

Australian Curriculum YR 4

ACMN081 Explore and describe number patterns resulting from performing multiplication

Key Idea-

- using known multiplication facts to calculate related division facts
- Identifying examples of number patterns in everyday life

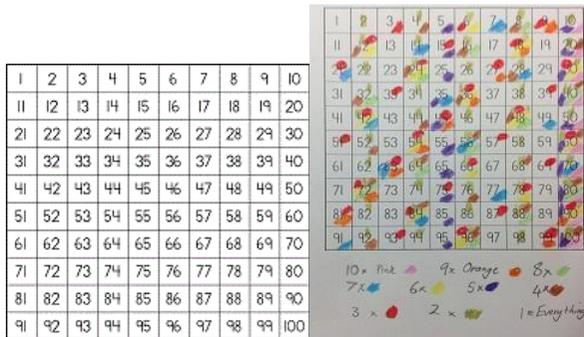
Resources

- FISH problem solving kit

Introductory Activity Process

Recall multiplication facts up to 10×10 and related division facts (ACMNA075)

Review the idea of multiplication being repeated addition. Then give students a hundreds board and have them colour in multiples of 10 - 2. If you start with larger multiples and suggest that the students only shade part of a box it allows students to see that some numbers have lots of multiples while others have none. Have students use a different colour for each multiple.



Activity Process-View together

Students use a coloured hundred board with multiples. Students then complete a blank 1- 10 multiplication and division table sheet.

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

÷	0	1	2	3	4	5	6	7	8	9	10	11	12
0													
1													
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12													

Review with students that multiplication is repeated addition. Division is sharing or repeated subtraction.

Students discuss how this statement is true. Division and Multiplication can be turnarounds.

$$\text{If } 3 \times 7 = 21 \text{ then } 21 \div 7 = 3 \text{ or } 21 \div 3 = 7.$$

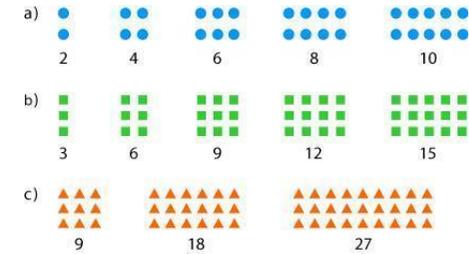
Developing learners can have access to blocks to physically view the sharing or division process.

Give students verbal multiplication and division questions and using their tables students record answers in their learning journals.

Activity Process-Students Explain

Have students look at the recording sheets and explain some of the patterns that they seen and identified.

Division or sharing a number can also be optionally explored?



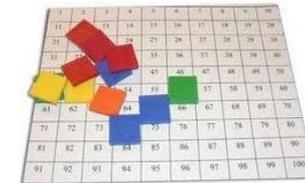
Students can have concrete examples of shapes or blocks and have to group them in different ways.

What are some patterns you see? How can you group the numbers? How can we multiply and divide them.



Ask students to use their math's learning journal to explain their thinking.

Review for Differentiation.



Teachers need to model this process in a small group setting for identified students.

For students that are still having difficulties recognising that different numbers can have the same multiple use coloured flat shapes on a larger hundred board.

Use a matchstick or thin long shape to represent multiples of 2 and have students count on adding in 2's. Put down a match-stick on every multiple of 2.

With triangles, count in 3's and put a triangle on every multiple of 3. Squares for 4's. Pentagons for 5 etc.

If you don't have shapes use different coloured counters. Teachers can pose the question to abler students.

Can also count backwards from a marker to see the division turnaround. Teacher places a marker on 42 and asks them to demonstrate How many 6's make up 42 etc.

Activity Process-Table Time

Working in collaborative groups divide up the times tables to be covered across the groups.

1. Have students use two facing pages in their learning journals and write down Multiplication on one side and the respective division on the other.

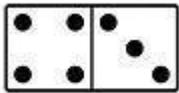
2. After the groups have filled out each table they can high light and annotate beside the table to show what patterns they can see. Give students a few minutes to try and see the patterns themselves and then have the groups volunteers to share their insights.

3. "All multiples of 2 always end in a even number ." "In the 9's the one digit gets smaller by one each time and the tens get bigger by one."

Discuss with learners the ideas and relationships they have identified when comparing and contrasting the multiplication and the division at the same time.

$3 \times 4 = 12$ so if we look directly across at the division side $12 \div 4 = 3$. a turnaround

Activity Process- Domino, Dice, Card, Multiplication and Division.



Using cards, dice or Dominoes students randomly select and then use them in a multiplication or division problem.

For Dominoes learners can select one die and use it as a multiplication. 4 times 3 equals 12. They can work in small groups and race each other to get the answer or take in turns. Another alternative is to use the 2 numbers together and try and identify a multiple or division. 43 does not divide evenly by 2.

2. Use a turnaround and 34 can

For cards same as above but use 2 cards.

possible ways of multiplying to get that number and also its division turnarounds.

12. $2 \times 6 = 12$, $6 \times 2 = 12$, $3 \times 4 = 12$, $4 \times 3 = 12$, $12/3 = 4$, $12/4 = 3$, $12/2 = 6$, $12/6 = 2$

For dice roll twice to get your random numbers.

A number 4 ways

After students have engaged in previous activities they should be noticing that numbers can be said to have 4 like facts.

$3 \times 4 = 12$, $4 \times 3 = 12$, $12/3 = 4$, $12/4 = 3$

a multiplication can be turned around and then the same total can be divided in the same way.

Give students 1 of the like facts and then they have to fill in the missing 3.

Then change your questions so that students now have to write the missing number. $3 \times ? = 12$ $35 / ? = 7$

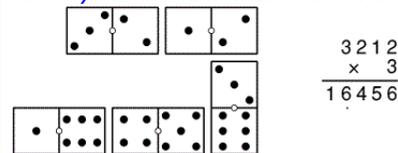
Discuss with students that we can do the opposite operation. $12/3 = ?$ $35/7 = ?$

be 2×17 or $34 \div 2 = 17$. Or consider that it is a Prime Number, the only way we can get the answer is to multiply the number by 1. $34 \times 1 = 34$. Using dice with various faces can make the experience more engaging. Consider the use of Prime Numbers

"No there isn't so we call these numbers prime numbers because in the same way if we look at 30 there are lots of ways to get to it. 3×10 , 2×15 , 5×6 , and all the turnarounds 10×3 , 15×2 , 6×5 . If a number has more ways of getting its total then by multiplying by 1. 30×1 . We call these numbers composite numbers"

Students can keep using their sheets. Write on board of say various numbers between 1 and 100 and students have to write if they are prime or composite. If composite students have to write down all the ways of getting that number. You may have to discuss why to leave 1,3,5 and 7 as primes.

Activity Process-Extensions and Variations



Expansion of multiplication cards and dominoes. Using multiple cards or dominoes (students can use calculator) to try and move around and manipulate them to get an answer like above but simplified. In cards pull out 8 cards and try and make a multiplication sum, 2,5,3,8,A,9,4,5. Could be $9 \times 5 = 45$, $8 \times 3 = 24$.

Students look for patterns in nature:

Students can look around the school to see if there are any number patterns. Flowers all being 5 or 7 petals. Work out how many petals on the plant by counting the flowers and multiplying by 5 or 7 Number of fronds on a palm leaf. Lovers in the classroom. Students write these problems down in books and discuss accuracy in student journals.

Activity Process-Prime and Composite

Have students refer back to their 100's board from the 1st activity. Discuss with students that sometimes we have some numbers that don't have a way of getting their total by multiplying, like all the white numbers. "Take 31 for example is there any way of multiplying by 2 whole numbers to get to 31?" If a student suggests 15.5×2 congratulate them on using their multiplication but we are

Activity Process-Image Patterning

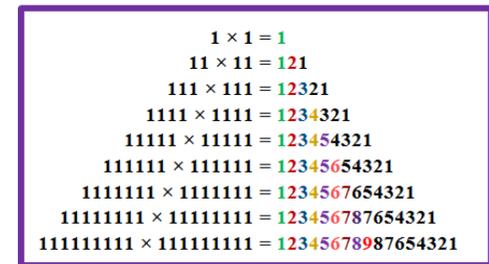
Students can search the internet for creative commons images displaying multiplication patterns. E.g. Ants walking in line. Soldiers on parade. Students create a multiplication and division problem based on their picture.

There are 20 rows of soldiers each row has 40 soldiers. How many soldiers are there? There are 210 soldiers in total in 7 lines, how many soldiers are there in each line?



Digital Learning

Using a calculator students experiment with larger numbers and multiplication. Students write down numbers to see if they see any patterns that they can describe.



Choose a number on the hundred board and write down all the

Investigation: Number Patterns

Working with a partner choose 4 numbers to do this to. A maximum of 2 numbers can be prime. 13. $13 \times 1 = 13$ $13 \div 1 = 13$

Working independently and using a personally selected number write a word problem for each. E.g. I have 12 cans of coke to share between my two brothers and myself. How many will we each get?

Assessment

Is based on learning journal work and evaluation of the investigation.

Was the student able to identify all the combinations for the chosen numbers.

Was the student able to provide sensible word problems.

Background

By the end of Year 4, students choose appropriate strategies for calculations involving multiplication and division. They recognise common equivalent fractions in familiar contexts and make connections between fraction and decimal notations up to two decimal places. Students solve simple purchasing problems. They identify unknown quantities in number sentences. They describe number patterns resulting from multiplication. Students compare areas of regular and irregular shapes using informal units. They solve problems involving time duration. They interpret information contained in maps. Students identify dependent and independent events. They describe different methods for data collection and representation, and evaluate their effectiveness.

Students use the properties of odd and even numbers. They recall multiplication facts to 10×10 and related division facts. Students locate familiar fractions on a number line. They continue number sequences involving multiples of single digit numbers. Students use scaled instruments to measure temperatures, lengths, shapes and objects. They convert between units of time. Students create symmetrical shapes and patterns. They classify angles in relation to a right angle. Students list the probabilities of everyday events. They construct data displays from given or collected data

Word Wall:

Multiplication, multiply by, addition, repeated addition, repetition, division, divisible by, sharing, equals, total, lots of,