

Multiples grid

Ready-made spreadsheets to explore mathematical ideas

Prerequisite knowledge

- Multiplication facts

Why do this unit?

This unit reinforces the concepts of multiples and common multiples and leads to an exploration of the underpinning structure.

Time

One lesson

Resources

Squared paper

CD-ROM: spreadsheet, resource sheets 1–6

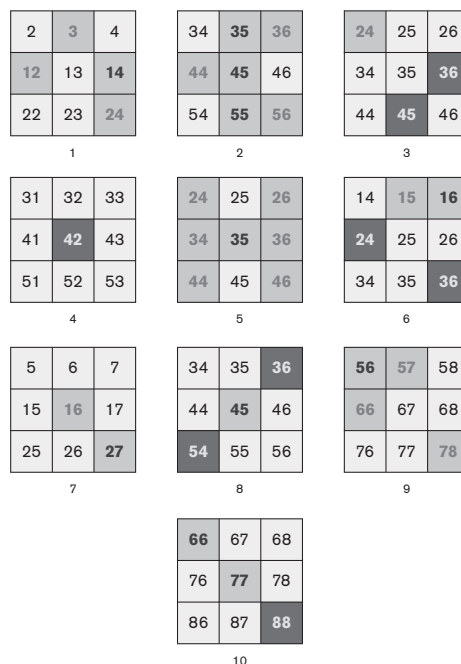
NRICH website (optional):

www.nrich.maths.org, March 2007, 'Multiples grid'

Multiples grid

Resource sheet 1

Window on the grid



- What do you see? [For example, part of the pattern goes blue–pink–blue vertically, or the maroon steps down evenly, or ...]
- What could the setting numbers have been? [pink 6, blue 4]

This pattern with coloured blocks can be made using a basic unit as a stamp, and stamping repeats of that unit, side by side, until the whole grid space is covered.

- What would the stamp unit look like? [any rectangle of width two and height six]

Discuss the structure of ‘Pattern 2’ (resource sheets 4 and 5) similarly. [The settings are pink 2, blue 5, with a single whole row as the repeating unit.]

Invite pupils, working in pairs, to find the basic stamp unit for other settings and explain any relationships they notice between the basic stamp and the setting numbers used.

Ask each pair of pupils to choose one grid pattern to print, superimposing their stamp unit and adding their conjectures and reasoning. Use these printouts to make a group display.

Plenary

Invite pupils to look at the patterns on display and to talk about any common features they have noticed.

Solution notes

Window on the grid

The table below shows the pink and blue settings which produce each window on resource sheet 1.

Window	Pink	Blue
1	3	7 or 14
2	4	5
3	3	9
4	6 7, 14, 21 or 42	7, 14, 21 or 42 6
5	2	7
6	3	4
7	4, 8 or 16	9 or 27
8	6	3 or 9
9	3	8
10	8	11

Printing wallpaper

If one of the setting choices is 2, for all choices of the other setting (n , $n < 10$), the stamps are all 2 wide and n deep giving an area of $2n$ square units with the exception of 5×5 . The rule breaks down here because multiples of 5 are vertical and therefore do not cut across the vertical lines of the multiples of 2.

By considering the slope of the diagonals of multiples of other n it is also possible to justify the ‘heights’ of the stamps.

For $3 \times n$ ($n < 7$) and $4 \times n$ ($n < 7$), similar justifications for the arrangement of stamps can be made.

If the two numbers have common factors this affects the ability to make a rectangular stamp. So 3×9 and 4×8 work.

It is possible to look at other grid widths to examine what stamps are made.