Chapter 9

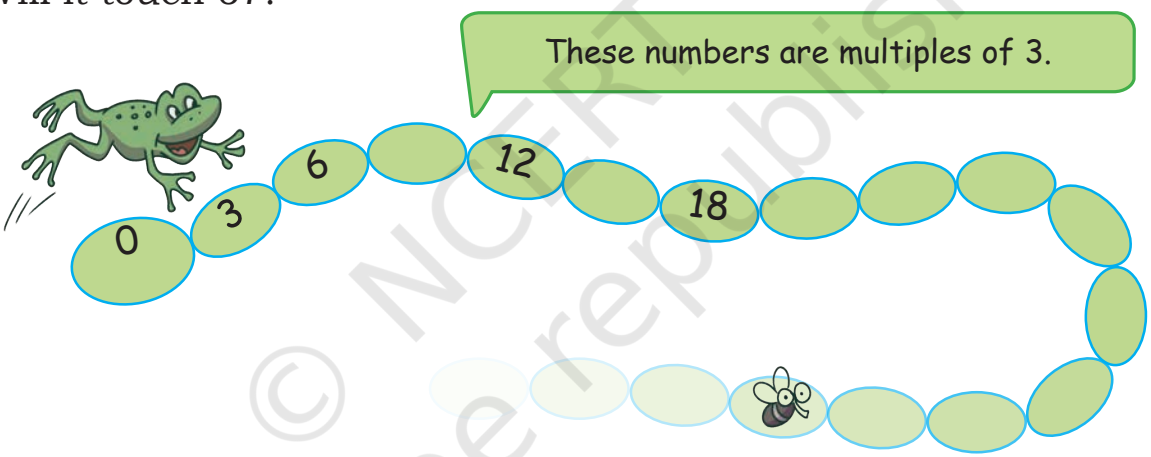
Equal Groups

0433CH09

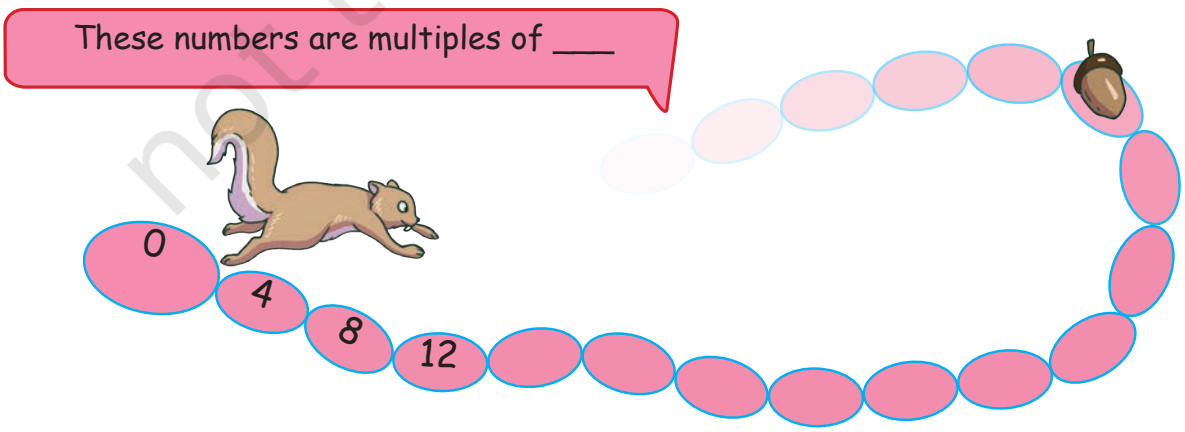
Animal Jumps

Fill in the blank spaces with the appropriate numbers. Find how many jumps the animal needs to take to reach its food.

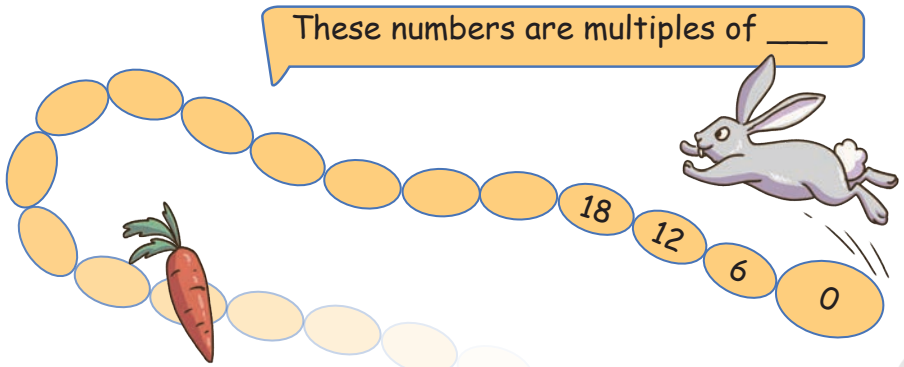
1. The frog jumps 3 steps at time. Which numbers will the frog touch? Will it touch 67?



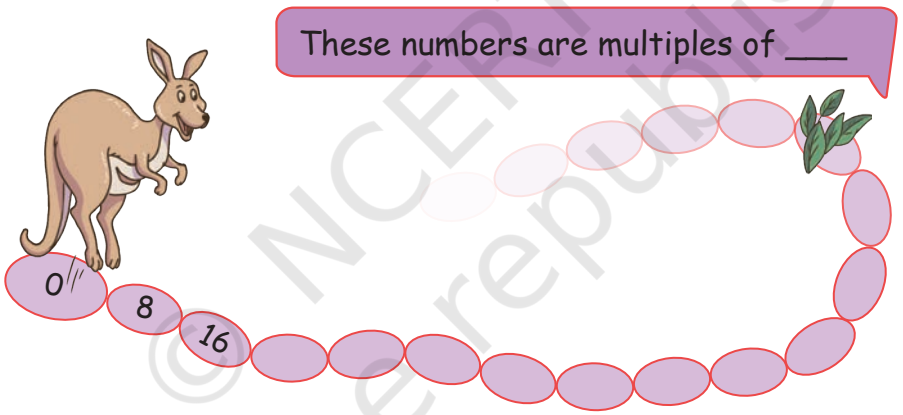
2. The squirrel jumps 4 steps at a time. Which numbers will the squirrel touch? How many times should the squirrel jump to reach 60?



3. The rabbit jumps 6 steps at a time.
Which numbers will the rabbit touch?
What is the smallest 3-digit number on which the rabbit will land?
How many times did the rabbit jump to reach this number?



4. The kangaroo jumps 8 steps at a time. Which numbers will the kangaroo touch?



Are there numbers that both the rabbit and the kangaroo will touch?

5. To reach 48, how many times did the rabbit jump? _____

How many times did the Kangaroo jump to reach the same number?

_____

What did you observe? Share your thoughts.

6. To reach 60, how many times did the frog jump? _____
How many times did the rabbit jump to reach the same number?
_____
What do you observe? Share your thoughts.

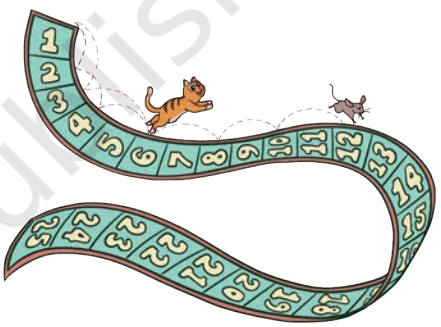
Common Multiples

1. Which numbers do both the frog and the squirrel touch? A few common multiples of 3 and 4 are _____.

2. Which numbers do both the rabbit and the kangaroo touch? A few common multiples of 6 and 8 are _____.

7. If the cat and the rat land on the same number, the cat will catch the rat.

The cat is now on 6 and the rat on 12. When the cat jumps 3 steps forward, the rat jumps 2 steps forward. Will the cat catch the rat? If yes, at which number?



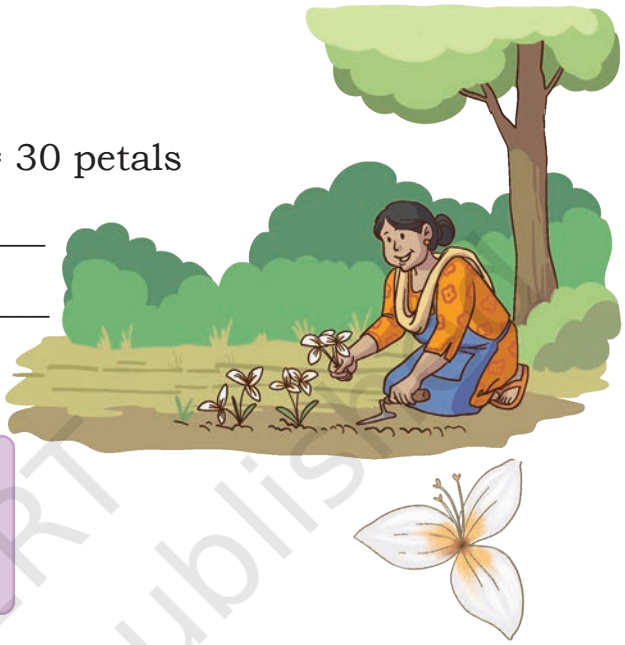
8. Find multiplication and division sentences below. Shade the sentences. How many can you find?

Two examples are done for you.

3	4	2	7	4	9	8	2
4	2	10	20	5	2	2	4
12	8	0	6	4	8	8	1
3	2	6	2	2	6	16	2
2	3	6	18	6	5	3	1
10	3	4	1	12	2	7	14
2	0	2	2	6	10	7	2
20	5	8	2	2	5	10	2

Gulabo's Garden

1. Gulabo's garden has lily flowers. Each lily flower has 3 petals. How many petals are there in 12 flowers? Show how you found your answer.



Gulabo will have 12 × 3 petals.

Petals in 10 lilies 10 × 3 petals = 30 petals

Petals in 2 lilies _____

Petals in 12 lilies _____

No. of groups (Multiplier)

12 × 3 = 36 *(Product)*

Group size (Multiplicand)

Multiplication statement

2. In a hibiscus flower there are 5 petals. Gulabo counted all the petals and found them to be 80. How many flowers did she have?

Gulabo has 80 ÷ 5 flowers.

5 petals is 1 flower.

10 petals are 2 flowers.

50 petals are 10 flowers.

Then, 80 petals are _____ flowers.

Note for Teachers: In this chapter, the focus is on multiplying 1-, 2-, and 3-digit numbers by 1-digit numbers, with group sizes less than 10. Children should be encouraged to break down the 'multiplier (no. of groups)' into multiples of 10 to simplify calculations. They can also use strategies like doubling and halving.

3. Gulabo plants some marigold saplings in a box as shown in the picture.

There are _____ saplings in each row.

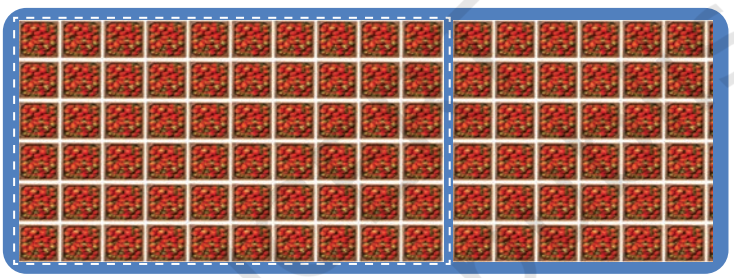
There are _____ rows.

How many saplings has she planted?

How did you calculate it?

Mathematical Statement _____

4. "Dailyfresh" supermarket has kept boxes of strawberries in a big tray.
How many boxes of strawberries does the supermarket have?
Show how you found them.



There are _____ columns of strawberry boxes.

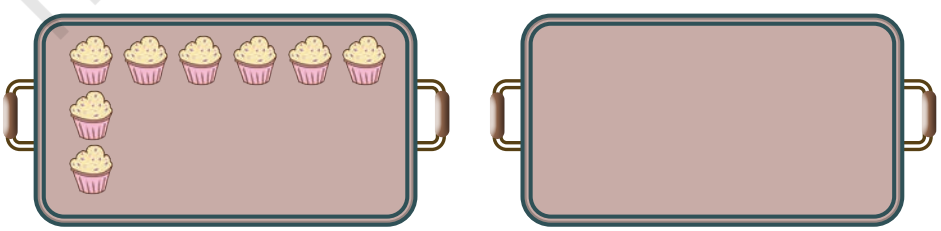
There are _____ boxes in each column.

There are _____ boxes in all.

Mathematical Statement _____

5. Radha runs a bakery shop. She bakes 18 cupcakes in one tray of the size shown below.

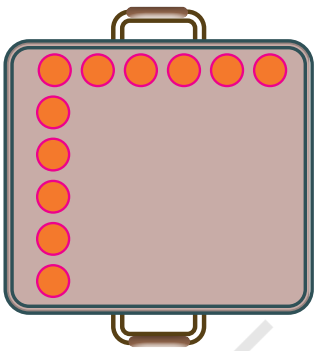
a) Complete arranging the cupcakes in the two trays given below.



b) She can use two such trays in her oven at a time. How many cupcakes can she make in one attempt? _____

c) Today she has received a special order. She has made 108 cupcakes. How many trays has she baked?

d) She has another square baking tray. She can bake 36 mini cupcakes in such a tray. Complete the arrangement below.



Number of columns: _____

Number of cupcakes in each column: _____

Multiplication statement _____

Find different ways of arranging the following numbers of cupcakes in rows and columns in your notebook.
36, 8, 12, and 24

The Doubling Magic

Magician Anvi came one day,

To Gulabo's house, ready to play.

From her coat, with a grand display,

Note for Teachers: Encourage learners to identify different ways of finding the answers. Children can skip count, count in rows and columns and think in terms of equal groups. The idea is to make children notice arrays as a way of representing multiplication.

She pulled out 23 flowers, bright and gay!

She smiled and said, "Now watch and see,
How many flowers will there be?"

How many flowers are there now? _____

What magic did Anvi do?

Flowers before magic	23	10	51	95	150	199	425	500			
Flowers after magic	46								222	410	500

a) Double of 32 =_____ b) Double of 14 =_____ c) Double of 26 =_____

d) Double of 17 =_____ e) Double of 39 =_____ f) Double of 45 =_____

1. Guess what will be the ones digit of the following numbers when doubled.
Write the ones digit in the space provided.

   a) 28 _____ b) 56 _____ c) 45 _____ d) 17 _____

2. Give examples of numbers that when doubled give the following digits in the ones place.

   a) 0 _____ b) 2 _____ c) 4 _____

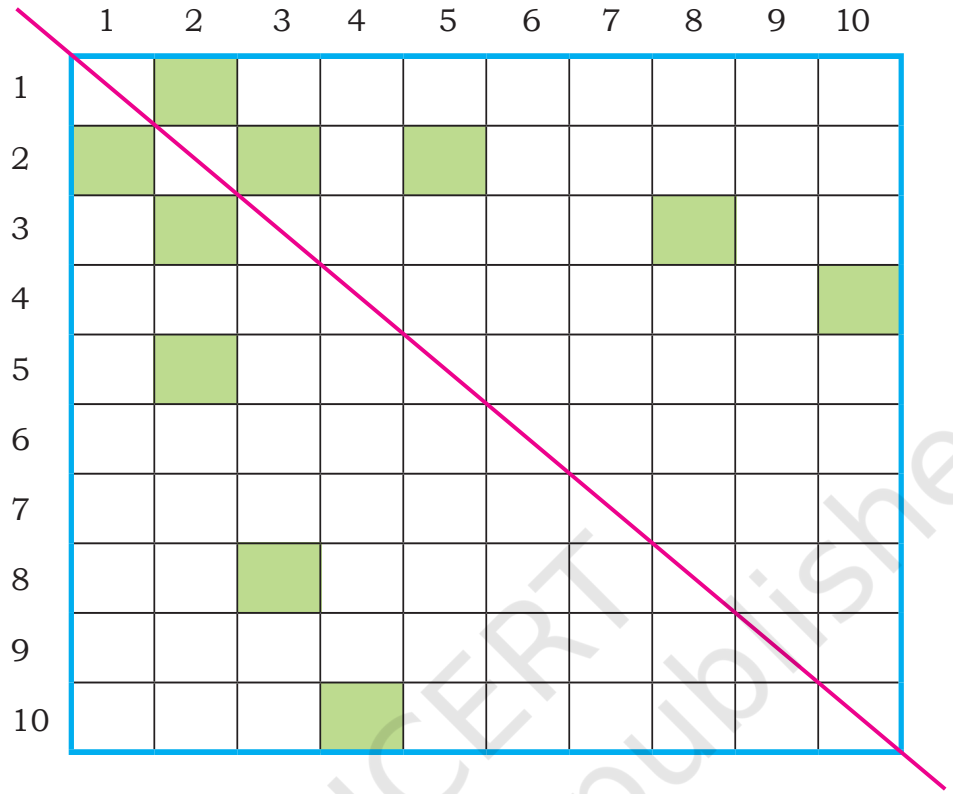
   d) 6 _____ e) 8 _____

Can we get 3, 5, 7, 9 as the ones digit after doubling?

What do we notice about the numbers that we get after doubling? Even or Odd?

Note for Teachers: Encourage children to use Diene's blocks or a ganit mala to double or half, especially for big numbers. Doubling and halving are useful strategies to include when teaching multiplication and division. Teacher can systematically change the numbers to include different digits in the ones place.

Fill each square in the chart by multiplying the row number by the column number.



What do you notice about the numbers shaded in green? Why is this happening?

1. Share the patterns that you notice in the table.
2. Are the numbers in row 7 the same as the numbers in column 7? In general, are the numbers in a given row the same as the numbers in the corresponding column? Why does this happen?
3. Is there a row where all answers (products) are even numbers? Which rows have this property?
4. Is there a row having only odd numbers as products?
5. Are there rows that have both even and odd numbers? What do you notice? Why is it so?
6. Are there more even numbers in the chart or odd numbers? How do you know?

7. Colour the common multiples of the following numbers. Use different colours for each item.

a) 2 and 3 b) 4 and 8 c) 7 and 9

Share your observations regarding the numbers that are common multiples in each case.

8. Observe the pattern in the ones digits of the products in row 5?

Observe the ones digit of the products in other rows also. What patterns do you notice?

9. Here is row 8 of the chart: 8, 16, 24, 32, 40, 48, 56, 64, 72, 80
The ones digit of the products are: 8, 6, 4, 2, 0, 8, 6, 4, 2, 0

Do you see a repeating pattern here?

Guess the ones digit of the following products. Verify your answer by multiplying. Write the digit in the space given.

11 × 8 _____ 12 × 8 _____ 13 × 8 _____

10. In row 8 of the chart, there is no number whose ones digit is 1. What other digits do not appear as the ones digit?
11. Is there a row in which all the digits from 0 to 9 appear as the ones digit? Which rows have this property?
12. It can be seen in row 8 that 0 appears as the ones digit two times.

☐ × 8 gives 0 as the ones digit.

What numbers can go in the box? Give 5 examples of such numbers.

13. Is there a row in which 0 appears as the ones digit only once? Which rows have this property?
14. What do you notice about the answers for Questions 11 and 13? Share in the grade .

Multiples of Tens

1. Let us count the number of wheels in tricycles.

Number of wheels in 10 tricycles with 3 wheels in each is 10 × 3 wheels = _____ wheels.

Number of wheels in 10 more tricycles with 3 wheels in each is 10 × 3 wheels = _____ wheels.

Number of wheels in 20 tricycles with 3 wheels in each is 20 × 3 wheels = _____ + _____ = _____ wheels.

10 × 3 = _____
20 × 3 = _____

2. Let us count the number of wheels in cars.

Number of wheels in 10 cars with 4 wheels in each is 10 × 4 wheels = _____ wheels.

Number of wheels in 30 cars with 4 wheels in each is 30 × 4 wheels = _____ + _____ + _____ = _____ wheels.

10 × 4 = _____
30 × 4 = _____

What happens when the number of groups is a multiple of 10?

Solve the following in a similar way. Share how you found the answers.

a) 10 × 6 = _____
b) 40 × 6 = _____

c) 10 × 8 = _____
d) 60 × 8 = _____

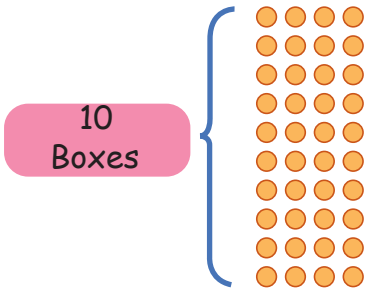
e) 6 × 8 = _____
f) 60 × 8 = _____

g) 4 × 6 = _____
h) 40 × 8 = _____

Note for Teachers: Encourage children to identify the relationship between products like above. Ten-times is a good way of articulating this relationship between products 6 × 8 and 60 × 8. Three-times could be a way of describing the relationship between 10 × 4 and 30 × 4.

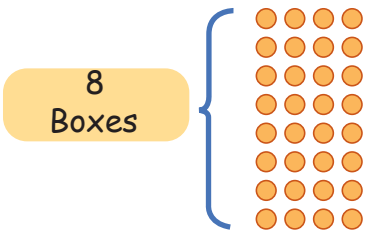
Multiplying Using 10s

1. Radha is packing cupcakes in boxes of 4. She has packed 18 boxes. How many cupcakes are there in the packed boxes?



18 boxes have 4 cupcakes in each.
So, there are 18 × 4 cupcakes.

10 boxes with 4 cupcakes in each contain
10 × 4 cupcakes = _____ cupcakes.

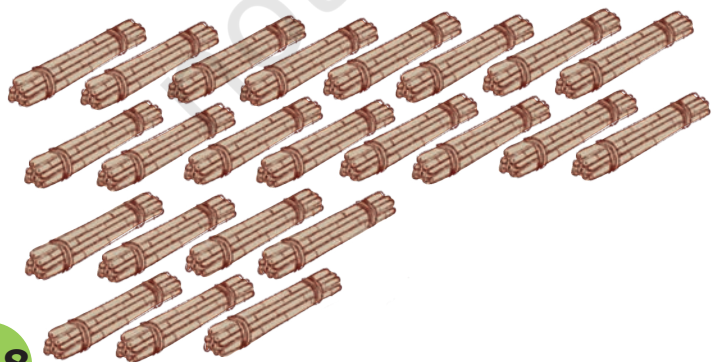


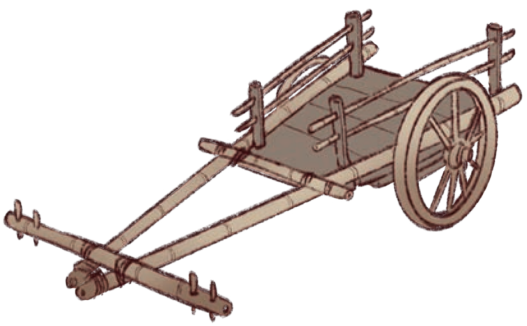
8 boxes with 4 cupcakes in each contain
8 × 4 cupcakes = _____ cupcakes.

18 boxes with 4 cupcakes in each
contain ____ + ____ cupcakes
= _____ cupcakes.

×	4
10	10 × 4 = 40
8	8 × 4 = 32
	72

2. 8 bamboo rods are needed to make a bullock cart. How many bamboo rods are needed for 23 carts?





One cart needs 8 bamboo rods. 23 carts need 23 × 8 rods.

20 carts with 8 rods in each need

20 × 8 rods = _____ rods.

3 carts with 8 rods in each need

3 × 8 rods = _____ rods.

×	8
20	20 × 8 = 160
3	3 × 8 = 24
	184

Let Us Solve

1. A flock of 25 geese and 12 sheep have gathered around a pond. Chippi the lizard sees many legs.
   How many legs does it see?

2. In an auditorium, 8 children are sitting in each row. There are 15 such rows in the school auditorium. How many children are in the auditorium?

3. A book shop has kept 9 books in each pile. There are 14 such piles. How many books does the shop have?

4. Surya is making a patch work with beads of two colours as shown in the picture. How many beads has he used? How many each of golden colour beads and white colour beads has he used in making this patch work?

5. For each of the following multiplication problems, make your own stories as above. Then find out the product.

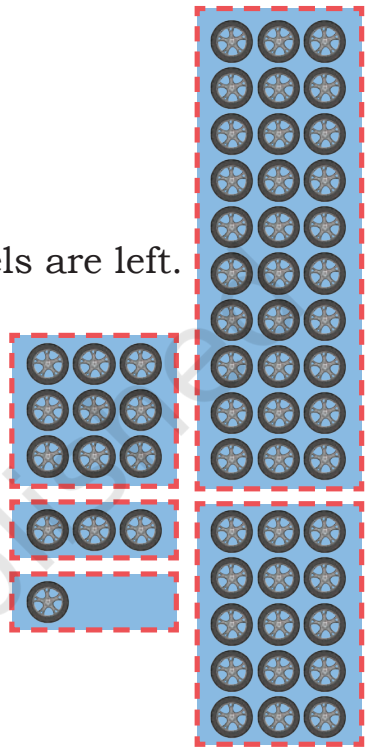
   a) 34 × 3 b) 75 × 5

   c) 46 × 6 d) 50 × 9

Division

1. A factory has ordered 58 wheels for the small tempos that they make. Each tempo has 3 wheels.

In how many tempos can they fix the wheels?
Discuss your thinking in each step.



Number of tempos is 58 ÷ 3
30 wheels are needed for 10 tempos. _____wheels are left.

15 wheels are needed for _____ tempos.
_____wheels are left.

9 wheels are needed for_____ tempos.
_____ wheels are left.

_____ wheels are needed for_____ tempos.
_____ wheels are left.

Can we make another tempo?
How many total tempos can the factory make using the 58 wheels?
_____

```
3) 58 ( 10+5+3+1
  -30
   28
  -15
   13
  - 9
    4
  - 3
    1
```

With 58 wheels, we can make 19 tempos.
1 wheel is left.

Note for Teachers: The division performed here is by partial quotient method. It is carried out by taking away groups of 10s, 5s or any other small multiples, which are easily available to children. Children can choose multiples of their own choice to solve the problems. Encourage them to gradually shift to taking away 10s and multiples of 10s.

2. A dairy farm has many cows. Chippi the lizard is surprised to see 88 legs.
How many cows are there in the farm? Write appropriate sentences as above to show your thinking.

Number of legs of a cow: _____
Number of cows is 88 ÷ _____

Show your work using the table below.
Hint: Taking out groups of 10s is easy.

No. of legs	No. of cows	No. of legs remaining
40 _____ _____	10 _____ _____	88 48 _____ _____

4) 88 (10+
– 40
48
–

Total number of cows = _____

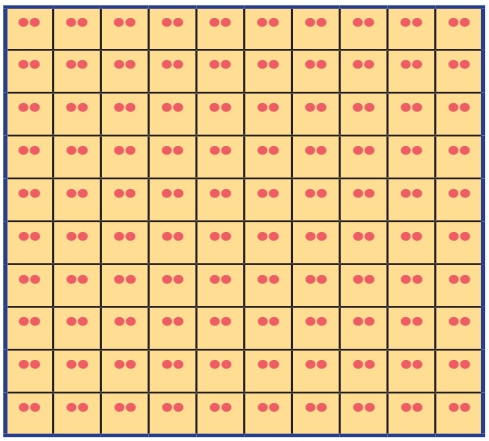
Let Us Solve

1. In a big aquarium, Jolly fish sees 72 legs of octopuses. How many octopuses are there in the aquarium?

2. A sports store packs 4 shuttlecocks in a bigger box. They have 50 shuttlecocks.
How many boxes will they need to pack all of them? Can they pack all the shuttlecocks in the boxes? How many are left?
3. Rakul Chachi uses a part of her farm to grow flowering plants for the upcoming festive season. She has planted 75 saplings of roses. Each row has 5 saplings. How many rows of saplings has she planted?
4. Make stories for the following problems and solve them:
   a) 70 ÷ 5
   b) 84 ÷ 7
   c) 69 ÷ 3
   d) 93 ÷ 6

Multiples of 100

2 people on each bike

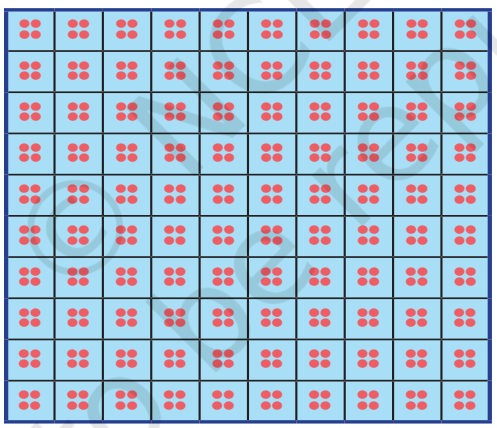


100 bikes with 2 people on each have
100 × 2 people = _____ people.

200 bikes with 2 people on each have
_____people.
How did you find it?

100 cars with 4 people in each have
100 × 4 people = _____ people.

500 cars with 4 people in each have
_____people.
How did you find it?



4 people in each car

500 × 4 = _____
100 × 4 = _____

5 × 4 = _____
50 × 4 = _____

What do you notice about multiplying by multiples of 100s?

Note for Teachers: Encourage children to work out the answers in different ways. Also help them notice the relationship between single digit multiplication and multiples of 100s of the same group size. Expressing the relationship as 'hundred-times' is appropriate.

Observe the pattern and complete the answers.

1 × 3 = 10 × 3 = 100 × 3 =	2 × 3 = 20 × 3 = 200 × 3 =	4 × 3 = 40 × 3 = 400 × 3 =
2 × 4 = 20 × 4 = 200 × 4 =	4 × 2 = 40 × 2 = 400 × 2 =	8 × 1 = 80 × 1= 800 × 1 =
3 × 4 = 30 × 4 = 300 × 4 =	3 × 5 = 30 × 5 = 300 × 5 =	3 × 9 = 30 × 9 = 300 × 9 =

More Multiplication

1. Big electric autorickshaws run in small towns of India and can carry 8 passengers. How many people can travel in 125 such autos in a single round?

8	8	8	8	8	8	8	8	8	8
8	8	8	8	8	8	8	8	8	8
8	8	8	8	8	8	8	8	8	8
8	8	8	8	8	8	8	8	8	8
8	8	8	8	8	8	8	8	8	8
8	8	8	8	8	8	8	8	8	8
8	8	8	8	8	8	8	8	8	8
8	8	8	8	8	8	8	8	8	8
8	8	8	8	8	8	8	8	8	8
8	8	8	8	8	8	8	8	8	8

100 autorickshaws with 8 passengers each

8	8	8	8	8	8	8	8	8	8
8	8	8	8	8	8	8	8	8	8

20 autorickshaws with 8 passengers each

8	8	8	8	8

5 autorickshaws with 8 passengers each

The total number of passengers 125 × 8.

100 autorickshaws with 8 passengers in each have 100 × 8 passengers = _____ passengers.

20 autorickshaws with 8 passengers in each have 20 × 8 passengers = _____ passengers.

×	8
100	100 × 8 = 800
20	20 × 8 = 160
5	5 × 8 = 40
	1000

5 autorickshaws with 8 passengers in each have 5 × 8 passengers = _____ passengers.

125 autorickshaws with 8 passengers in each have ____ + ____ + _____= _____ passengers.

2. Kahlu and Rabia are potters and make earthen pots *(kulhad)* for trains.

They pack 6 *kulhads* in a box and have packed 174 boxes for delivery.

How many *kulhads* have they made?

The total number of *kulhads* is _____.

100 boxes with 6 *kulhads* each

70 boxes with 6 *kulhads* each

4 boxes with 6 *kulhads* each

174

×	6
100	100 × 6 = ____
70	70 × 6 = ____
4	4 ×6 = ____

Let Us Solve

1. BP Girl's school has decided to give all its students two pencils on the first day of school.
It has 465 students.
How many pencils does the school need to buy?

2. 234 children of a school have decided to organise a school mela. Each child contributes ₹5 for the organisation of the mela. How much money do they collect?

3. Make stories for the following problems and solve them.
   a) 439 × 4 b) 514 × 8
   c) 356 × 5 d) 623 × 7

More Division

9 boats have to ferry 108 people waiting along the banks of the Cauvery River. Every boat carries the same number of people. How many people should be ferried in each boat?

108 people are to be ferried in 9 boats.
In 1 boat, the number of people ferried is 108 ÷ 9.

If 5 people sit in each of the boats, then 45 people can be ferried in 9 boats.
If 5 more people sit along with them in each of the boats (total 10), then 90 people can be ferried in the 9 boats.

The remaining 18 people have to be adjusted in the 9 boats. 2 more people will have to sit in each of the boats.
So, the 9 boats need to take 12 people each.

```
9) 108 ( 5+5+2
  - 45
    63
  - 45
    18
  -  18
     0
```

9 boats need to take 12 people each.

Note for Teachers: Division problems are of 2 types—share and measure. In share problems, the number of equal groups is given (i.e the multiplier) leading to opportunities to share objects equally. The example above is a share problem. In measure problems, the size of each group is given (i.e, the multiplicand), like when we ask how many ants are there if the number of legs is 60. Including both kinds of problems is helpful for children.

Patterns in Division

How much money will each get? Draw arrows linking the money and the children to answer the questions.

1. ₹30 shared equally among 3 children _____
2. ₹900 shared equally among 3 children _____

Using the above way of thinking, solve the following problems.
Observe and explain the patterns that you notice below.

A

3 ÷ 3 = _____
30 ÷ 3 = _____
300 ÷ 3 = _____

5 ÷ 5 = _____
50 ÷ 5 = _____
500 ÷ 5 = _____

B

9 ÷ 3 = _____
90 ÷ 3 = _____
900 ÷ 3 = _____

8 ÷ 4 = _____
80 ÷ 4 = _____
800 ÷ 4 = _____

C

15 ÷ 3 = _____
150 ÷ 3 = _____
300 ÷ 3 = _____

4 ÷ 2 = _____
20 ÷ 2 = _____
100 ÷ 2 = _____

1. A load carrying truck has 6 tyres. Chippi the lizard sees 60 tyres. How many trucks are there?
2. Chippi sees 80 wheels in a car parking space. How many cars are standing in the parking space?
3. Chippi sees 600 legs of ants walking towards the anthill. How many ants are there?
4. A fancy shop has packed 800 rubber bands in several packets. Each packet has 4 rubber bands.
   How many packets of rubber bands does the shop have?

Let Us Solve

1. A school bus hires 7 buses to take 245 children to the transport museum. Each bus carry the same number of children. How many children are traveling in each bus?
2. The Darjeeling Himalayan Railway is fondly called the "Toy Train". This toy train ride is also a UNESCO World Heritage Site.
   This amazing train runs between New Jalpaiguri and Darjeeling and it also passes through one of the highest stations in the world, namely, Ghum. It runs 88 km daily. How much distance does it travel in a week?

3. The 16 Km river rafting from Shivpuri to Rishikesh in the Ganga provides the most interesting rafting opportunity. In the summer months, VentureOut company took 259 people for rafting. Each raft can take 7 people. How many rafts did it take?
4. Anu saves ₹45 every month by putting it in her piggy bank.
   a) How much money will Anu save in 6 months?
   b) She distributes the total money saved after 6 months among 6 of her friends. How much does each friend get?
   c) If she decides to distribute the saved money among 3 friends after 6 months, how much money will each get?
5. Raju drives an auto in his village and takes people to the bus stand. He makes 8 trips in a day. Which of the following questions can be exactly calculated with the above statement?
   a) How much money does he make in a day?
   b) How many trips does he make in 7 days?

Note for Teachers: Encourage the children to observe relationships between divisor, dividend and quotient, understand the relationship between quotients when the dividend is changed by 5 times/10 times, and the relationship between multiplication and division.

c) How much time does one trip take?

d) How many trips does he make in 4 weeks?

6. Solve

a) 45 × 9 b) 507 × 7

c) 94 ÷ 4 d) 778 ÷ 6

e) 94 × 5 f) 396 × 4

g) 83 ÷ 3 h) 635 ÷ 5

7. In mathematics, some statements are always true, some are sometimes true, and some are never true.
Tick (√) in the appropriate column.

	Statement	Always True	Never True	Sometimes True
a)	Multiplying by 10 gives 0 in the ones digit of the number.			
b)	Multiplying a number by 2 gives an odd number.			
c)	Multiplying a number by 5 gives a number with 5 in the ones digit.			
d)	The number immediately after an odd number is an even number.			
e)	Halving any number gives an even number.			
f)	Adding 0 to a number increases the number by 1.			

Note for Teachers: The "always true, never true, or sometimes true" type of questions in math are designed to help students understand and evaluate the validity of mathematical statements under different conditions. They encourage critical thinking, testing conceptual understanding and encouraging students to reason logically with counter examples. They help students to move beyond rote memorisation to a better understanding of mathematical principles.