

AFRICAN INSTITUTE FOR MATHEMATICAL SCIENCES SCHOOLS ENRICHMENT CENTRE TEACHER NETWORK

STRIP PATTERNS



Xoli decorated a strip of 20 squares. She painted a red dot on the corner on every second square Then she put a blue cross on every third square. Then she put a green triangle on every fourth square.

And she put a black square on every fifth square

So there was nothing on the first square.

Can you make a pattern like this?

How many other squares had no decoration? Which squares were they?

Did any squares get three decorations? Which ones? Why?

Did any squares get all four decorations? Which ones? Why?

SOLUTION

How many other squares had no decoration? Which squares were they?

The 1st, 7th, 11th, 13th, 17th and 19th squares had no decoration.

Decorations are put on squares corresponding to multiples of 2 (red), 3 (blue), 4 (green) or 5 (black). The numbers 1, 7, 11, 13, 17 and 19 are not multiples of 2, 3, 4 or 5.

Did any squares get three decorations? Which ones? Why?

The 12th square will get 3 decorations, for 2, 3 and 4, because these numbers are all factors of 12, that is 12 is a common multiple of 2, 3 and 4.

Did any squares get all four decorations? Which ones? Why?

No squares got all four decorations if the strip pattern stops at 20. To get all four decorations the square must correspond to a (common) multiple of 2, 3, 4 and 5 so 60 is the first such square.

NOTES FOR TEACHERS

Diagnostic Assessment This should take about 5–10 minutes.

- 1. Write the question on the board, say to the class: "Put up 1 finger if you think the answer is A, 2 fingers for B, 3 fingers for C and 4 fingers for D".
- 2. Notice how the learners responded. Ask a learner who gave answer A to explain why he or she gave that answer and DO NOT say whether it is right or wrong but simply thank the learner for giving the answer.
- 3. Then do the same for answers B, C and D. Try to make sure that learners listen to these reasons and try to decide if their own answer was right or wrong.
- 4. Ask the class again to vote for the right answer by putting up 1, 2, 3 or 4 fingers. Notice if there is a change and who gave right and wrong answers. It is important for learners to explain the reason for their answer otherwise many learners will just make a guess.
- 5. If the concept is needed for the lesson to follow, explain the right answer or give a remedial task. Which pattern is not a repeating pattern?



D. is the correct answer. **Common Misconceptions**

A. B. and **C**. It seems these learners did not understand the question, perhaps not understanding the words 'repeating' and 'pattern' or possibly the learners just made a guess.

White Rose Maths Diagnostic Question https://diagnosticquestions.com

Why do this activity?

This activity offers a pattern making approach to number work, and to understanding the concepts of multiples and common multiples. It can be used to reinforce and to practice the learning of multiplication tables. The activity naturally leads into further work on multiples, factors and prime numbers. It could be used as preparation for a lesson on prime numbers using the Patterns of Multiples activity https://aiminghigh.aims.ac.za/grades-6-to-9-patterns-of-multiples-seive/ (Seive of Eratosthenes).

Intended learning outcomes

This study of numeric and geometric patterns develops the concept of multiples and common multiples and can be used to introduce these terms and to help language development. The focus is on the number giving the place in the sequence and multiples of 2, 3, 4 and 5. By making the pattern themselves learners are encouraged to link the geometric pattern with the number of the term (its place in the sequence) and with times tables (multiples of 2, 3, 4, and 5).

Possible approach

Either before or following on from this activity you might like to combine it with the class chanting multiples of 2 up to 20 then multiples of 3 then multiples of 4 then 5. They could do this by counting from 1 to 20 but whispering the numbers that don't belong in the multiplication tables and saying the multiples more loudly and they might clap on the multiples. This can be done in unison with the class split into four groups, one group doing the multiples of 2, another group the multiples of 3 another the multiples of 4 and another the multiples of 5. Each group can clap on their multiples.

When the class discuss the answers to the strip pattern questions these answers can be linked to the chanting and clapping exercise when the four groups in the class act out the same number patterns to the patterns given by the red, blue, green and black shapes.

You may ask a pair of learners to come to the board and explain their method to the class. Having a pair of learners to do this means that while one is writing on the board the other can do the explaining.

Key questions

Where are you putting the red dots? Do you have a name for those numbers? Where are you putting the blue crosses? Do you have a name for those numbers? Where are you putting the green triangles? Do you have a name for those numbers? Where are you putting the black squares? Do you have a name for those numbers? Do those numbers come into the multiplication tables that you know?

Possible Support

Draw the attention of the learners to the chanting of the multiples of 2,3,4 and 5 (the multiplication tables) and ask them to make the connection to the strip decorating activity.

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

Possible extension

Provide the learners with 6 copies of the 100 square (see below) and ask them to shade multiples of 2 on one grid, multiples of 3 on a second grid, and multiples of 4, 5, 6 and 7 on the other grids and then to describe the patterns that they see. This leads to the **Patterns of Multiples** activity https://aiminghigh.aims.ac.za/grades-6-to-9-patterns-of-multiples-seive/

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