you multiply by 8?
• Counting forward and back
How far can you reach counting in eights? Use the calculator as a check. Key in '0 + 8 ='. Now as you press =, =, =, the calculator will count in eights.
Can you count back in eights from 40?
Can you count back in eights from 80?
• Division
'A spider has eight legs'. How many spiders have 32 legs?
How many eights in twenty-four?

ACTIVITY 3.18 SEVENS (FIRST FIVE MULTIPLES)

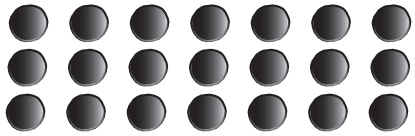
Five times + 2 times			Skip count	
7 x 1	**Seven ones**	**and**	**1 x 7**	**One seven**
7 x 2	**Seven twos**	**and**	**2 x 7**	**Two sevens**
7 x 3	**Seven threes**	**and**	**3 x 7**	**Three sevens**
7 x 4	**Seven fours**	**and**	**4 x 7**	**Four sevens**
7 x 5	**Seven fives**	**and**	**5 x 7**	**Five sevens**

MATERIALS

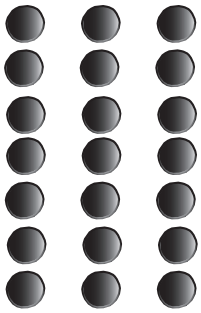
Counters, cubes, calculators, **BLM 3.4**.

TEACHING SEQUENCE

1. Check understanding



7 x 3 = Seven lots of three



3 x 7 = Three lots of seven = 7 + 7 + 7

2. Make up contexts

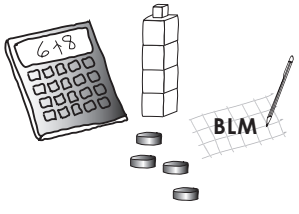
- 7 x 3: *Seven ice creams at three dollars each cost twenty-one dollars.*
- 3 x 7: *Three ice cream tubs at $7 each cost twenty-one dollars.*

3. Strategy development (5 times + 2 times)

- 7 x 4: 5 times 4 = 20, and 8 more is 28.

4. Challenge: instant strategy use

- Individual students should be able to quickly calculate the first five multiples of 7 using the above strategy.



5. Develop skip counting (7, 14, 21, 28, 35)

• Place counters or cubes on board if necessary.

7, 14, 21, 28, 35

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

• Count in sevens. To calculate the next number in the sequence, DO NOT count on in ones. Either add seven directly to the units, or, if it is easier, add 10 and subtract 3. For example for '14 + 7', think '14 + 10, 24, subtract 3, 21.'

6. Challenge: instant skip counting

• Invite students to say the first five multiples of 7 as quickly as possible: 7, 14, 21, 28, 35.

• *Now say the first 3 multiples… the first 4 multiples. What is 3* x *7? 7* x *4?*

7. Practice and Consolidation

• Can you count in sevens quickly to 35?

• Explain how to use the '5 times + 2 times' strategy to calculate 7 x 4.

• Use Set R test (**BLM 3.3**).

8. Connections

• Make a connection chart (**BLM 3.9**) for 3 x 7.

9. Extensions

• Larger numbers

Can you use the 'Five times + 2 times' strategy to work out 7 x *15? 7* x *23?*
What other numbers can you multiply by 7?

• Counting forward and back

How far can you reach counting in sevens? Use the calculator as a check.
Key in '0 + 7 ='. Now as you press =, =, =, the calculator will count in sevens.
Can you count back in sevens from 35?
Can you count back in sevens from 70?

• Division

'A week has seven days'. How many weeks for 21 days?
How many sevens in thirty-five?

ACTIVITY 3.19 SIXES (SECOND FIVE MULTIPLES)

Five times + 1 lot			Skip count	
6 x 6	**Six sixes**	**And**	**6 x 6**	**Six sixes**
6 x 7	**Six sevens**	**And**	**7 x 6**	**Seven sixes**
6 x 8	**Six eights**	**And**	**8 x 6**	**Eight sixes**
6 x 9	**Six nines**	**And**	**9 x 6**	**Nine sixes**
6 x 10	**Six tens**	**And**	**10 x 6**	**Ten sixes**

MATERIALS

Counters, cubes, calculators, **BLM 3.4**.

TEACHING SEQUENCE

1. Check understanding

- What does 6 x 7 mean?
- Draw a picture or diagram or use **BLM 3.10** to show 6 x 6.

2. Make up contexts

- 6 x 6: *If I throw six sixes with dice I score thirty-six.*

3. Strategy development (5 times + one lot)

- Students tend to know multiples of five. To calculate 6 x 8, 5 eights are 40, so 6 eights are 8 more, 48.

4. Challenge: instant strategy use

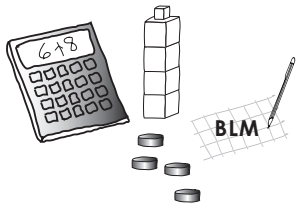
- Individual students should be able to quickly calculate the first ten multiples of 6 using the above strategy.

5. Develop skip counting (6, 12, 18, 24, 30, 36, 42, 48, 54, 60)

- Place counters or cubes on board if necessary.

6, 12, 18, 24, 30, 36, 42, 48, 54, 60

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



- Count in sixes. To calculate the next number in the sequence, DO NOT count on in ones. Either add six directly to the units, or, if it is easier, add 10 and subtract 4. For example for '48 + 6', think '48 + 10, 58, subtract 4, 54'.

6. Challenge: instant skip counting
- Invite individual students to say the first ten multiples of 6 as quickly as possible.
- *Now stop at the ninth multiple… the seventh multiple…*

7. Practice and Consolidation
- Can you count in sixes quickly to sixty?
- Explain how to use the '5 times + one lot' strategy to calculate 6 x 7.
- Try the Times 6 Circuit (**BLM 3.15**). Place a number from 1 to 10 in the top left hand circle, and work round the circuit. Start each of the six circuits with a different number.
- Use set S test (**BLM 3.3**).

8. Connections
- Make a connection chart (**BLM 3.9**) for 6 x 8.

9. Extensions
- Larger numbers
  Can you use the 'Five times + 1 lot' strategy to work out 6 x *12? 6* x *32?*
  What other numbers can you multiply by 6?
  Can you find a pattern to help multiply by 6?
- Counting forward and back
  How far can you reach counting in sixes? Use the calculator as a check. Key in '0 + 6 ='. Now as you press =, =, =, the calculator will count in sixes.
  Can you count back in 6s from 60? Use the calculator as a check. Key in 60 - 6 ='. Now as you press =, =, =, the calculator will count back in sixes.
  Can you count back in sixes from 90?
- Division
  Make these true: 6 x __ *= 30.*
  __ x *6 = 48.*
  Make these true: 36 ÷ 6 = __ .
  54 ÷ __ *= 6.*

ACTIVITY 3.20 NINES (SECOND FIVE MULTIPLES)

Ten times take 1 lot			Skip count	
9 x 6	**Nine sixes**	**and**	**6 x 9**	**Six nines**
9 x 7	**Nine sevens**	**and**	**7 x 9**	**Seven nines**
9 x 8	**Nine eights**	**and**	**8 x 9**	**Eight nines**
9 x 9	**Nine nines**	**and**	**9 x 9**	**Nine nines**
9 x 10	**Nine tens**	**and**	**10 x 9**	**Ten nines**

MATERIALS

Counters, cubes, calculators, **BLM 3.4**.

TEACHING SEQUENCE

1. Check understanding

- What does 3 x 9 mean?
- Draw a picture or diagram or use **BLM 3.10** to show 9 x 4.

2. Make up contexts

- 9 x 10: *My grandma has lived through nine decades, that's ninety years*.
- 10 x 9: *Ten teams of nine will use all ninety people who want to play*.

3. Strategy development (Ten times less one lot)

- Ten times a number is easy, and nine times is one lot less. So to calculate 9 x 7, 10 times 7 is 70, so 9 times 7 is 7 less, 63.

4. Challenge: instant strategy use

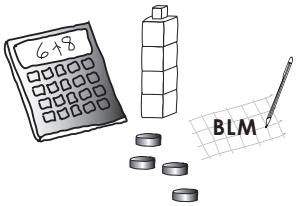
- Individual students should be able to quickly calculate the first ten multiples of 9 using the above strategy.

5. Develop skip counting (9, 18, 27, 36, 45, 54, 63, 72, 81, 90)

- Place counters or cubes on board if necessary.

9, 18, 27, 36, 45, 54, 63, 72, 81, 90

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



• Count in nines. To calculate the next number in the sequence, DO NOT count on in ones. Either add nine directly to the units, or, if it is easier, add 10 and subtract 1. For example for '54 + 9', think '54 + 10, 64, subtract 1, 63'.

6. Challenge: instant skip counting

• Invite individual students to say the first ten multiples of 9 as quickly as possible.
• Now stop at the sixth multiple… the eighth multiple…

7. Practice and Consolidation

• Can you count in nines quickly to 90?
• Explain how to use the '10 times – one lot' strategy to calculate 9 x 8.
• Try the Times 9 Circuit (**BLM 3.18**). Place a number from 1 to 10 in the top left hand circle, and work round the circuit. Start each of the six circuits with a different number.
• Use Set T test (**BLM 3.3**).

8. Connections

• Make a connection chart (**BLM 3.9**) for 8 x 9.

9. Extensions

• Larger numbers
Can you use the 'Ten times take 1 lot' strategy to work out 9 x *25? 9* x *32?*
What other numbers can you multiply by 9?
Can you find a pattern to help multiply by 9?
• Counting forward and back
How far can you reach counting in nines? Use the calculator as a check. Key in '0 + 9 ='. Now as you press =, =, =, the calculator will count in nines.
Can you count back in 9s from 90? Use the calculator as a check. Key in 90 - 9 ='. Now as you press =, =, =, the calculator will count back in nines.
• Division
Make these true: 9 x __ *= 54.*
__ x *9 = 36.*
Make these true: 72 ÷ 9 = __ .
45 ÷ __ *= 9.*

ACTIVITY 3.21 EIGHTS (SECOND FIVE MULTIPLES)

Double double 2 lots			Skip count	
8 x 6	**Eight sixes**	**and**	**6 x 8**	**Six eights**
8 x 7	**Eight sevens**	**and**	**7 x 8**	**Seven eights**
8 x 8	**Eight eights**	**and**	**8 x 8**	**Eight eights**
8 x 9	**Eight nines**	**and**	**9 x 8**	**Nine eights**
8 x 10	**Eight tens**	**and**	**10 x 8**	**Ten eights**

MATERIALS

Counters, cubes, calculators, **BLM 3.4**.

TEACHING SEQUENCE

1.Check understanding

- What does 8 x 6 mean?
- Draw a picture or diagram or use **BLM 3.10** to show 7 x 8.

2. Make up contexts

- 8 x 7: *Eight weeks more of school, fifty-six days to go.*
- 7 x 8: *Seven rowing eights on the water, fifty-six rowers.*

3. Strategy development (Double double double)

- 8 = 2 x 2 x 2. So 8 x 9: double 9 = 18, double 18 = 36, and double 36 = 72.

4. Challenge: instant strategy use

- Individual students should be able to quickly calculate the first ten multiples of 8 using the above strategy.

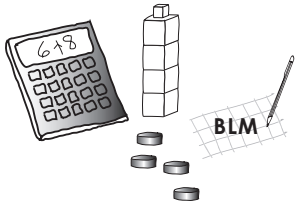
5. Develop skip counting (8, 16, 24, 32, 40, 48, 56, 64, 72, 80)

- Place counters or cubes on board if necessary.

8, 16, 24, 32, 40, 48, 56, 64, 72, 80

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

- Count in eights. To calculate the next number in the sequence, DO NOT count on in ones. Either add eight directly to the units, or, if it is easier, add 10 and subtract 2. For example for '48 + 8', think '48 + 10, 58, subtract 2, 56'.



6. Challenge: instant skip counting

- Invite individual students to say the first ten multiples of 8 as quickly as possible.
- *Now stop at the sixth multiple… the ninth multiple…*

7. Practice and Consolidation

- Can you count in eights quickly to 80?
- Explain how to use the '2 x 2 x 2 x' strategy to calculate 8 x 7.
- Try the Times 8 Circuit (**BLM 3.17**). Place a number from 1 to 10 in the top left hand circle, and work round the circuit. Start each of the six circuits with a different number.
- Use Set U test (**BLM 3.3**).

8. Connections

- Make a connection chart (**BLM 3.9**) for 8 x 7

9. Extensions

- Larger numbers

  Can you use the 'Double double 2 lots' strategy to work out 8 x *15? 8* x *23?*
  What other numbers can you multiply by 8?
  Can you find a pattern to help multiply by 8?
- Counting forward and back

  How far can you reach counting in eights? Use the calculator as a check. Key in '0 + 8 ='. Now as you press =, =, =, the calculator will count in eights.
  Can you count back in 8s from 80? Use the calculator as a check. Key in 80 - 8 ='. Now as you press =, =, =, the calculator will count back in eights.
- Division

  Make these true: 8 x __ *= 32.*
  __ x *8 = 56.*
  Make these true: 64 ÷ 8 = __ .
  80 ÷ __ *= 8.*

ACTIVITY 3.22 SEVENS (SECOND FIVE MULTIPLES)

Five times + 2 times			Skip count	
7 x 6	**Seven sixes**	**and**	**6 x 7**	**Six sevens**
7 x 7	**Seven sevens**	**and**	**7 x 7**	**Seven sevens**
7 x 8	**Seven eights**	**and**	**8 x 7**	**Eight sevens**
7 x 9	**Seven nines**	**and**	**9 x 7**	**Nine sevens**
7 x 10	**Seven tens**	**and**	**10 x 7**	**Ten sevens**

MATERIALS

Counters, cubes, calculators, B**LM 3.4**.

TEACHING SEQUENCE

1. Check understanding

• What does 7 x 9 mean?

• Draw a picture or diagram or use **BLM 3.10** to show 10 x 7.

2. Make up contexts

• 7 x 9: *Seven packs of nine Easter eggs, sixty-three eggs*.

• 9 x 7: *Nine dogs weighing seven kilos each weigh sixty-three kilos together.*

3. Strategy development (5 times + 2 times)

• 7 x 8: 5 times 8 = 40, twice 8 = 16, 40 + 16 = 56.

4. Challenge: instant strategy use

• Individual students should be able to quickly calculate the first ten multiples of 7 using the above strategy.

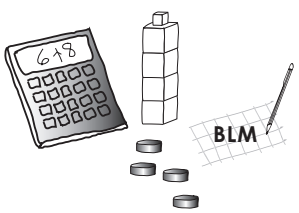
5. Develop skip counting (7, 14, 21, 28, 35, 42, 49, 56, 63, 70)

• Place counters or cubes on board if necessary.

7, 14, 21, 28, 35, 42, 49, 56, 63, 70

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

• Count in sevens. To calculate the next number in the sequence, DO NOT count on in ones. Either add seven directly to the units, or, if it is easier, add 10 and subtract 3. For example for '49 + 7', think '49 + 10, 59, subtract 3, 56'.



6. Challenge: instant skip counting

• Invite individual students to say the first ten multiples of 7 as quickly as possible.
• *Now stop at the eighth multiple… the sixth multiple…*

7. Practice and Consolidation

• Can you count in sevens quickly to 70?
• Explain how to use the '5 times + 2 times' strategy to calculate 7 x 8.
• Try the Times 7 Circuit (**BLM 3.16**). Place a number from 1 to 10 in the top left hand circle, and work round the circuit. Start each of the six circuits with a different number.
• Use Set V test (**BLM 3.3**).

8. Connections

• Make a connection chart (**BLM 3.9**) for 6 x 7.

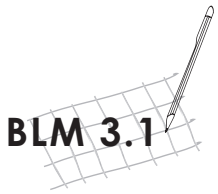
9. Extensions

• Larger numbers
Can you use the 'Five times + two times' strategy to work out 7 x *16? 7* x *52?*
What other numbers can you multiply by 7?
• Counting forward and back
How far can you reach counting in sevens? Use the calculator as a check. Key in '0 + 7 ='. Now as you press =, =, =, the calculator will count in sevens.
Can you count back in 7s from 70? Use the calculator as a check. Key in 70 - 7 ='.
Now as you press =, =, =, the calculator will count back in sevens.
• Division
Make these true: 7 x __ *= 35.*
__ x *7 = 49.*
Make these true: 63 ÷ 7 = __ .
56 ÷ __ *= 7.*

TESTS

Tests are given for each set, except for sets D and K (Multiples of Zero). The tests can be used for two purposes: (a) as tests of ability to use a strategy to calculate an answer, and (b) as tests of instant recall.
If used for strategy use, then 10 – 15 seconds should be allowed for each question. That is, if the test is given as a written test, then students have about two minutes to answer all ten questions. If the test is given orally, then after giving each item, no more than 10 - 15 seconds is allowed for an answer. The students can also be asked, orally, or in writing, to explain a way of calculating the item.
If used as tests of instant recall, then no more than 3 seconds should be allowed for each question. That is, if the test is given as a written test, then students have 30 seconds to answer all ten questions. If the test is given orally, then after giving each item, no more than 3 seconds is allowed for an answer. If used as mastery tests, at least 8 correct answers are needed (maybe 9 or even 10).

Four mixed tests are also provided.



BLM 3.1

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

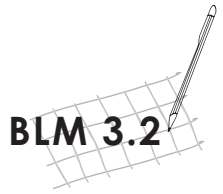
SET B	
1	3 x 3
2	3 x 2
3	4 x 3
4	1 x 3
5	3 x 5
6	3 x 3
7	5 x 3
8	3 x 1
9	2 x 3
10	3 x 4

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

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

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

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



BLM 3.2

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

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

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

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

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

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

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

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

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

BLM 3.3

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

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

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

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

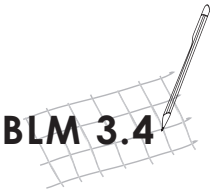
SET V	
1	8 x 7
2	7 x 10
3	6 x 7
4	7 x 9
5	7 x 7
6	7 x 8
7	10 x 7
8	7 x 7
9	9 x 7
10	7 x 6

MIXED SETS A - G	
1	5 x 4
2	4 x 2
3	3 x 5
4	4 x 4
5	5 x 1
6	3 x 10
7	2 x 3
8	10 x 4
9	5 x 5
10	4 x 3

MIXED SETS J - N	
1	8 x 1
2	6 x 3
3	2 x 7
4	4 x 8
5	10 x 6
6	7 x 5
7	9 x 2
8	3 x 7
9	5 x 9
10	7 x 4

MIXED SETS O - R	
1	2 x 6
2	9 x 4
3	4 x 7
4	9 x 2
5	8 x 3
6	6 x 5
7	4 x 8
8	3 x 9
9	4 x 6
10	7 x 5

MIXED SETS S - V	
1	10 x 8
2	6 x 7
3	9 x 6
4	7 x 7
5	0 x 7
6	6 x 8
7	9 x 7
8	8 x 9
9	7 x 6
10	8 x 7



BLM 3.4

1 - 100 BOARD (LARGE)

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

BLM 3.5

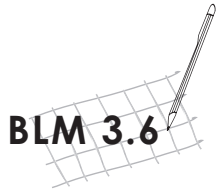
1 - 100 BOARDS (SMALL)

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

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

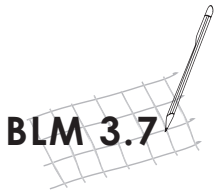
1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

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



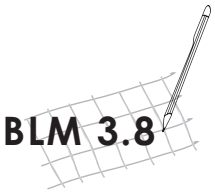
BLM 3.6

BLANK 100 BOARD (LARGE)



BLM 3.7

BLANK 100 BOARDS (SMALL)



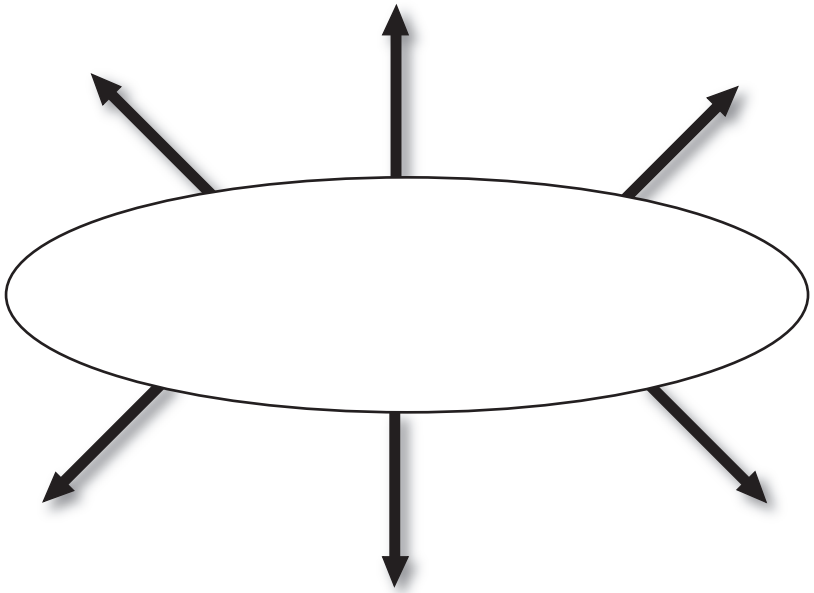
BLM 3.8

MULTIPLICATION SQUARE

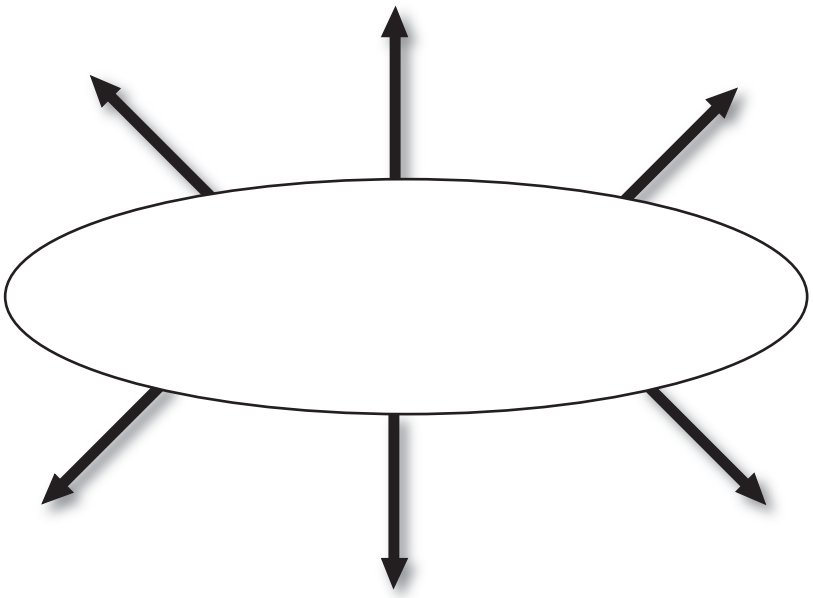
1	2	3	4	5	6	7	8	9	10
2	4	6	8	10	12	14	16	18	20
3	6	9	12	15	18	21	24	27	30
4	8	12	16	20	24	28	32	36	40
5	10	15	20	25	30	35	40	45	50
6	12	18	24	30	36	42	48	54	60
7	14	21	28	35	42	49	56	63	70
8	16	24	32	40	48	56	64	72	80
9	18	27	36	45	54	63	72	81	90
10	20	30	40	50	60	70	80	90	100

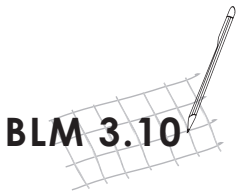
BLM 3.9

CONNECTION CHART



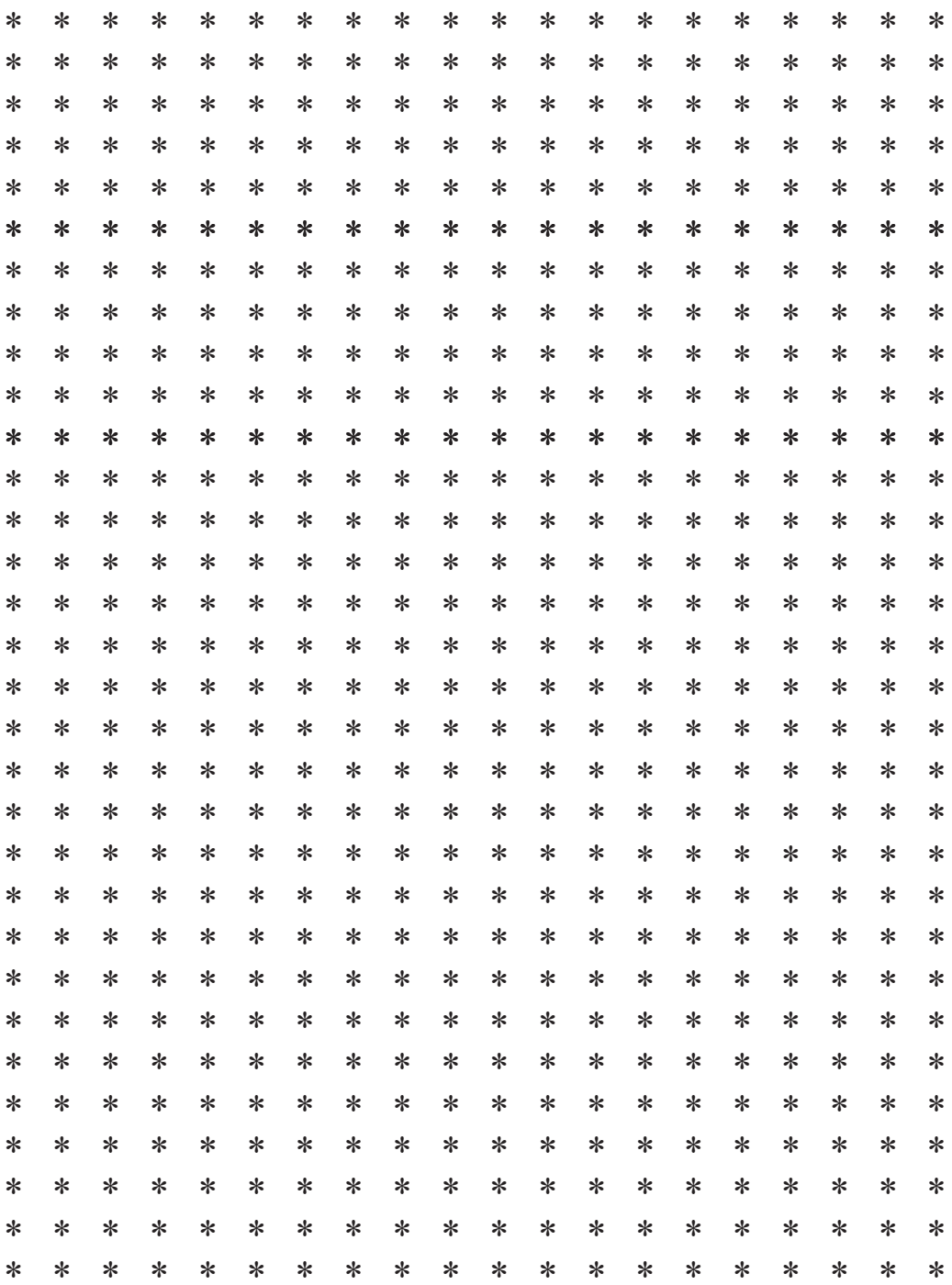
CONNECTION CHART





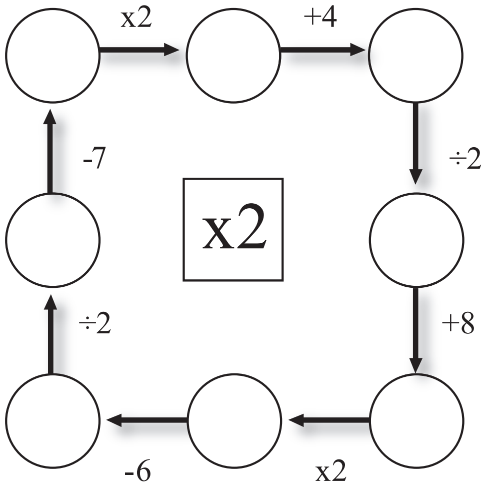
BLM 3.10

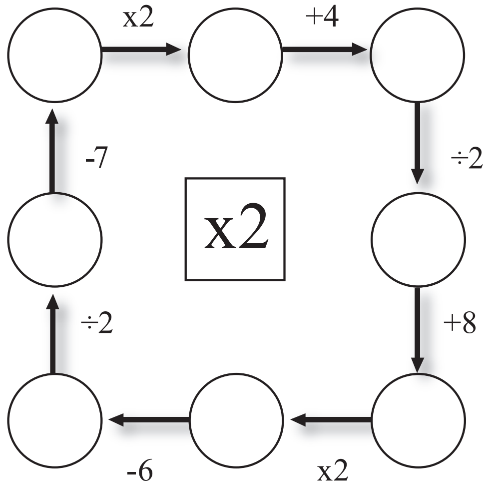
RECTANGULAR ARRAY

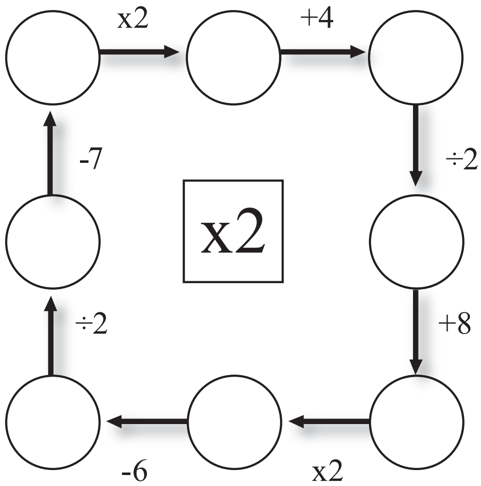


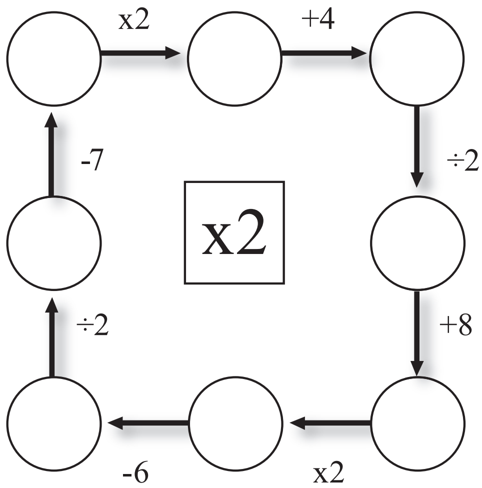
BLM 3.11

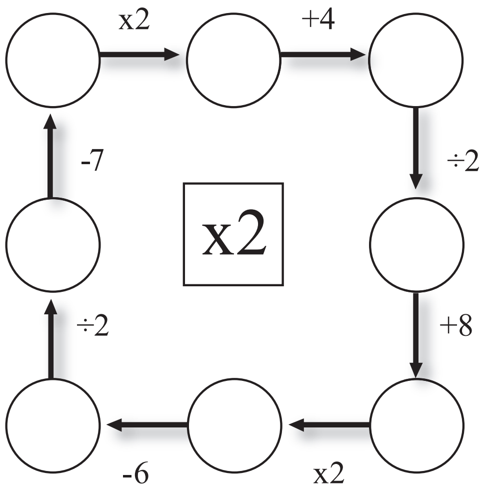
TIMES 2 CIRCUITS

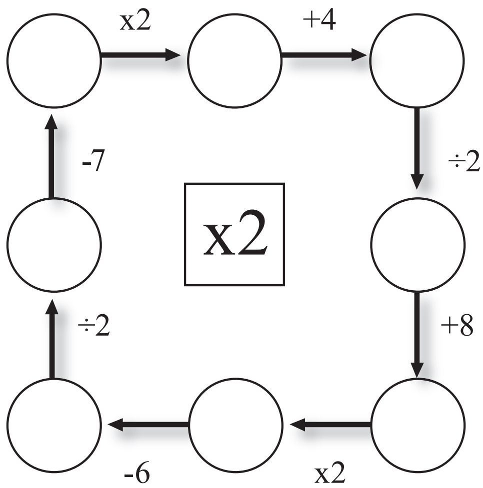






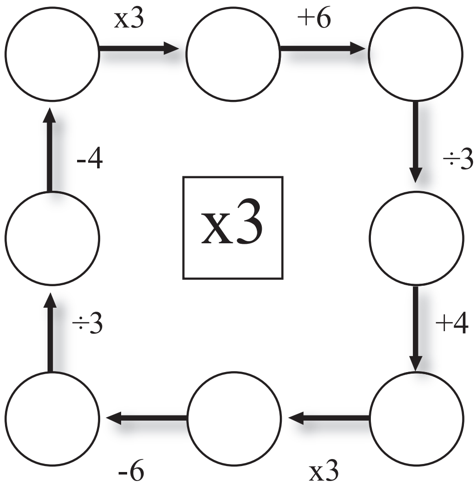


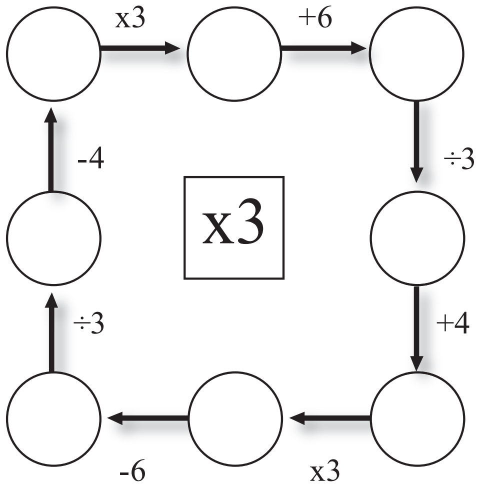


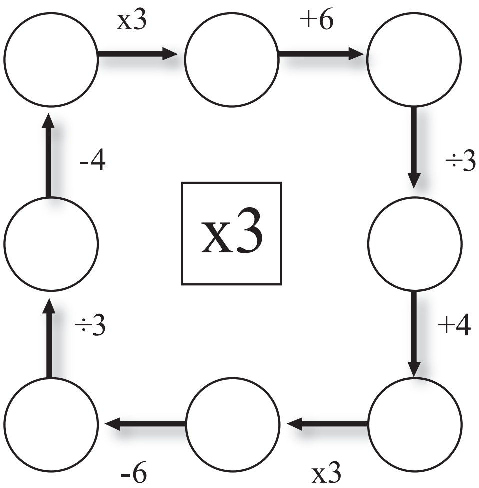


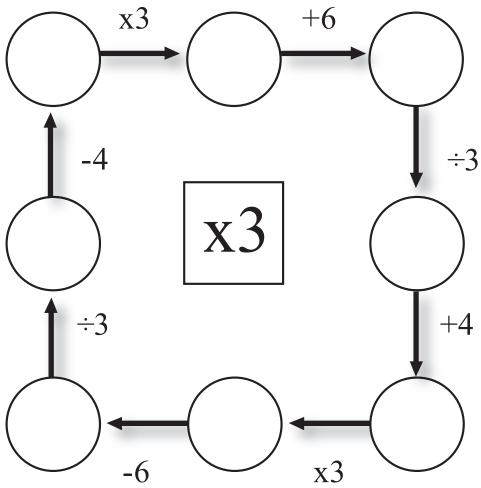
BLM 3.12

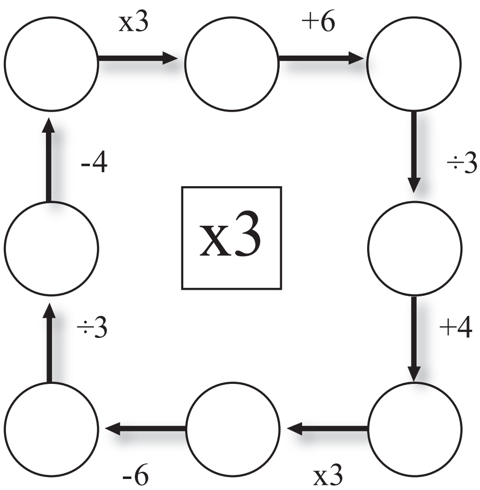
TIMES 3 CIRCUITS

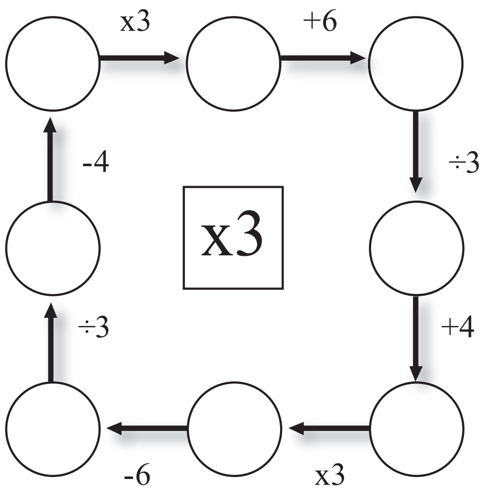






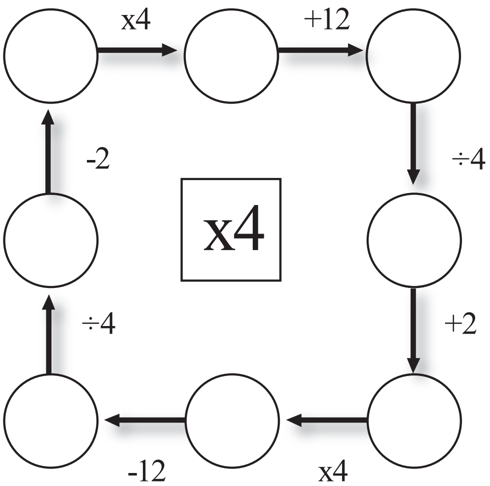


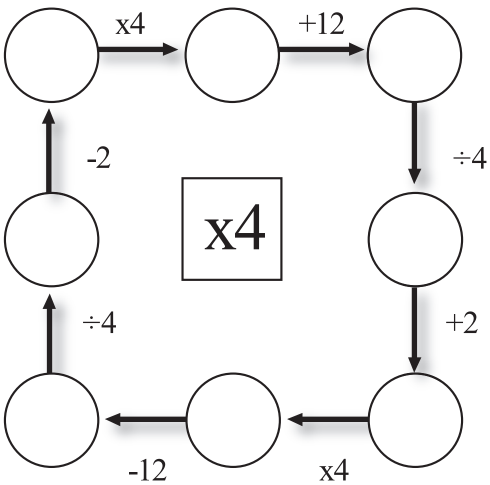


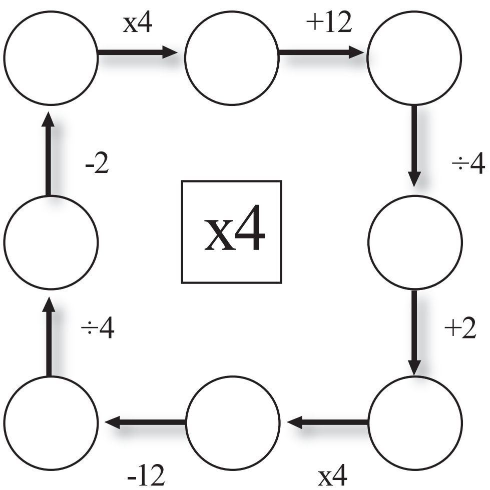


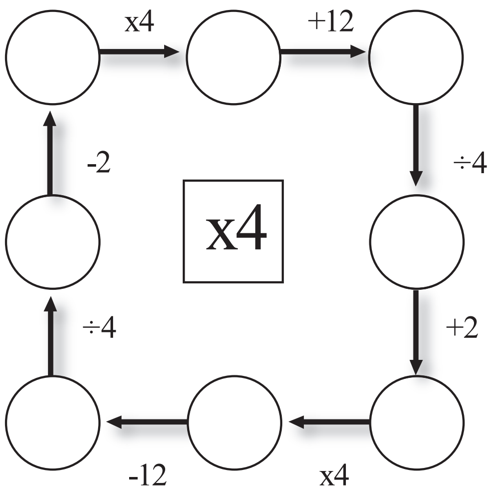
BLM 3.13

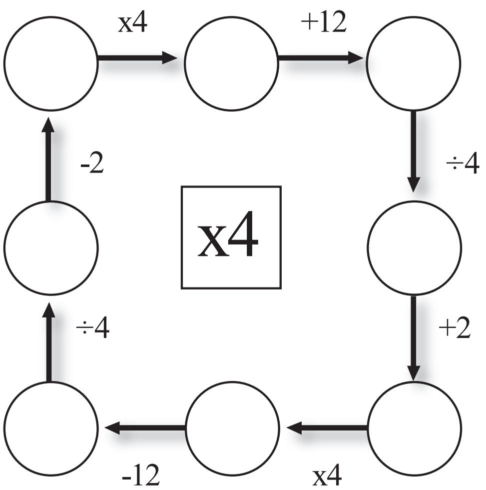
TIMES 4 CIRCUITS

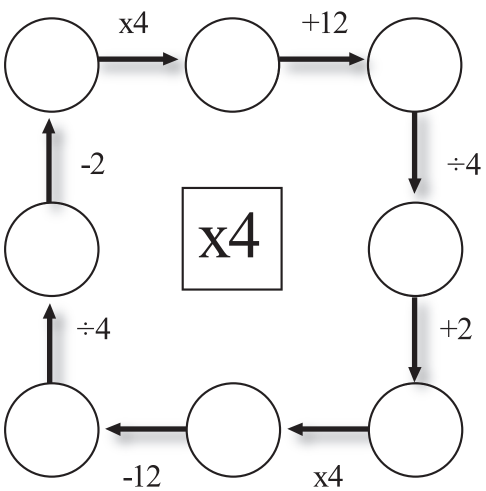






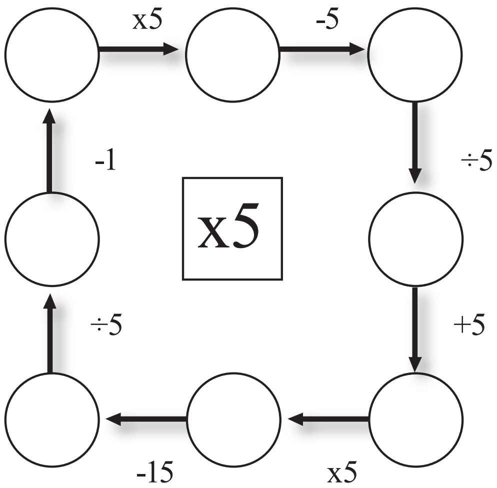


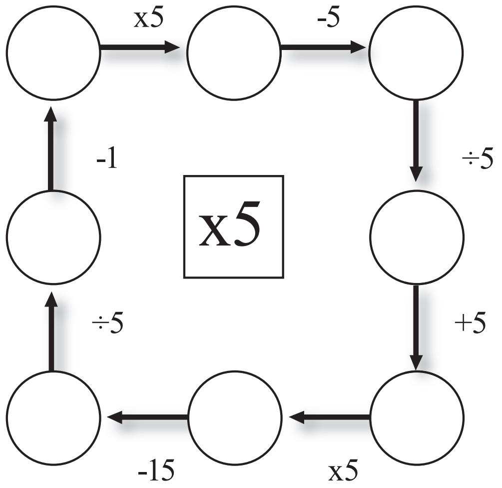


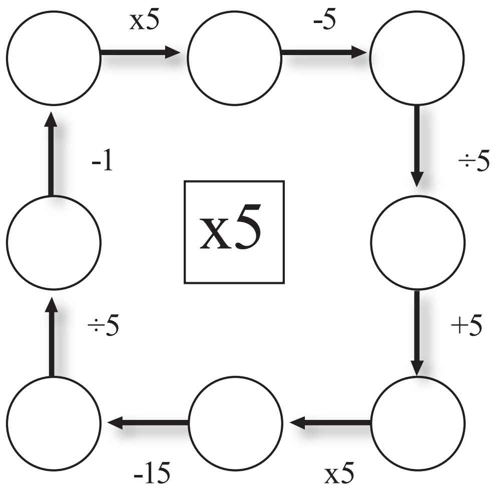


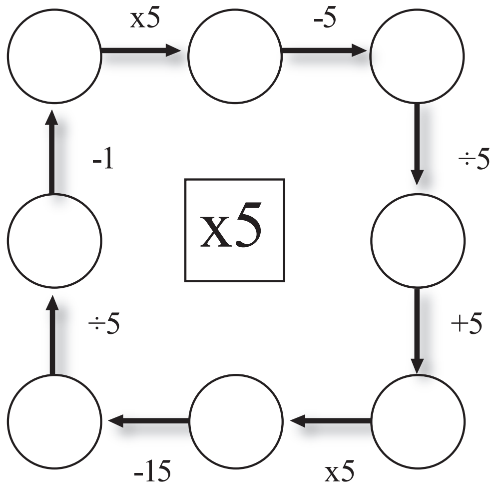
BLM 3.14

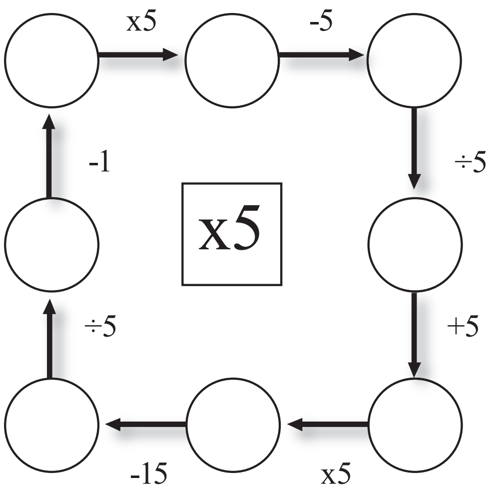
TIMES 5 CIRCUITS

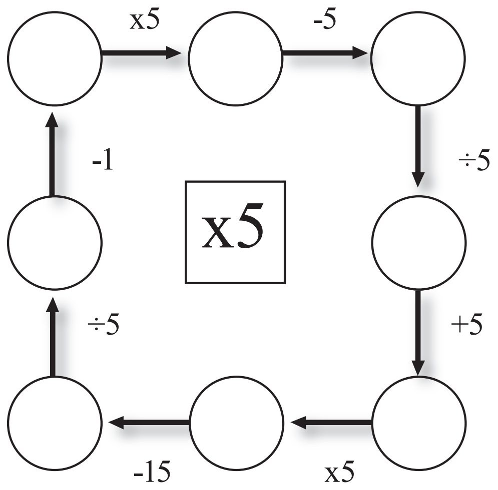






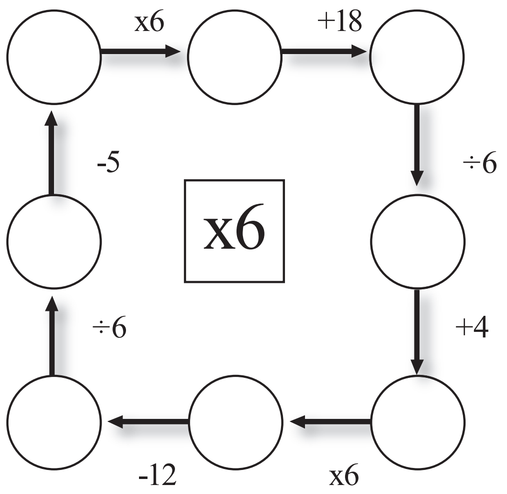


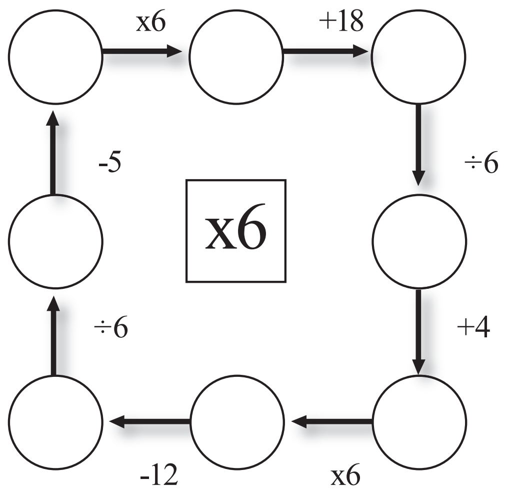


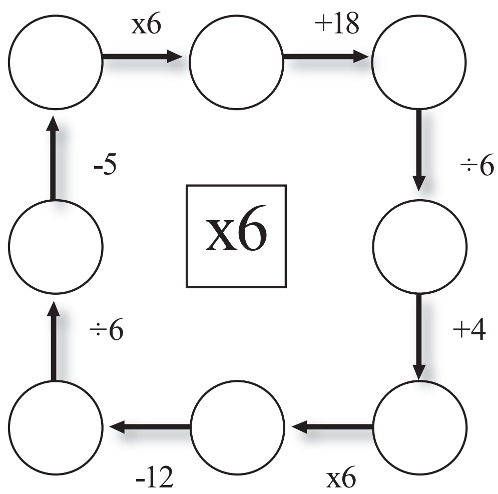


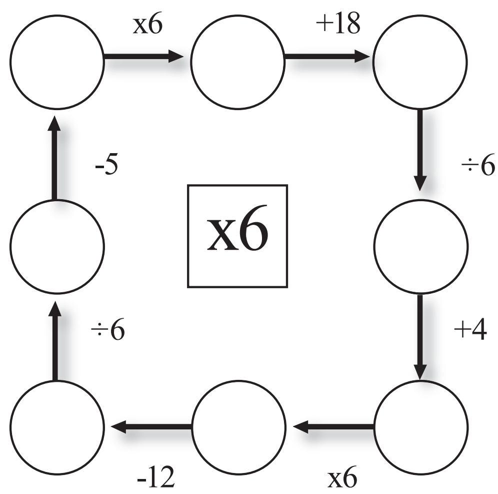
BLM 3.15

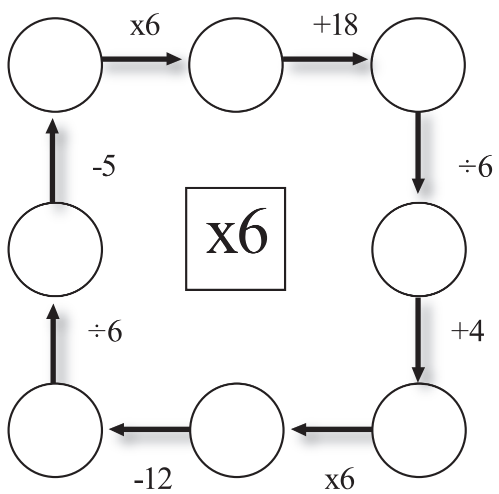
TIMES 6 CIRCUITS

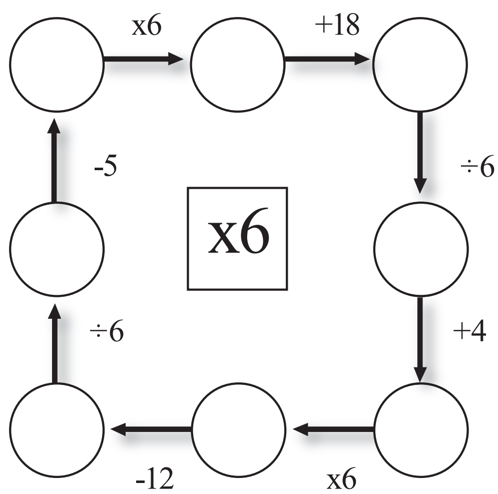






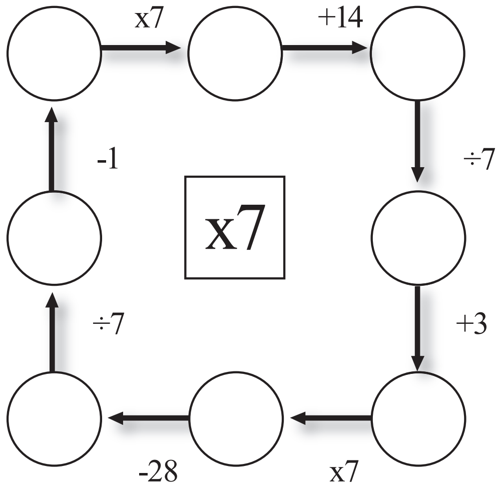


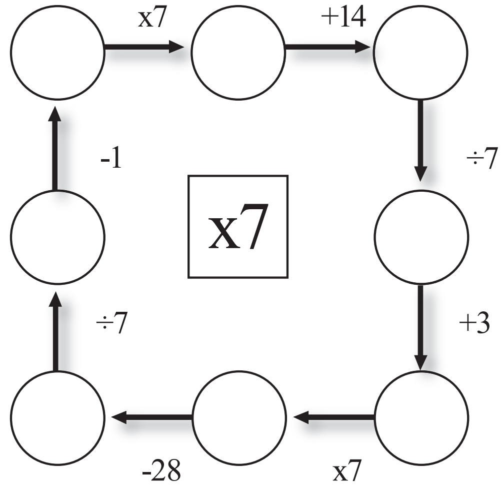


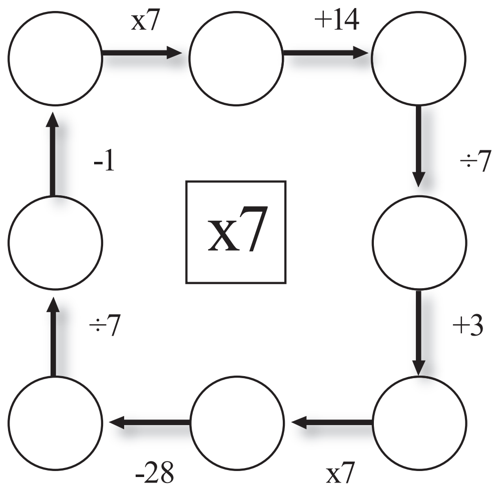


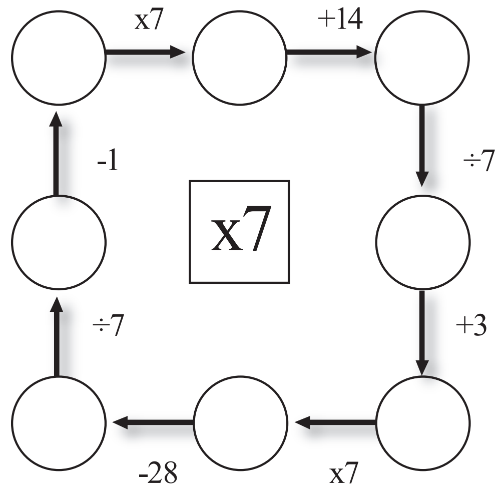
BLM 3.16

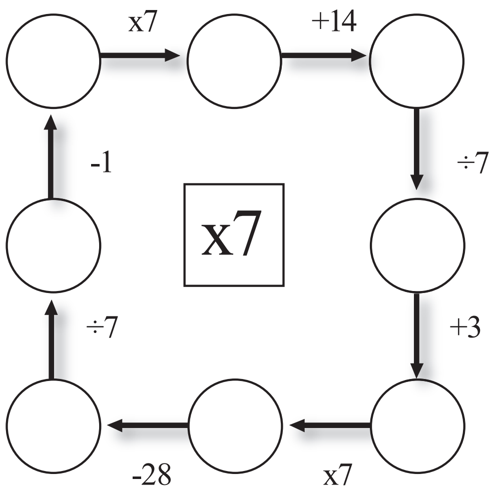
TIMES 7 CIRCUITS

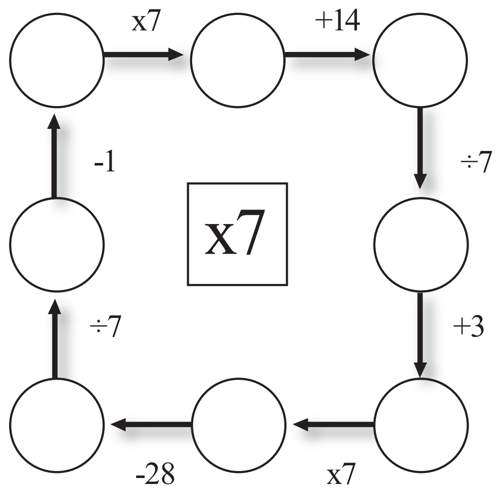






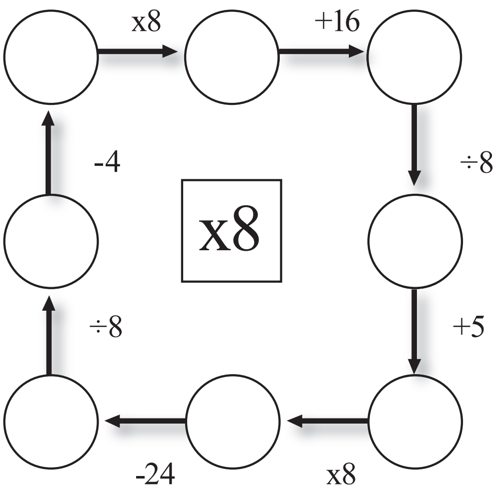


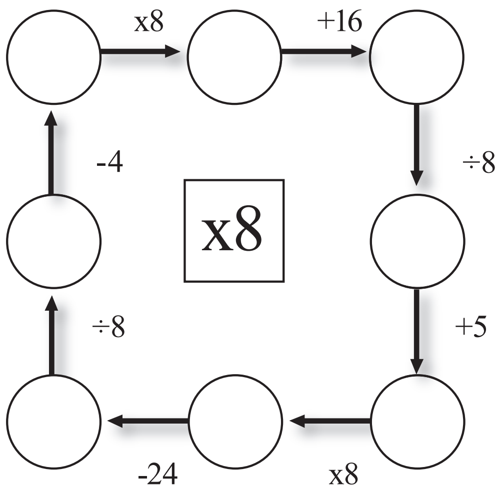


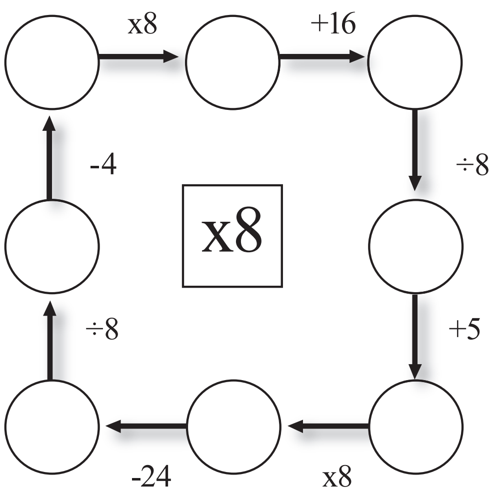


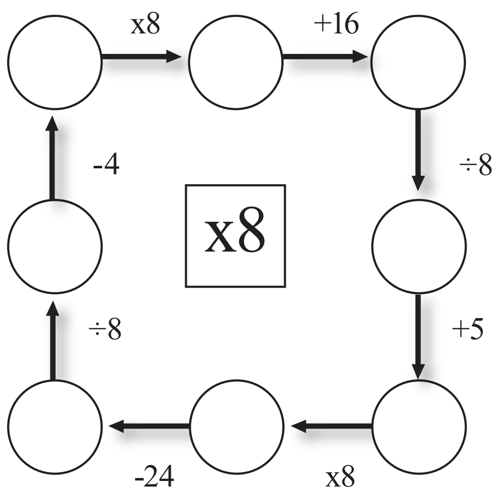
BLM 3.17

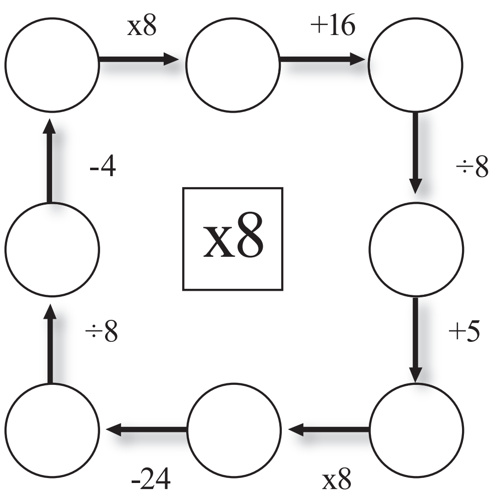
TIMES 8 CIRCUITS

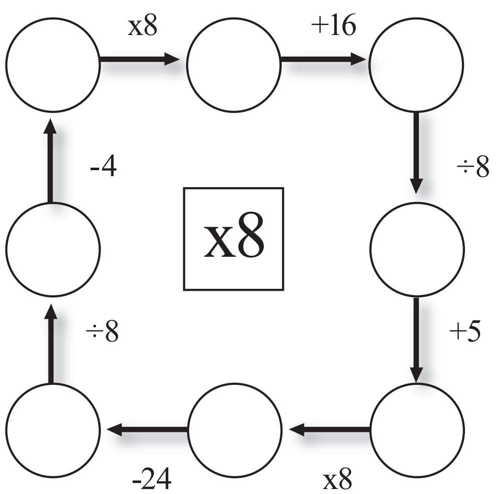






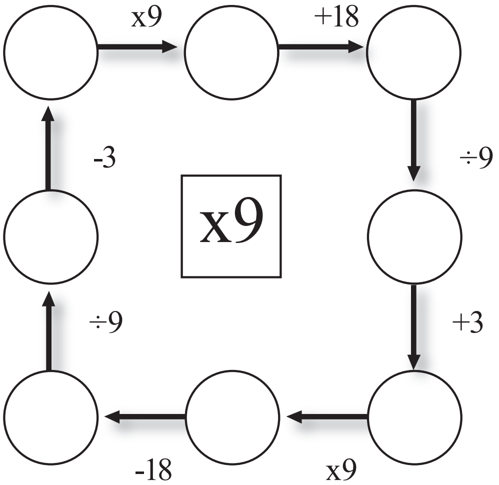


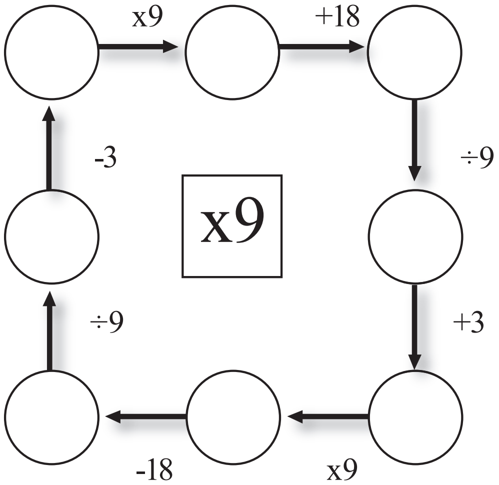


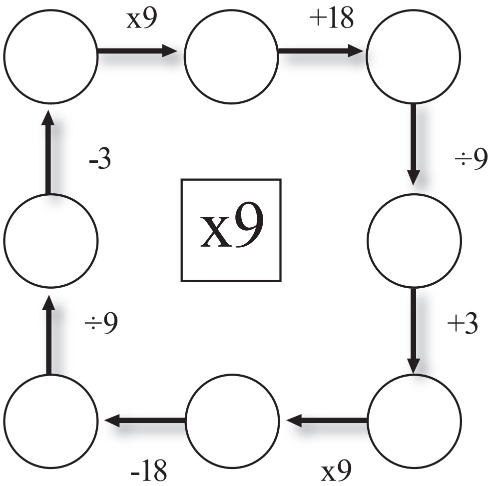


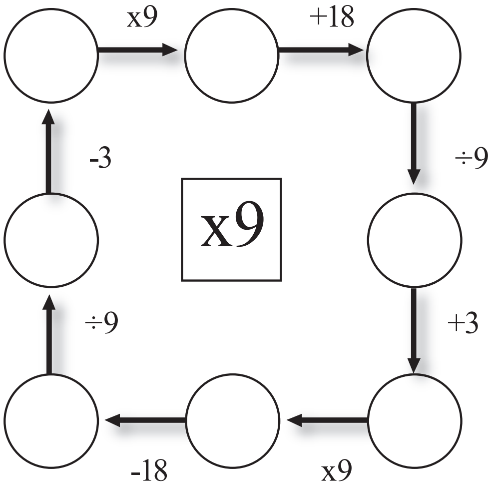
BLM 3.18

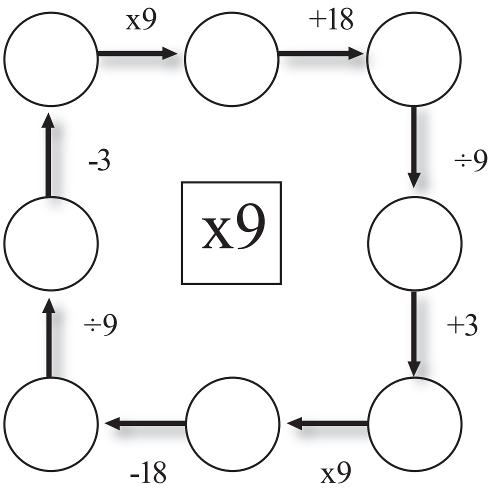
TIMES 9 CIRCUITS

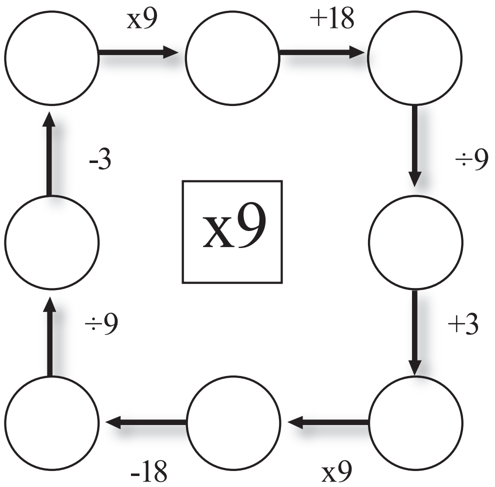












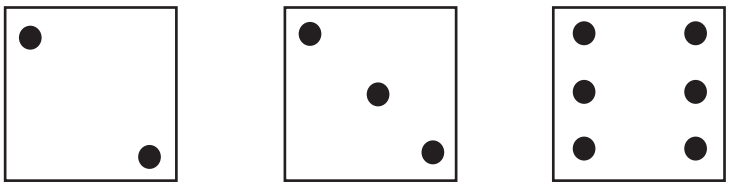
BLM 3.19 LINE OF THREE TABLES GAME

NUMBER OF PLAYERS:
2 OR 3

YOU NEED:
3 dice, 6 counters of a different colour for each player.

AIM:
To get three counters of your colour in a line horizontally, vertically or diagonally on the board.

AIM:
Each player in turn rolls the three dice. They choose to multiply any two of the numbers shown on the dice, and then add the third number. They then place a counter of their colour on the resulting number, if that number is visible on the board.



For example, if the three dice show the numbers 2, 3 and 6, then any of the following numbers can be covered: 12 (2 x 3 + 6), 15 (2 x 6 + 3) and 20 (3 x 6 + 2).

17 or 26	17	11	14
5	18 or 22	8	6
12	16	21 or 20	9
10	13	15	4 or 19

REFERENCES

Anghileri, J. (2000). *Teaching Number Sense*. London: Continuum.