Multiplication Tables: Grids

Overview

Many students feel really bad because they still don't know their tables 'after all these years'. Sometimes only a few shaky facts will lead to students becoming anxious about all tables, and so a small investment of effort will give a large return in confidence.

Certainty with multiplication and addition facts will go a long way towards overcoming maths anxiety.

This activity introduces table 'grids' as a method to assist your students learn and explore helpful patterns in the multiplication tables.

Skills and Knowledge

- Automatic recall of multiplication tables

Preparation and Materials

Copy Activity Sheets 1 & 2 (1 per student)

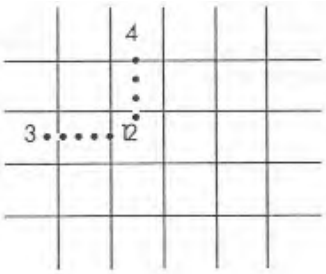
*If students do learn their tables it is important that they work towards recalling **random facts** and do not have to recite the tables in order, e.g. to find 7 x 4 = 28, they do not have to go through 7, 14, 21, 28.*

Suggested Procedure

Filling in the Multiplication Grid

Distribute copies of Activity Sheet 1 – the large Multiplication Grid.

Show the students how to fill in the grid.



11 and 12 times tables are often omitted in these days of the metric system. If your students want to include them you can reduce the grid slightly on the page as you copy it, so students can add the two extra rows and columns.

Explain:

- *First fill in all of the tables you are confident about*
- *This might not leave many spaces left to fill in*
- *For those I want you to work out the answer by adding, or getting help from someone else, or using a calculator*
- *When you have filled all the spaces in compare your grid with someone else to make sure they are the same*

You might like to check that students' final grids are correct so that they can keep them for reference.

Note: If students prefer tables set out 'the old way' in columns. They may still find these on the back of some exercise books. They could also write them out for themselves using the grid as a reference.

Searching the grid for patterns

Patterns in the tables can sometimes help students to remember multiplication facts.

For example:

- 2, 4, 6, 8, 10 tables: all have even numbers
- 5 times table: all end in 5 or 0
- 10 times table: all end in 0

These patterns can be found by looking for commonalities in the columns or rows.

Ask:

- *Can you see anything that the numbers in the 10s column have in common?*
- *What about the numbers in the 5s column?*
- *Can you see anything similar about the numbers in the 2s column?*
- *Do any of the other columns have only even numbers?*

Discuss responses to these questions long enough for all students to see the patterns.

Patterns of added digits

Some tables have interesting patterns that are not so obvious to see at first glance.

- 3 times table: the digits of all the numbers add to give 3, 6, or 9. For example:
  - 3 x 5 = 15 1 + 5 = 6
  - 3 x 6 = 18 1 + 8 = 9
  - 3 x 7 = 21 2 + 1 = 3

  [Following this pattern for all numbers in the 3 times table, from 1 onwards gives an interesting repetition]

- 9 times table: the digits of all the numbers add to give 9. For example:
  - 9 x 2 = 18 1 + 8 = 9
  - 9 x 3 = 27 2 + 7 = 9
  - 9 x 4 = 36 3 + 6 = 9

To help students uncover these facts show them what *adding the digits of the numbers* means.

Start with the 3 times table.

Ask:

- *Write down all of the numbers in the 3 times table column*
- *Now add the digits for all of them*
- *What do you see?*
- *Is there anything in common?*

Explain

- *This can help you when you are not sure of the tables*
- *For example if you guessed that 3 x 9 = 26*
- *You can check if it is right by adding the digits*
- *In this case 2 + 6 = 8*
- *That's not, 3, 6 or 9 so 26 is wrong*

Repeat this procedure for the 9 times table until students can see the pattern of 9 s from the added digits.

Nine times table patterns

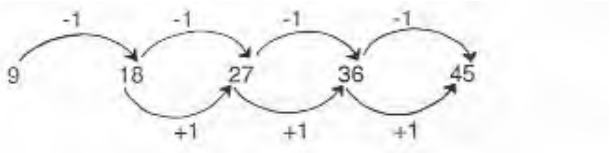
Other interesting patterns that can help students remember the 9 times tables are the following.

- The tens digit is always 1 less that the number you are multiplying by. For example:
  - 2 x 9 = 18 1 (in 18) is 1 less that 2
  - 3 x 9 = 27 2 (in 27) is 1 less that 3
  - 4 x 9 = 36 3 (in 36) is 1 less that 4

- Once you know the first digit, then you can use the fact that both add to 9 to find the second digit. For example:
  - For 3 x 9: first digit is one less than 3 = 2
  - 2 + second digit = 9 second digit = 7
  - answer is 27

Another helpful pattern:

- As the tens digit goes up by 1 the units digit decreases by 1:

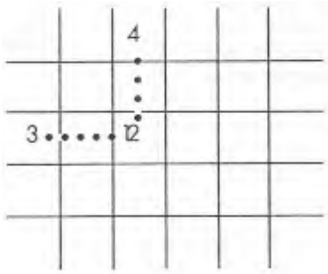


Using the multiplication grid for division

Explain

- *The grid can also be used for division*
- *For example for 12 ÷ 4*
- *Look for the 12 in the main part of the grid along a column (or row) headed by 4.*
- *Find the row (or column) that meets it, in this case 3.*

Demonstrate using a grid or draw the diagram on the board.
These 3 squares show us that: 4 x 3 = 12, or 12 ÷ 4 = 3, also 12 ÷ 3 = 4.



Further practice

Activity sheet 2 – Tangled Tables can be used as a follow up for student practice. The blank grids on the page can be filled in by students individually (with your help) to practise the multiplication facts that they find difficult.

Alternatively, as a whole class practice exercise, you can fill in the as blanks before copying.

Multiplication Grid

Activity Sheet 1

X	0	1	2	3	4	5	6	7	8	9	10
0											
1											
2											
3											
4											
5											
6											
7											
8											
9											
10											

Tangled Tables

Activity Sheet 2

1. Fill in each grid.

x	7	3	5
8			
6			
2			

x	4	5	10
5			
4			
2			

x	6	1	3
3			
7			
4			

x	8	4	0
9			
2			
3			

2. First choose the numbers for the sides of the grid and then fill it in.

x			

x			

x			

x			