Hundred Board Wonders

Grades 3–4

Goals

Given a rule, students will explore number patterns using a hundred board.

Prior Knowledge

In the third grade, children should be familiar with basic number combinations and should have had some experience in finding and describing patterns.

Materials and Equipment

This activity requires each student to have a copy of either of the hundred boards (1–100, 0–99) for each of the patterns that will be explored. Blackline masters for the boards can be found in the appendix. Copies are also included on the CD-ROM. Colored pencils or crayons can be used to create the visual patterns on the board. You will need a poster (or a list written on the chalkboard or an overhead slide) with the number rules the students are to follow.

Classroom Environment

You may wish to organize your students in pairs or small groups to carry out the activity.

Activity

Engage

Tell the students that they are going to create colorful designs following rules for selecting numbers from the hundred boards. Discuss the multiples of 2, 3, 4, …, or talk about numbers divisible by 2, 3, 4, …. Either assign or ask the students to select two or three of the rules below. After they have selected a rule, the students should color each square with the numbers that follow the rule. They should use different colors for each rule. If counters are available, have the children use them to mark the pattern before coloring the patterns.

Rules for Hundred-Board Wonders

1. Numbers with a 2 in them
2. Numbers whose digits have a difference of 1 (Be sure the students always select numbers whose tens-place digit is 1 greater than the ones-place digit.)
3. Numbers with a 4 in them
4. Numbers that are multiples of 3
5. Numbers with a 7 in them
6. Numbers that are multiples of 5
7. Numbers with a 0 in them

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You may want to assign rules 4 and 6 or rules 1, 3, and 5 so students can see the outcome patterns.

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

A hundred board colored according to rule 4

8. Numbers that are divisible by 6
9. Numbers with a 5 in the tens place
10. Numbers that are multiples of 4
11. Numbers having both digits the same
12. Numbers that are divisible by 8
13. Numbers whose digits add to 9 (For example, in 63, the digits 6 and 3 add to 9, and in 27, the digits 2 and 7 add to 9.)
14. Numbers that are multiples of both 2 and 3

Explore

Allow time for the groups to investigate their completed patterns. Encourage the children to look for distinct as well as similar patterns. Ask the groups to describe their findings. Encourage the students to reflect on what they have observed, clarify their thinking, and share their thoughts.

When the groups have completed the task, ask the students to report to the whole class on what they have discovered. Use the following questions to facilitate the discussions:

Do any boards have the same pattern?

How are the boards alike, and how are they different?

Do you see a difference between the boards with multiples of even numbers and those with multiples of odd numbers?

(*Refer to a board with multiples of 3 and 5.*) What can you say about numbers that are multiples of both 3 and 5? What is the difference between the patterns?

How does the pattern of multiples of 4 compare with that of numbers divisible by 8?

After the 0, the diagonal from 0 to 99 shows doubles—11, 22, 33, ..., 99. The diagonal from 9 to 90 shows multiples of 9.

Extend

Ask the students to make predictions about other patterns:

(*Refer to the 0–99 board.*) What do you think the pattern would be for numbers with a 3, 8, or 9 in them? Why do you think so? What would it be for numbers that are multiples of 2 or 7? Why do you think so?

(*Refer to the 0–99 board.*) If you were to color the squares along a diagonal, what rule would describe the pattern from 0 to 99? From 9 to 90?

(*Refer to the 0–99 board.*) If the column starting with 5 and the row starting with 50 were colored, what rule would describe the pattern?

Some of the patterns identified by students include "All the numbers contain a 5"; "The sum of the digits in corresponding elements of the column and the row is the same; for example, the digits of 54 and 45 add to 9"; and "The numbers in corresponding positions in the column and the row show the digits reversed."

You may ask the students to create their own patterns with a rule and have their classmates discover the rule.

Assessment Ideas

Assess the students' descriptions of the patterns they see on the hundred boards on the basis of clarity and how well the representation is described. In the extension phase of the activity, pay close attention to the reasons students give to support what they think the rule or pattern might be.