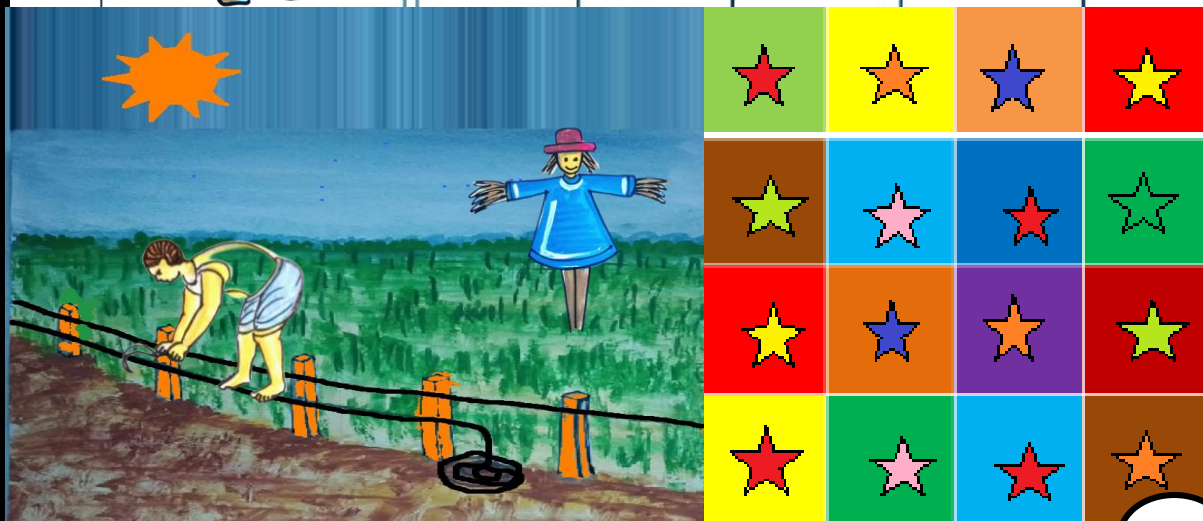


MENSURATION : PERIMETER AND AREA CLASS VI SUBJECT : MATHEMATICS



**SRI SATHYA SAI VIDYA VIHAR, INDORE
(AFFILIATED TO C.B.S.E.)**



Acknowledgement

Having an idea and turning it into a novel is an arduous task. This Graphic Novel is a concerted effort of teachers and educationists who have burnt the midnight oil to give out their best. We are immensely grateful to all those who have contributed in the making of this book.

GRAPHIC NOVEL DEVELOPMENT COMMITTEE

Concept-	Ms. Punita Nehru (Principal)
Advisory body-	Dr. Anju Chopra (Vice Principal - Bal Mandir)
	Ms. Vandana Daji (Vice Principal - Senior School)
	Mr. Sandeep Sethi (Director Education, M.S.M.S.II, Museum Trust)
	Ms. Bhavna Mulani (Coordinator)
	Ms. Deepika Sachar (Coordinator)
In charge/ HOD :	Mr. Ravindra Jain / Mr. Amar Paliwal
Scripts and Dialogue-	Mr. Ravindra Jain, Ms. Rakhi Nagpal
	Ms. Neeta Lala, Ms. Bhakti Akheniya
Art Department -	Mr. Akhilesh Goud and Ms. Ekta Dubey
Designing and Technical Assistance: (IT)	Ms. Mona Sachar
Cover Page:(IT & ART)	Ms. Mona Sachar and Mr. Akhilesh Goud
Editing -	Ms. Nurani Gupta

DISCLAIMER

This is an educational work by the teachers of Sri Sathya Sai Vidya Vihar, Indore to enable students understand a tricky mathematical concept in a lucid playful manner. All the names, characters, places, and events given here are the products of imagination. The practice questions are authors' creation.

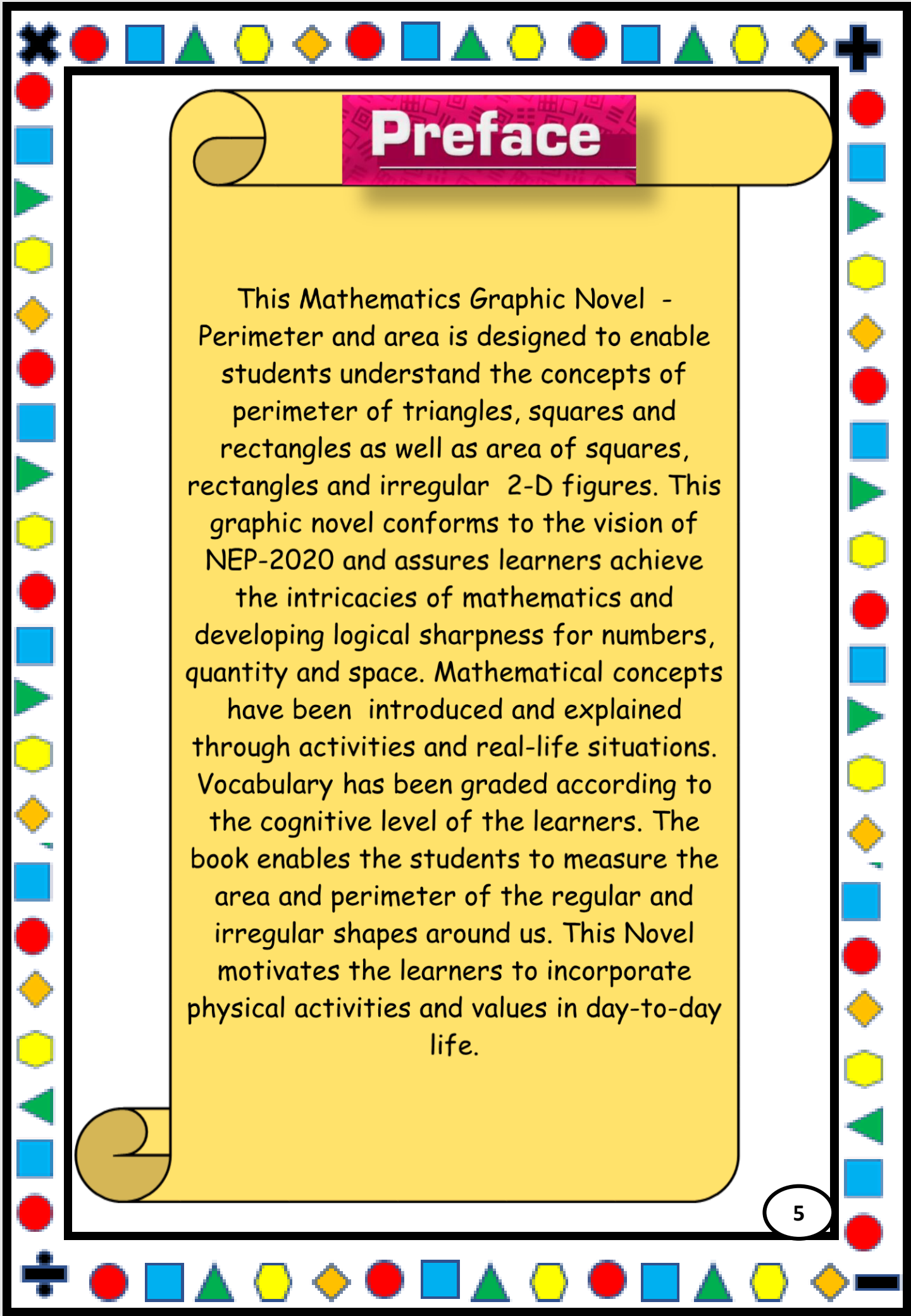
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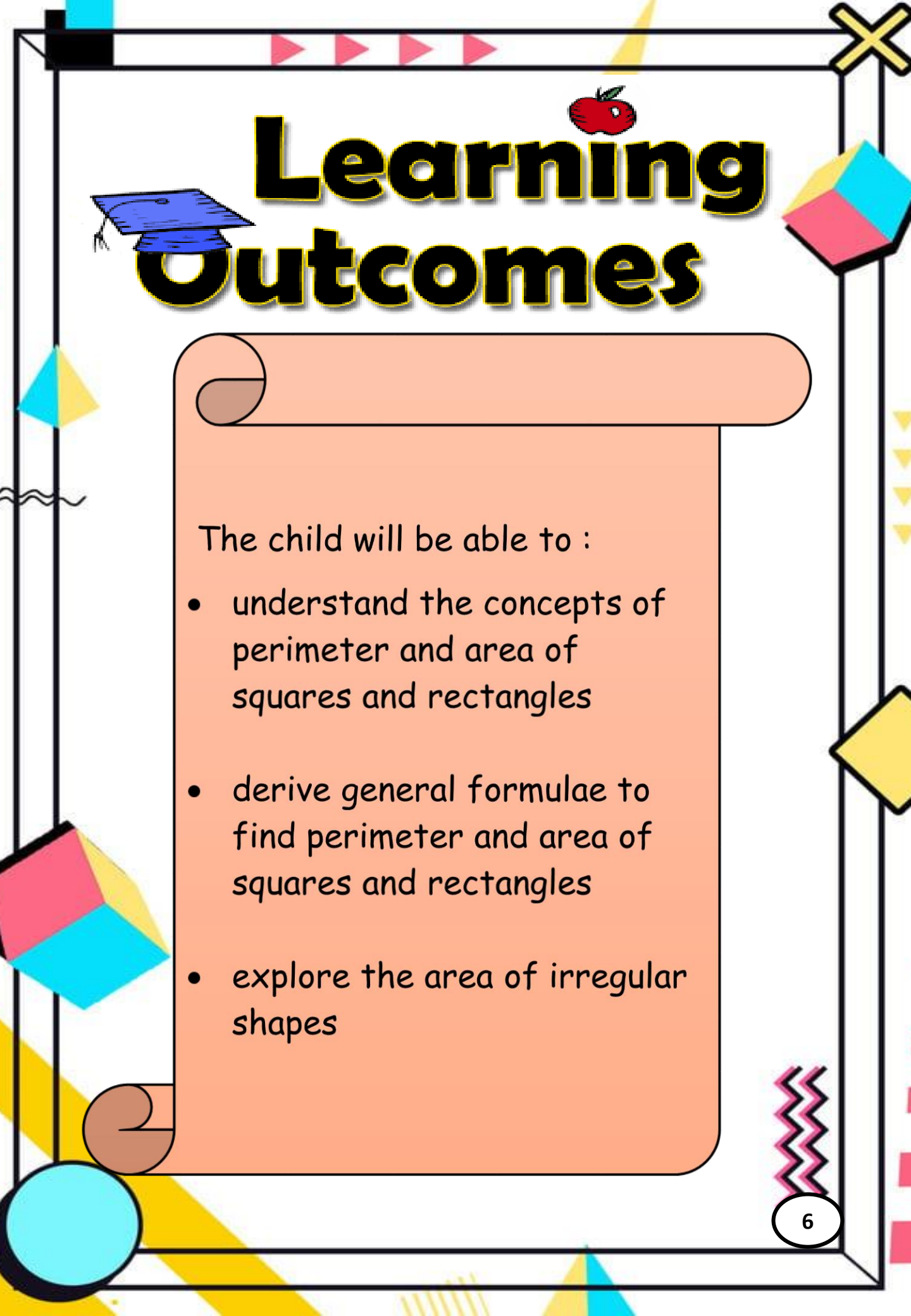
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Preface

This Mathematics Graphic Novel - Perimeter and area is designed to enable students understand the concepts of perimeter of triangles, squares and rectangles as well as area of squares, rectangles and irregular 2-D figures. This graphic novel conforms to the vision of NEP-2020 and assures learners achieve the intricacies of mathematics and developing logical sharpness for numbers, quantity and space. Mathematical concepts have been introduced and explained through activities and real-life situations. Vocabulary has been graded according to the cognitive level of the learners. The book enables the students to measure the area and perimeter of the regular and irregular shapes around us. This Novel motivates the learners to incorporate physical activities and values in day-to-day life.



Learning Outcomes

The child will be able to :

- understand the concepts of perimeter and area of squares and rectangles
- derive general formulae to find perimeter and area of squares and rectangles
- explore the area of irregular shapes

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5.

• GABRU UNDERSTANDS AREA

6.

• CROSSWORD PUZZLE

7.

• ACTIVITY

STORY BOARD

Perimeter

The length of the boundary of a closed figure is called perimeter of the figure.

Area

The region/space covered by the figure is called the area of the figure.

THE NOVEL COVERS:

- ✓ THE PERIMETER & AREA OF A SQUARE AND A RECTANGLE.
- ✓ THE PERIMETER OF A TRIANGLE.
- ✓ THE AREA OF IRREGULAR FIGURES.

#Formulae#

- **Perimeter of triangle = sum of all sides**
- **Perimeter of square = $4 \times$ length of one side**
- **Perimeter of rectangle = $2 \times$ (length + breadth)**
- **Area of square = side $\times$ side**
- **Area of rectangle = length $\times$ breadth**

CHARACTERS



MY MOTHER
SMT. BHANUMATI



MY FATHER
SHRI. CHAMPAKLAL



DR. MEHRA



HELLO!
I AM GABRU. LET
ME INTRODUCE
YOU TO ALL THE
CHARACTERS OF
THIS STORY.

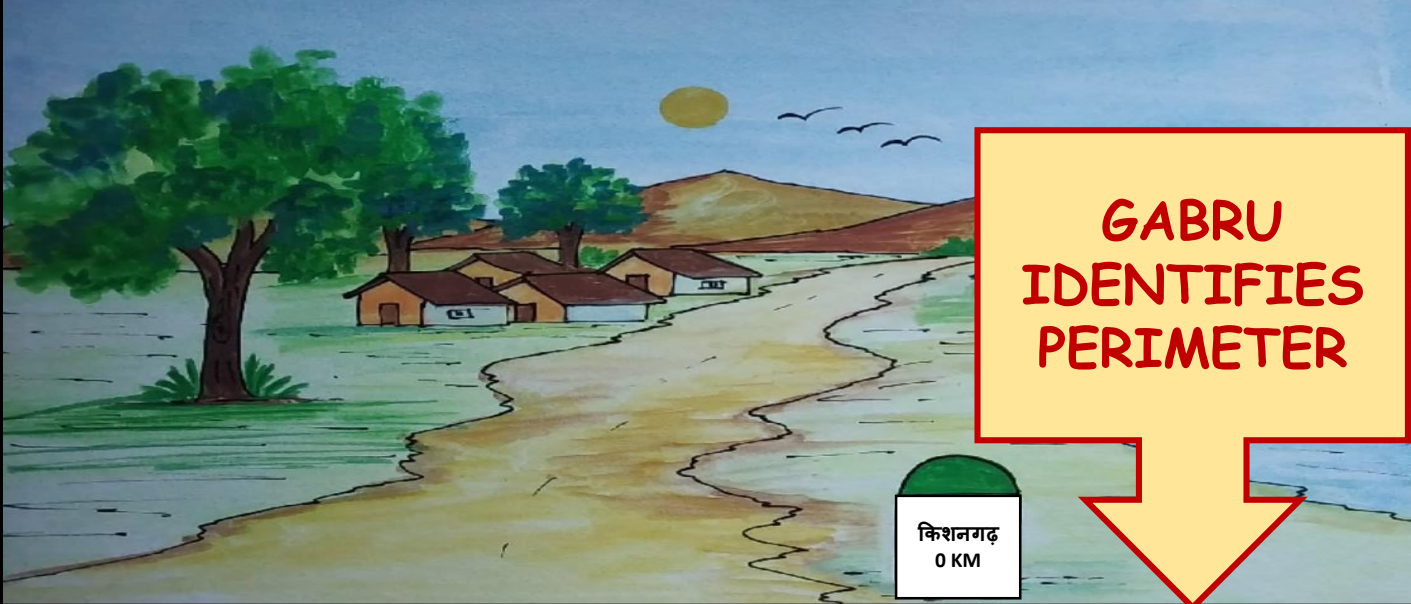


BABURAO PAINTER

MY MATHS TEACHER
MS. MAHTO







GABRU
IDENTIFIES
PERIMETER

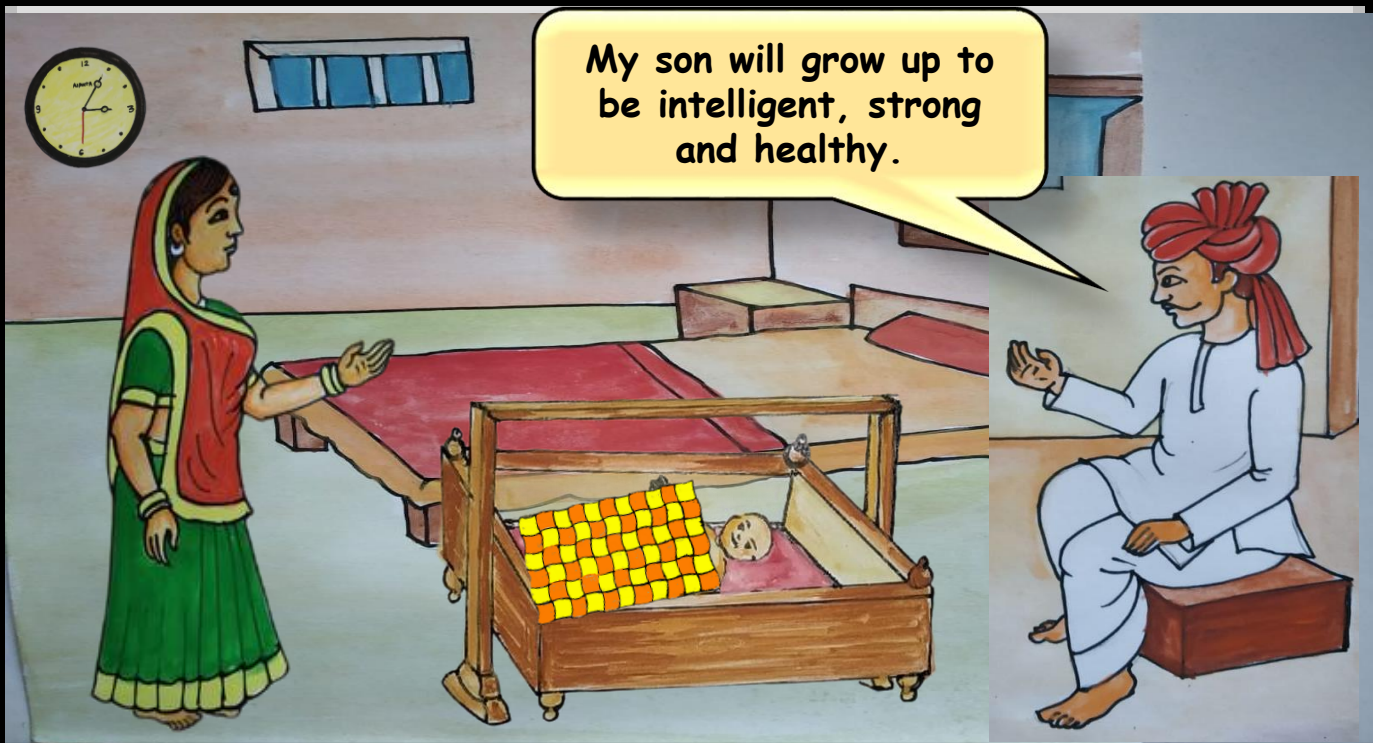
किशनगढ़
0 KM

Once upon a time, a hardworking man named Champaklal lived in *KishanGarh* village with his wife.



After years of prayers, they were blessed with a baby boy- Gabru





As he grew older, Gabru became obese due to excessive love and care of his parents



Worrying about his son, Champaklal's health gets affected.

Bhanumati was concerned about Champaklal



I have been observing for a long time, you seem to be sad.

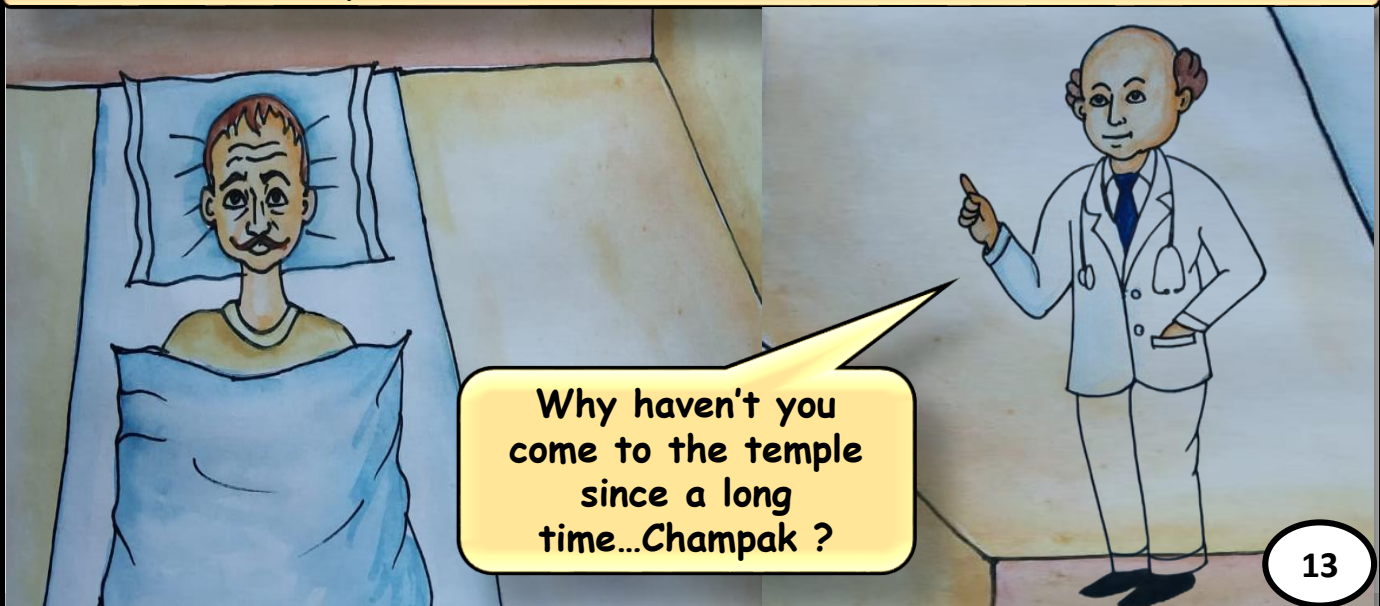


Champaklal became worried.



What's wrong with my son ... God!!!! help me!

Champaklal's friend Dr. Mehra visited his home



What should I
say friend ...
My negligence
has made my
son overweight.



Champaklal poured
his heart out.

What
should be
done?



Don't worry
Champak. Let's
plan
something...



I have an
excellent idea !!!
Ask Gabru to
visit the temple
daily, as you used
to do.



He won't
refuse.



That's a good idea !

Next day, Champaklal called his son Gabru

Champaklal is sitting on a blue bed, looking towards the right. He is wearing a white kurta and dhoti.

Gabru...
Gabru...
where
are
you?

Gabru is standing in the center of the frame, wearing a pink t-shirt and blue jeans. He has his arms crossed and is smiling.

I'm
coming.

Gabru is standing on the left, wearing a pink t-shirt and blue jeans. Champaklal is sitting on the blue bed on the right, wearing a white kurta and dhoti.

You
called me
...Papa?

A close-up of Gabru's face. He is smiling and looking slightly to the left.

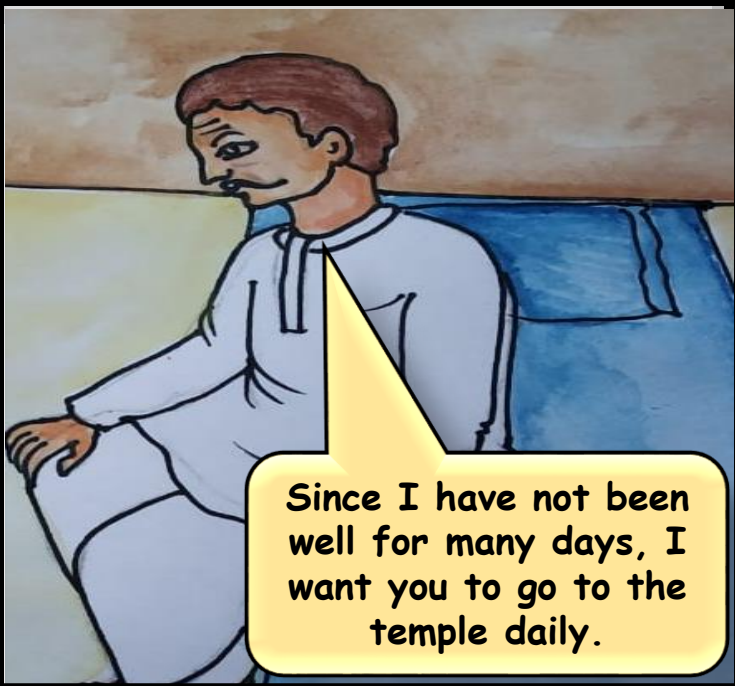
What can I do
for you Papa?

Yes,
my
son...



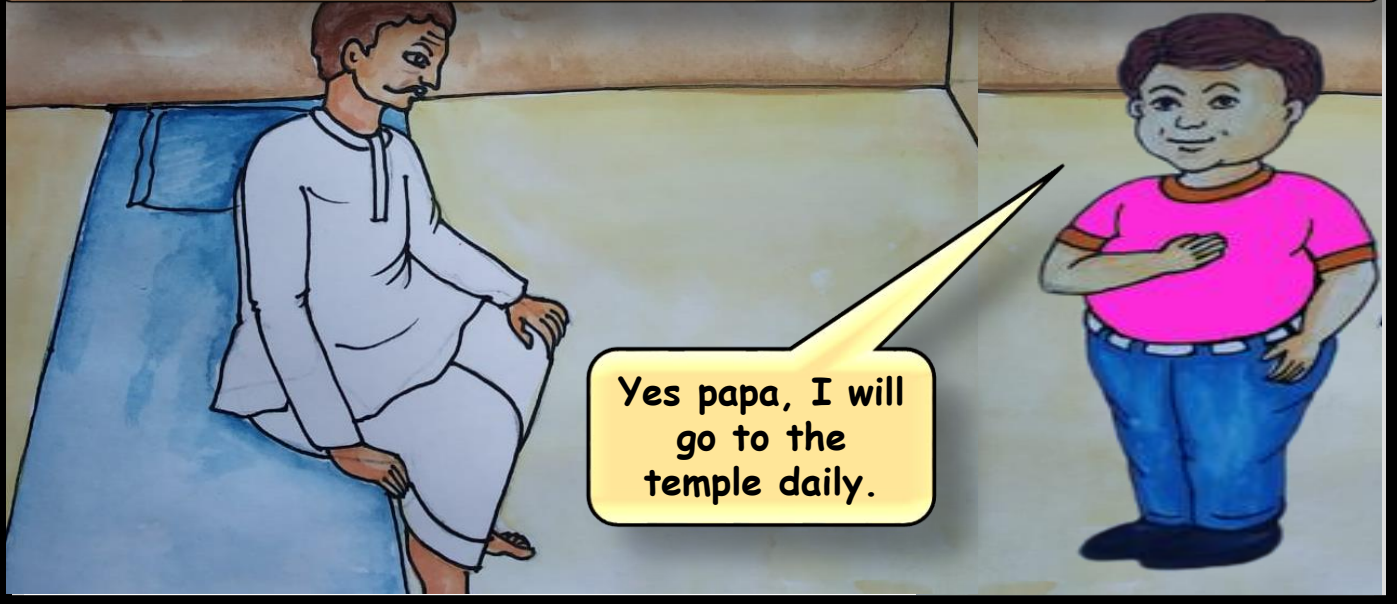
I have been visiting the temple everyday.

It is about 1.5 km away from our house.

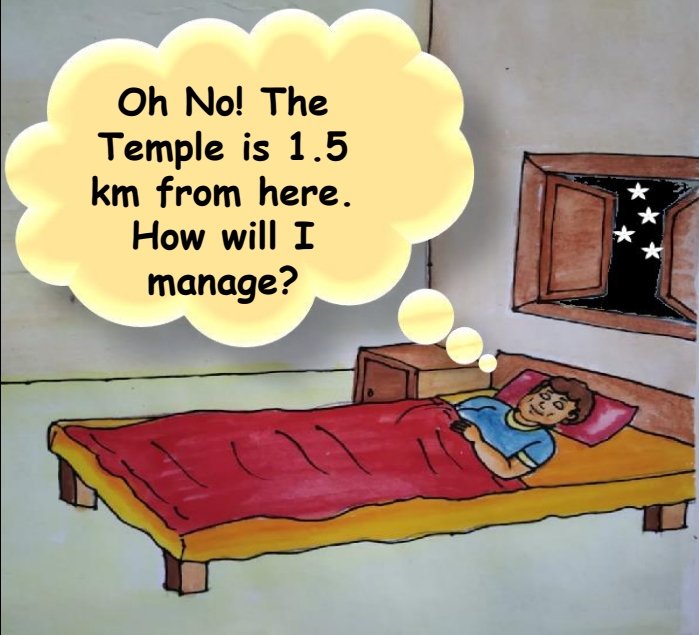


Since I have not been well for many days, I want you to go to the temple daily.

As Gabru loved his father, he didn't refuse.



Yes papa, I will go to the temple daily.



Oh No! The Temple is 1.5 km from here. How will I manage?

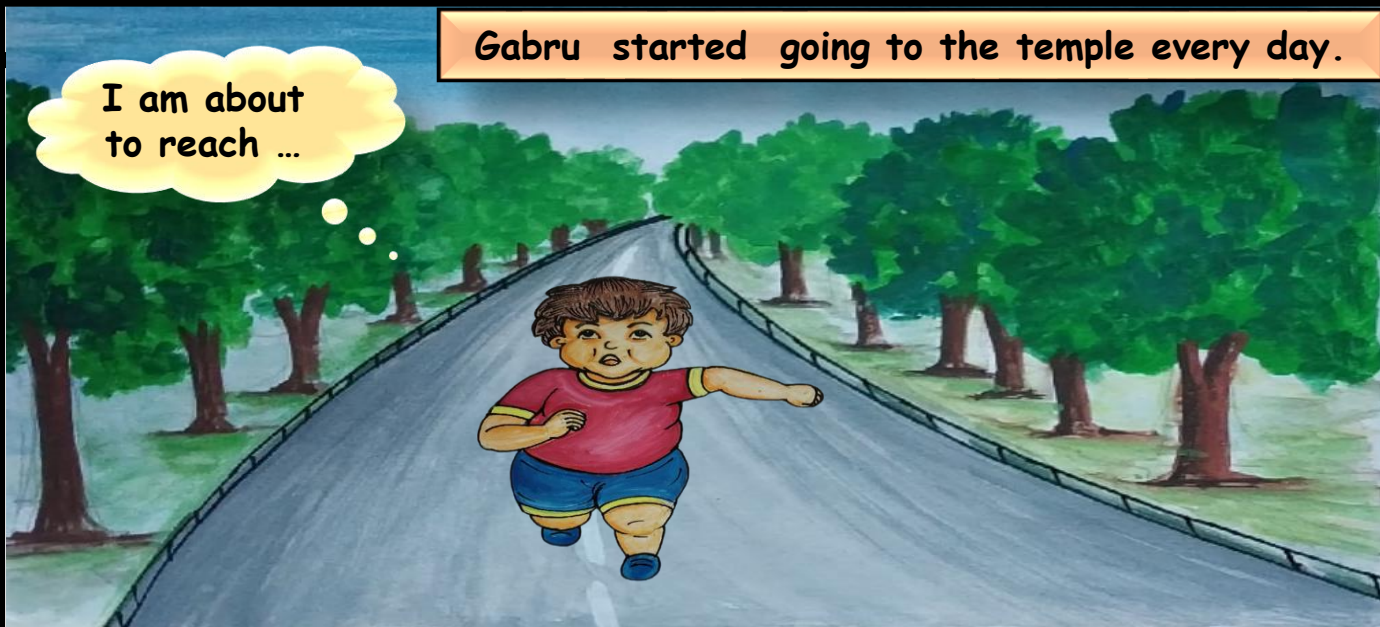


Anyhow, I must go to the temple.

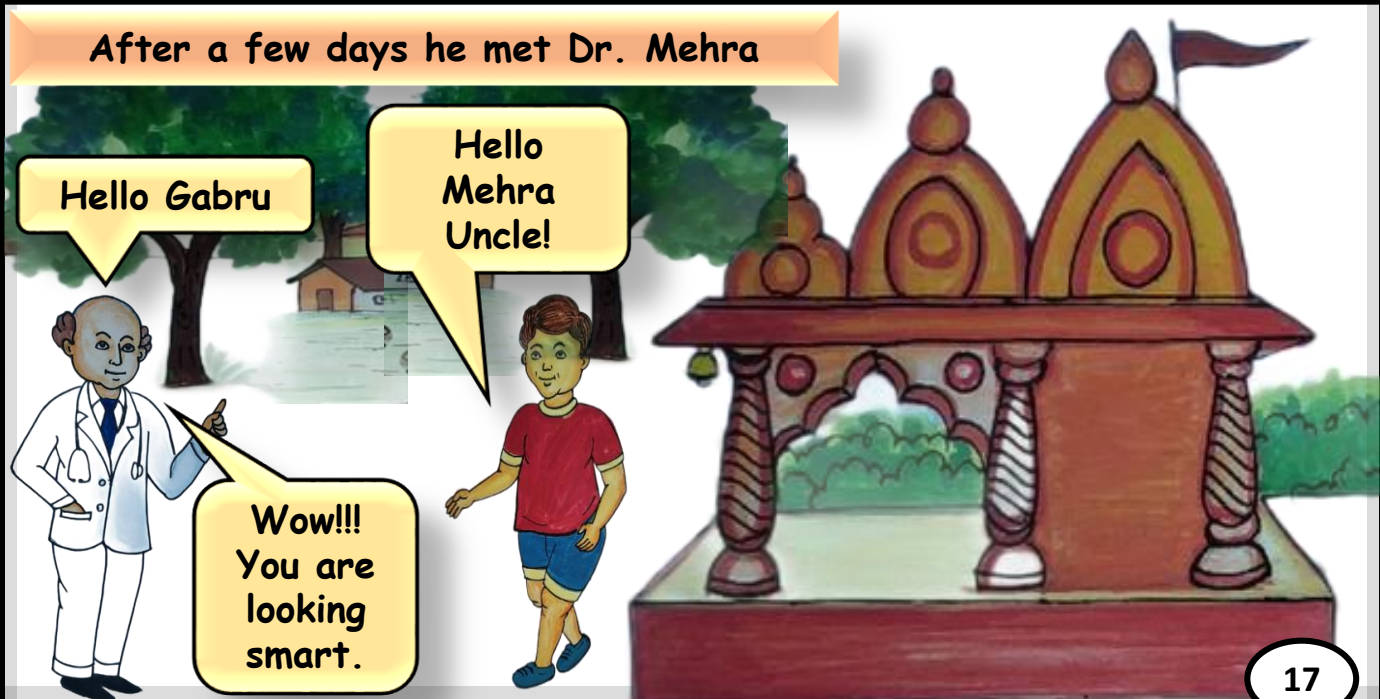
Next morning, Gabru was ready to go to the temple.

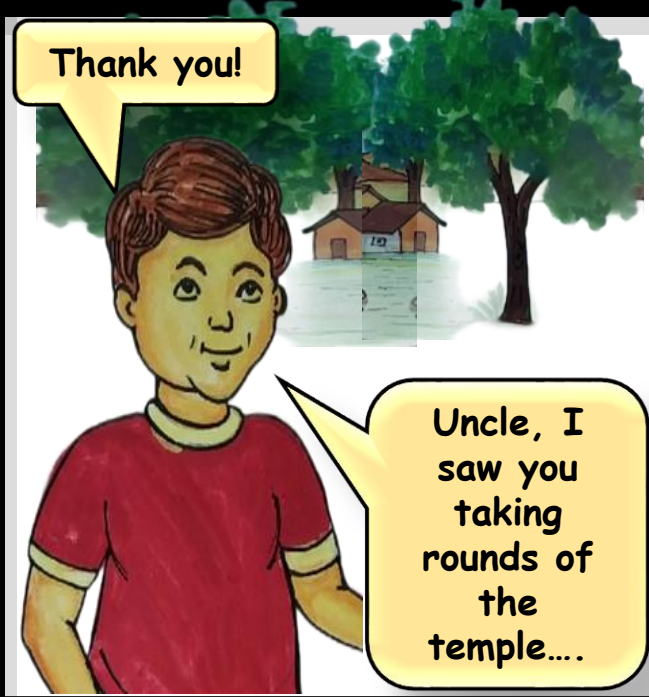


Gabru started going to the temple every day.



After a few days he met Dr. Mehra





Thank you!

Uncle, I saw you taking rounds of the temple....

Dr. Mehra explained to Gabru the importance of *parikrama*



Yes Gabru... that is called *parikrama*. It is a very common ritual.

Next Day....Gabru took three *parikramas* of the temple.



He started maintaining a daily record of the calories he burnt and the distance he travelled to and fro and around the temple.

One day while he was at the temple, he met his maths teacher.



Gabru!!! You are looking very fit and strong

Thank you Ma'am, I walk to the temple daily.

Distance between my home and temple is 1.5 km and I also take 3 *parikramas* of the temple.

WOW...
That's
great!

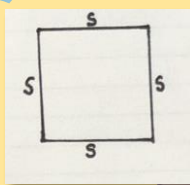
Gabru, do you
know the distance
you walked around
the temple once is
called Perimeter.

OK
ma'am

Ma'am, does it mean that the
length of the outline of a closed
figure is called its Perimeter?

Yes, and the
standard unit of
measuring
perimeter is
metre.

Also, since all four
sides of this temple
are equal, now tell me
what is its perimeter?

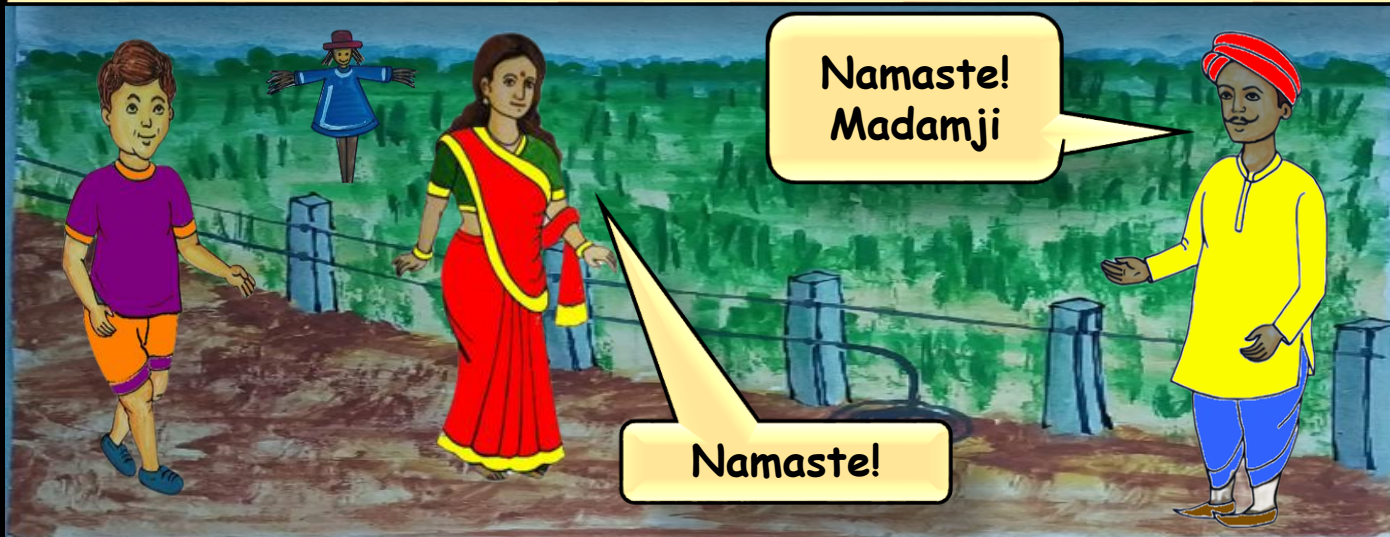


You are
correct.

Ma'am, it
will be
side +
side +
side +
side =
4 x side.

Remember that
the figures
which have all
sides and angles
equal are called
regular figures.

While returning home, Gabru and his teacher saw a farmer struggling to fence his field.....



And what is the length and breadth of your field?

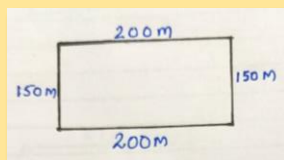
Gabru beta, length is 200 m and breadth is 150 m.

OO OH Chacha ...then definitely you will face a problem

Why?????
Gabru beta

What??
What is perimeter?

Chacha...the perimeter is
 $200 + 150 + 200 + 150$
 $= 700\text{m}$ and length of your wire is 500 m.





Perimeter is the length of the boundary of your rectangular field

or

sum of length of all four sides

b

l

b

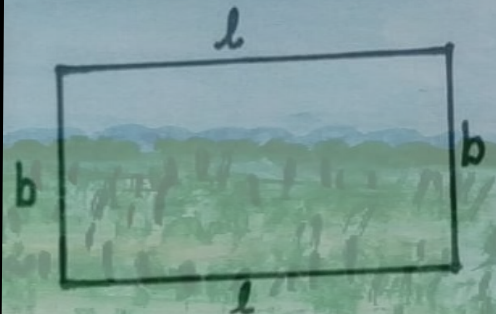
l

Very Good Gabru.

Thank you Ma'am.

It means twice the sum of length and breadth.

Got it ma'am. The perimeter of rectangle
 $= 2(l + b)$



$$\begin{aligned}\text{Perimeter of rectangle} &= l + b + l + b \\ &= 2l + 2b \\ &= 2(l + b)\end{aligned}$$

I need to put 3 rounds of wire around my field, so how much wire do I need?

Simply, multiply the perimeter by 3.

Thank you so much!

Gabru's teacher was very happy and she appreciated him.

Gabru now happily started visiting the temple everyday and was even delighted to see his Maths teacher Ms. Mahto there.

Since Navratri was about to begin, Gabru's mother asked him to beautify a chunri to adorn the deity.

I'll bring an elegant lace for its border.

Next day at shop.

What is the cost of this beautiful lace?

It is Rs.20 per metre. How much do you need?

My chunri's length is 2.5 metres and breadth is 1.5 metres. Therefore, its perimeter is $2 \times (2.5 + 1.5) = 8$ metres.



OK



Give me 8 meters...



So Gabru quickly computed the total cost of 8 metres lace as Rs 160, happily paid off the shopkeeper and set off home.

He put the beautiful lace and his parents were very impressed to see his active involvement in the entire work and blessed him heartily. His father's health improved steadily.

Next day at the temple...

Beautiful decoration !!

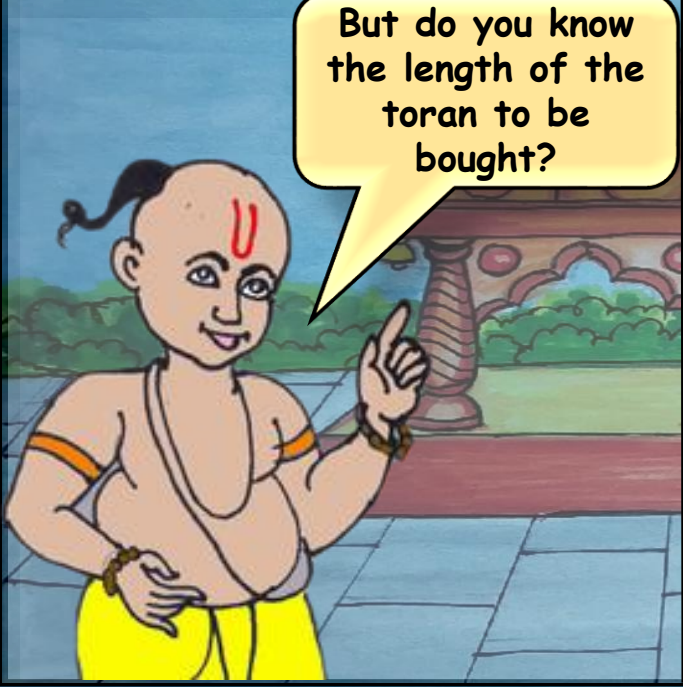


May I bring the toran for you?



But it's incomplete. I want to adorn all the four triangles of the top dome of the temple with a 'Toran*'.

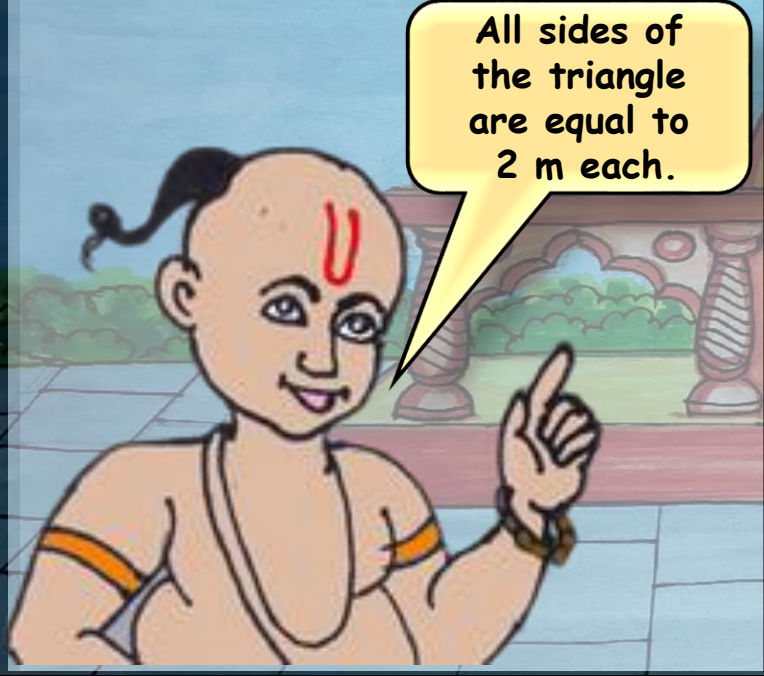
*Toran – Festive hanging decoration



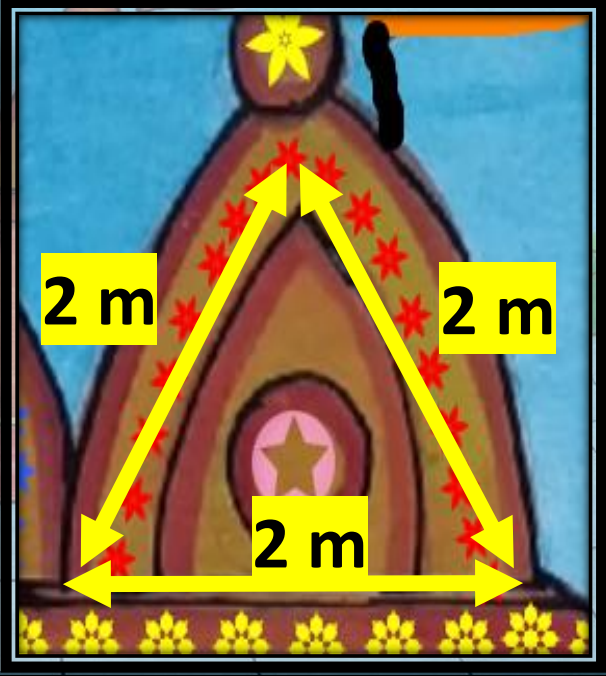
But do you know
the length of the
toran to be
bought?



Can you please
tell me the
length of each
side?



All sides of
the triangle
are equal to
2 m each.



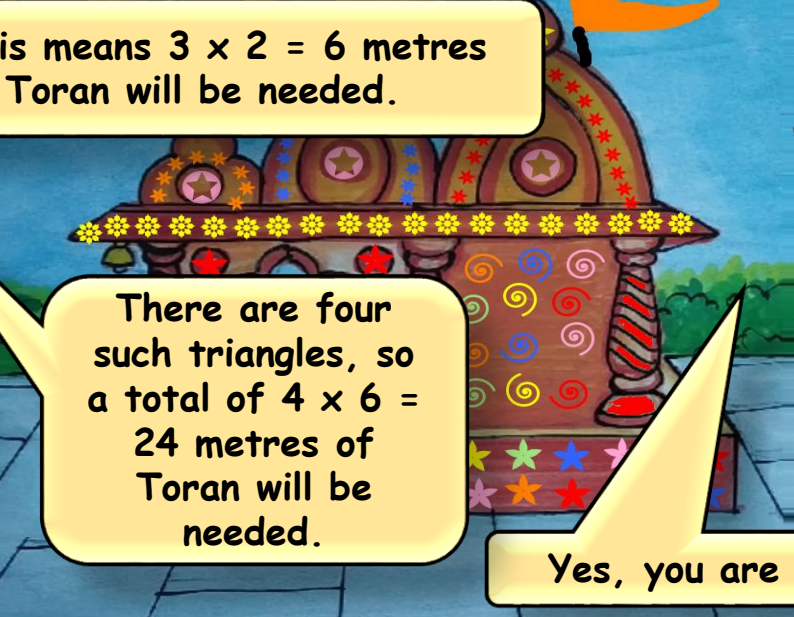
2 m

2 m

2 m



This means $3 \times 2 = 6$ metres
of Toran will be needed.



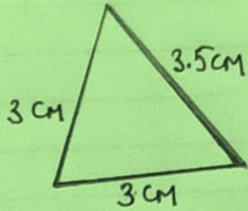
There are four
such triangles, so
a total of $4 \times 6 =$
24 metres of
Toran will be
needed.



Yes, you are correct.

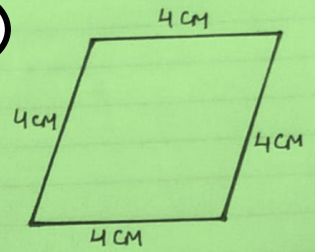
Now I can easily calculate the perimeter of these figures. CAN YOU?

a)



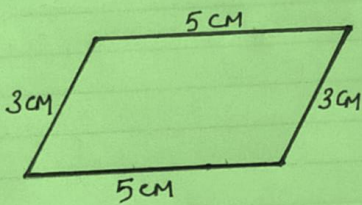
TRIANGLE

b)



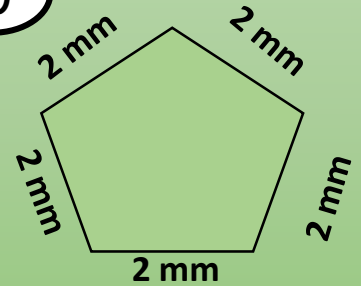
RHOMBUS

c)



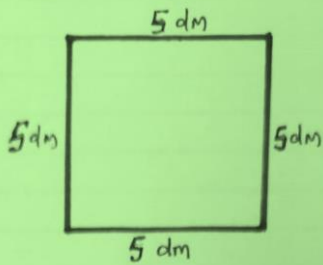
PARALLELOGRAM

d)



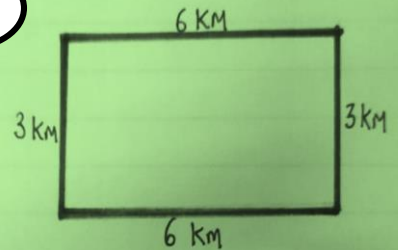
REGULAR PENTAGON

e)



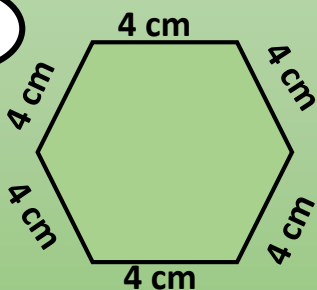
SQUARE

f)



RECTANGLE

g)



REGULAR HEXAGON

ANSWERS :
a) 9.5 cm.
b) 16 cm.
c) 16 cm.
d) 10 mm
e) 20 dm
f) 18 km
g) 24 cm

किशनगढ़
0 KM

PERIMETER OF TRIANGLE, SQUARE AND RECTANGLE

ASSESS AND EVALUATE YOURSELF

CHOOSE THE CORRECT ANSWER

- Gabru wants to use a decorative tape to cover the edges of a cube of side 15 cm. Find the length of the tape that he needs.
a) 60 cm b) 225 cm c) 240 cm d) 180 cm
- Meet builds a square with a side of 15 cm from some wire. If from the same wire, he builds a rectangle with a width of 6 cm, what is the length of the rectangle?
a) 18 cm b) 24 cm c) 48 cm d) 36 cm
- A park shaped like a rectangle has a length of 24 meters and a width of 18 meters. If trees are planted on its sides with gaps of 3 meters between them, how many trees need to be planted?
a) 42 trees b) 28 trees c) 21 trees d) 45 trees
- Aarti wants to make a toran for her main door entrance using equilateral triangles. She calculated that 7 triangles are sufficient to make the toran. If the length of one side of the triangle is 12 cm, find the total length of the lace required if she puts the lace around each triangle of the toran.
a) 84 cm b) 36 cm c) 252 cm d) 22 cm
- Rohan jogs around a rectangular park of length 50 m and breadth 30 m. If he takes 10 rounds of the park each day, how much distance does he cover in a day in km?
a) 320 km b) 1600 km c) 160 m d) 1 km 600 m or 1.6 km

Fill in the blanks-

- The perimeter of square is _____.
- All sides of a square are _____ in length.
- Perimeter is the _____ of all sides.
- The perimeter of an isosceles triangle with one side 7 cm and equal sides 12 cm each is _____.
- The perimeter of a rectangle =

_____ + _____ + _____ + _____ or

_____ + _____ or

2 (_____ + _____)

ANSWERS

Choose the correct answer:

- (d) 180 cm
- (b) 24 cm
- (b) 28 trees
- (c) 252 cm
- (d) 1 km 600 m or 1.6 km

Fill in the blanks-

- 4 x side
- equal
- sum of lengths
- 31 cm
- $1 + b + 1 + b$ or $2l + 2b$ or $2(l + b)$

GABRU UNDERSTANDS AREA

There was a Rangoli competition in the school and Gabru also participated in it. Gabru made a square Rangoli of 4×4 feet and his friend Sonu made a rectangular Rangoli of 8×2 feet

See Sonu, my Rangoli is larger than yours .

No, no my dear
My Rangoli is bigger than yours.

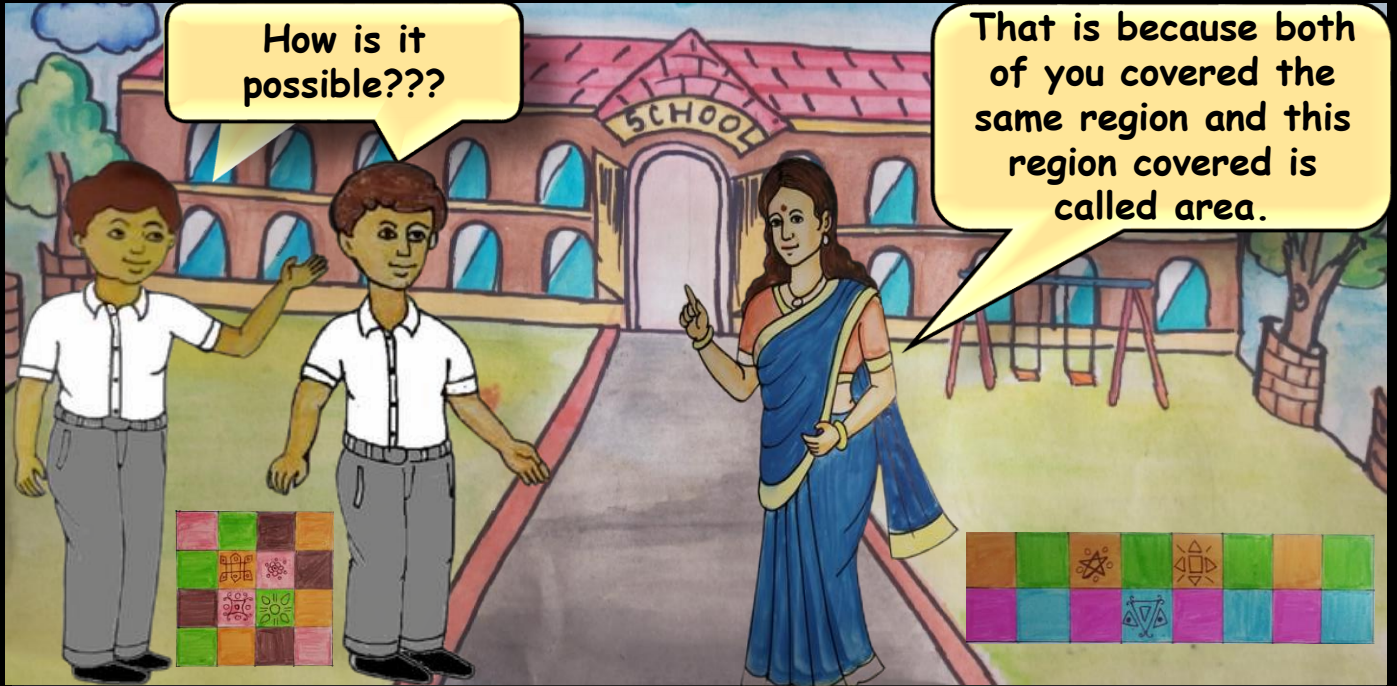
Let us ask our teacher ji



Count the number of squares in your Rangoli Gabru and Sonu .

There are 16 squares.

Same here.

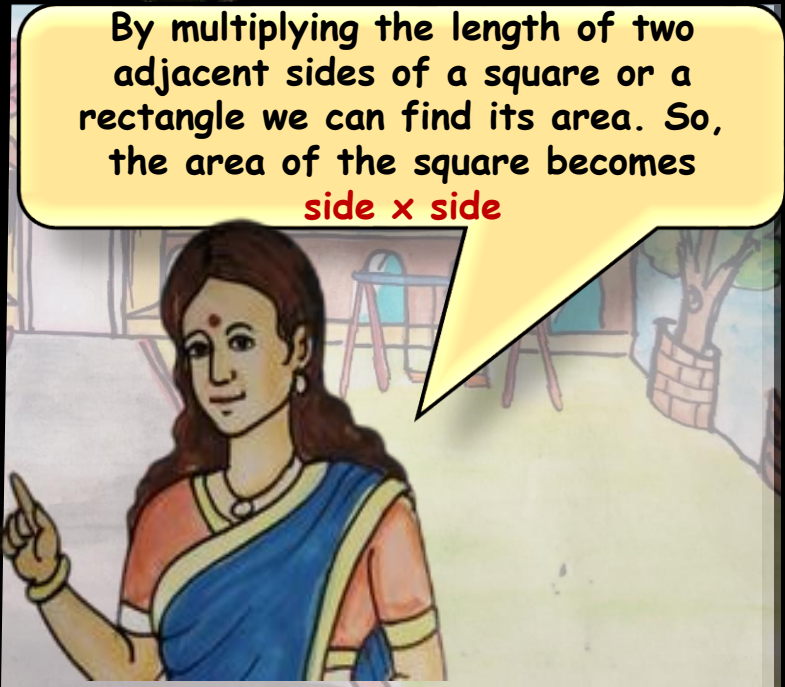


How is it possible???

That is because both of you covered the same region and this region covered is called area.



How can we find the area?



By multiplying the length of two adjacent sides of a square or a rectangle we can find its area. So, the area of the square becomes **side x side**



Can you tell me the area of rectangle?



Yes ma'am, **length x breadth.**



Excellent! And always remember that the standard unit of area is sq. m.

On his way back home, he saw a farmer who was distressed ...

Why are you worried?

I want to divide my field equally amongst my three children.

But, how to do it?

What is the length and breadth of your field?

Length is 500 m and breadth is 300 m.

This means it's a rectangular field and its area is

$$A = L \times B$$

$$= 500 \times 300$$

$$= 1,50,000 \text{ sq.m}$$

$= 15 \text{ ha}^*$. So, you can give 5 hectares to each.

* 1 ha (hectare) = 10,000 sq.m

Oh great !!!!
You solved my problem.
Now my children will be able to grow different crops in equal area.

When Gabru reached home, he saw his father talking to a painter. Since Diwali was approaching, he wanted to get one exterior (front) wall of his house whitewashed.

What are your charges?

7 ft.

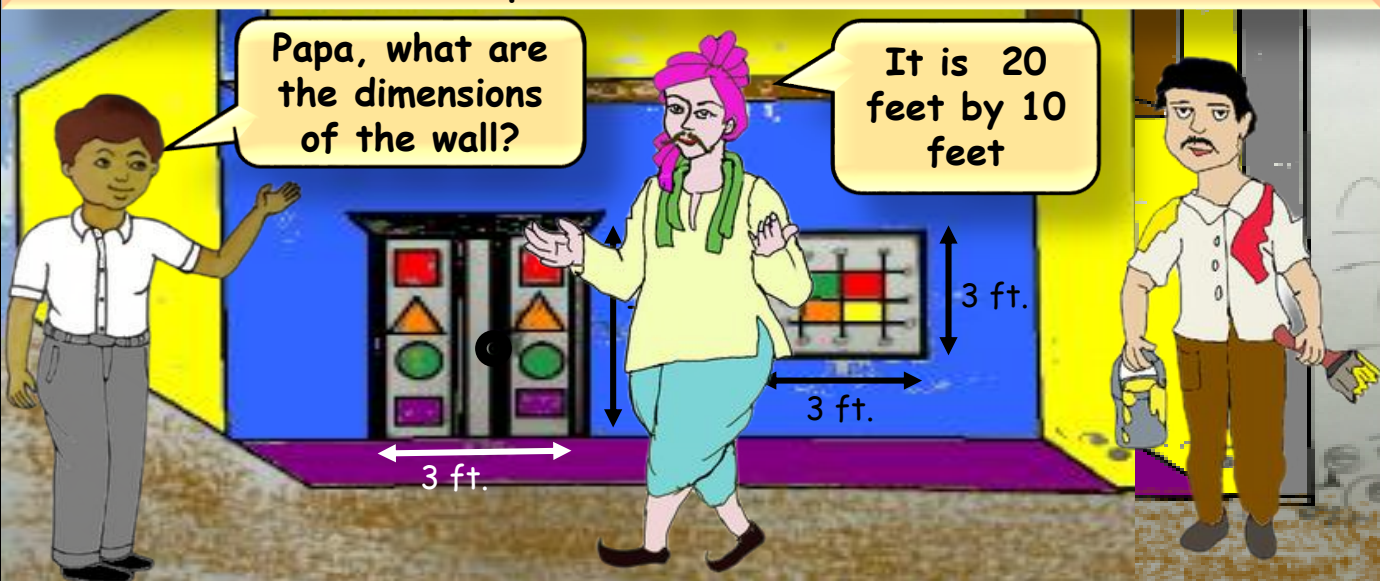
3 ft.

3 ft.

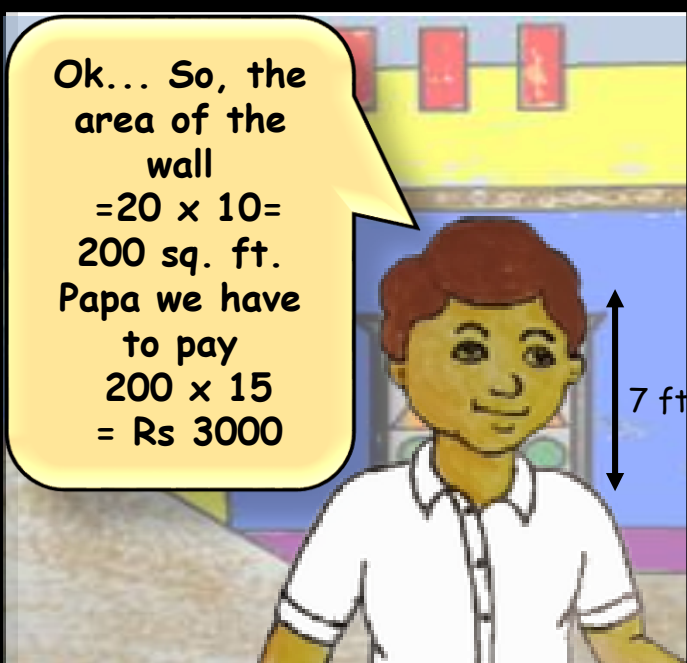
3 ft.

Rs. 15 per sq. ft.

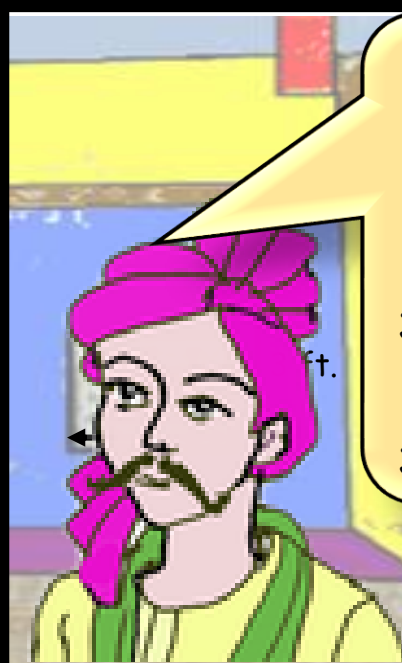
Gabru was keen to know the total money his father has to pay to the painter, for that



Ok... So, the area of the wall
 $= 20 \times 10 =$
 200 sq. ft.
Papa we have to pay
 200×15
 $= \text{Rs } 3000$



No.. No... dear son, you forgot that the wall has one door of dimension 3 ft. by 7 ft. and a window of dimension 3 ft. by 3 ft.



Yes, papa you are correct, Now I got it. We have to subtract the sum of area of the door and the window from the area of wall.



Papa, area of the door is $3 \times 7 = 21$ sq. ft. and the area of the window is $3 \times 3 = 9$ sq. ft.

Now calculate the total area of the door and the window.



7 ft.

3 ft.



3 ft.



The total area of the door and the window is 30 sq. ft.

Now, find the area of the wall to be whitewashed.



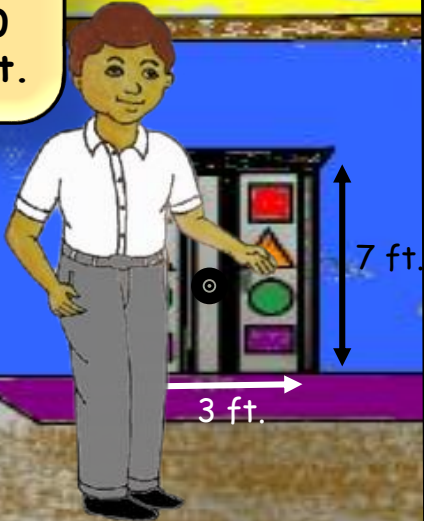
7 ft.

3 ft.

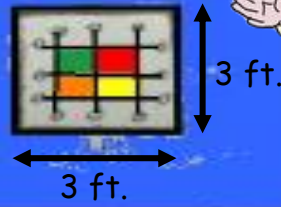


3 ft.

Yes, area to be whitewashed
= $200 - 30$
= 170 sq. ft.



Now, how much money should be paid to the painter?



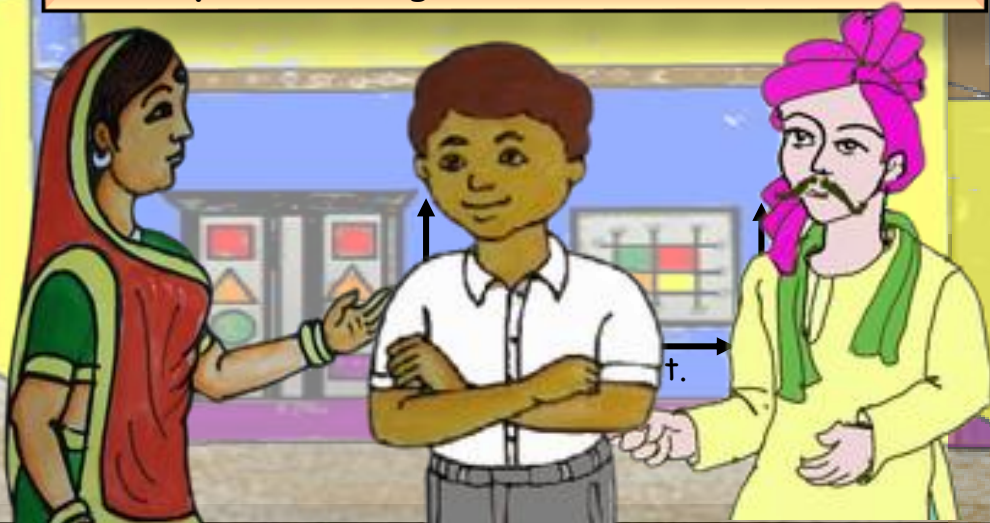
$170 \times 15 =$
Rs.2550

Baburao, we will pay you Rs.2550.

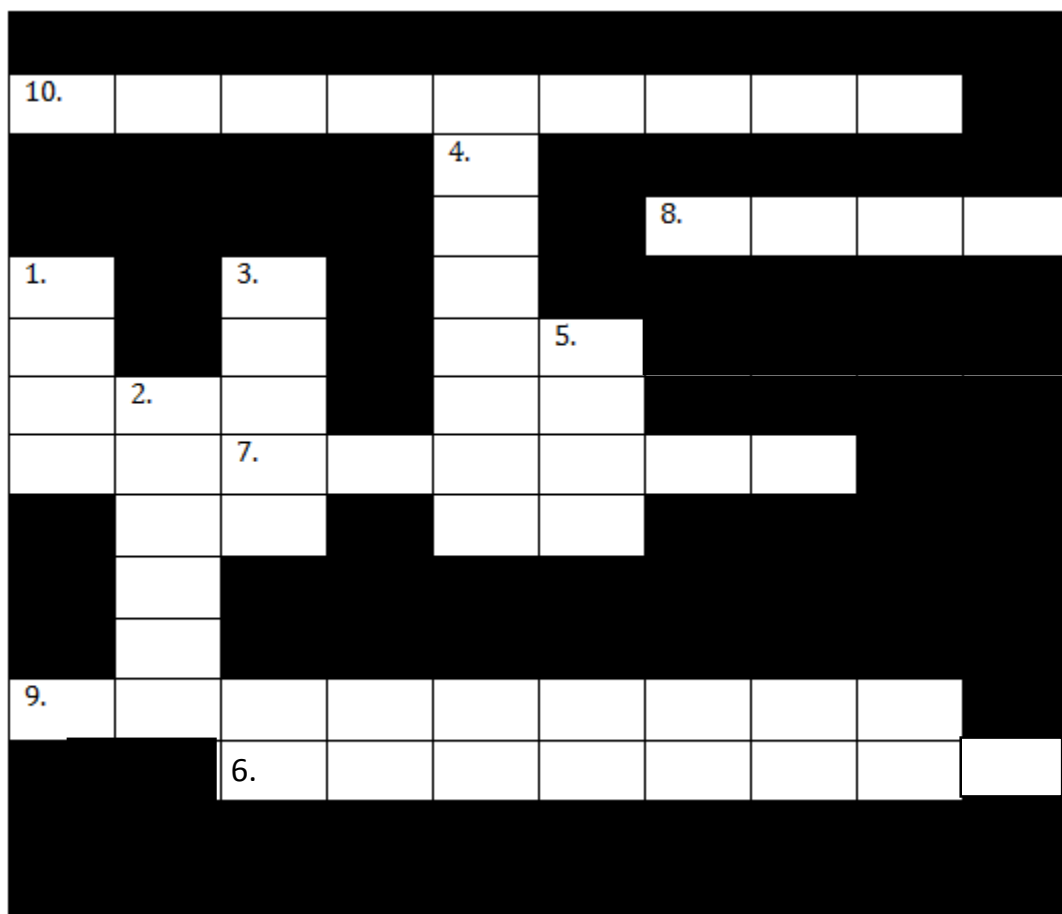
Ok, Babu ji



Gabru and his family were all set to celebrate Deepawali with great zeal and enthusiasm.



CROSSWORD PUZZLE



DOWN ↓

1. Champaklal wishes to paint his wall. For that, he will have to calculate the _____ of the wall.
2. One of the windows of the wall has all sides and angles equal, then the shape of the window is a _____.
3. The length and breadth of Gabru's rectangular pencil box are 8 cm and 5 cm, then its area is _____ sq. cm.
4. In order to perform at the school's Rangoli competition Sonu started practicing on a square tile of side 10 cm. The area covered by the square tile is _____ sq. cm.
5. Gabru has a triangular eraser. If each side of eraser is 3 cm, then its perimeter will be _____ cm.

ACROSS →

6. The shopkeeper wanted to display a triangular table cloth of sides 10 cm, 12 cm and 20 cm on his display window, the perimeter of this table cloth would be _____ cm.
7. While offering puja Bhanumati was sitting on a square mat of perimeter 80 cm, then each of its side is _____ cm.
8. The courtyard of Gabru's house is 8 m long and its perimeter is 24 m, then its breadth will be _____ m.
9. Champaklal bought a square plot of each side 14 m and his doctor friend bought a rectangular plot of length 20 m and breadth 15 m. Then the plot in the shape of a _____ encloses more area.
10. While making a card for your parents, you want to put a yarn around the card. In that case you will find the _____ of the card.

10. PERIMETER
9. RECTANGLE
8. FOUR
7. TWENTY
6. FORTY TWO

Across:

ANSWERS:

Down:
1. AREA
2. SQUARE
3. FORTY
4. HUNDRED
5. NINE

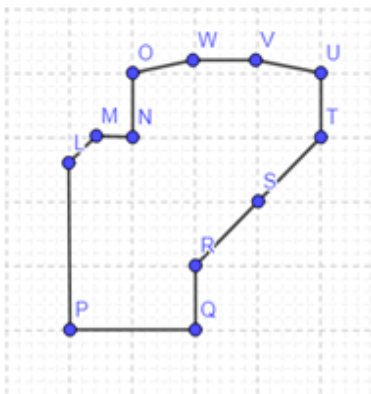
ACTIVITY

OBJECTIVE: TO FIND THE AREA OF A FIGURE USING A GRAPH-PAPER

PROCEDURE: FOR FINDING THE AREA BY USING SQUARE-SHAPED PAPER, WE FOLLOW THE FOLLOWING STEPS:

- (a) The area of one full square is taken as 1 sq unit. If it is a square centimeter sheet, then area of one full square will be 1 sq cm.
- (b) Ignore portions of the area that are less than half a square.
- (c) If more than half a square is in a region. Count it as one square.
- (d) If exactly half the square is counted, take its area as $\frac{1}{2}$ sq units.

EXAMPLE: Find the area of the following figure:



To find the area of the figure we count...

Number of complete squares covered by the figure = 9

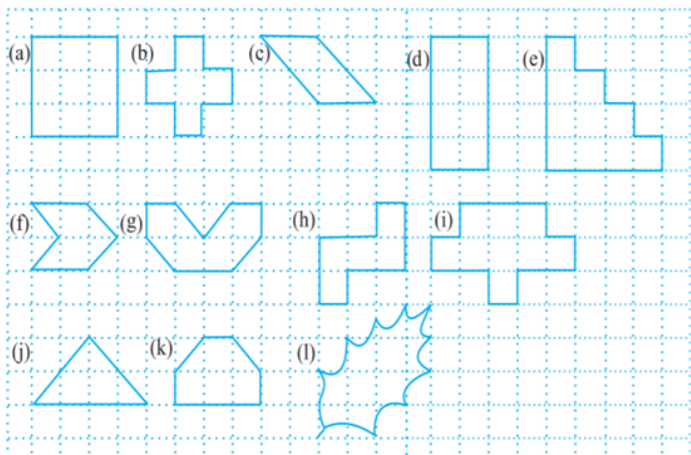
Number of squares which are covered more than half = 1

Number of half square (two half squares make one square) = 1

Therefore The area of the figure = $9 + 1 + 1$
= 11 sq. unit

Drill & Explore:

Find the area of the following figures as explained above:



REAL LIFE CONNECTION (Do the following activities using graph sheet)

- (a) Find the area of your palm and any leaf from a tree.
- (b) Draw the outlines and find the area and perimeter of your pencil box, eraser, sharpener, soap box, toothpaste box etc.

FROM THE PRINCIPAL'S PEN



Ms. Punita Nehru
(Principal)
SSSVV, INDORE

Sairam !

We invite the students to join us on an enjoyable voyage of discovery and learning through the graphic novels. To keep pace with the changing scenario in the field of education, it's time to think out of the box, evolve and adopt a variety of strategies to make pedagogy engaging and interesting. In the time and age, when children are widely exposed to a plethora of visual mediums, presenting content in the form of a graphic novel will not only ensure student engagement but also make learning enjoyable and easy to understand.

The novels are a result of the dedicated and diligent efforts of the subject teachers, the Art department and the IT department. In spite of the challenges faced due to online classes and no physical contact, students too rose to the occasion and contributed to project. The willingness and proactive support from the alumni to pitch in is truly noteworthy.

We are grateful to the CBSE for thinking about presenting content in a graphic format, such that it is accessible to all- regardless of economic and geographical disparity. A heartfelt thanks to all the concerned authorities for providing the schools a platform for creative expression of their knowledge and skill. We thank Mr. Sandeep Sethi for his consistent guidance and support through the making of the novels. Moving forward, this concept may well prove to be a game changer!

Mathematics often requires a visual understanding of the concept. This graphic novel will develop a keen interest in the learners and enable them to get a clear picture of the concepts taught. It also inspires learners to successfully apply the mathematical concepts in various practical situations thereby helping them to make sense of mathematics and communicating that understanding to others.

We hope this novel will prove to be helpful for students and make learning fun!



**SRI SATHYA SAI VIDYA VIHAR,
INDORE
(AFFILIATED TO C.B.S.E.)**

SUMMARY

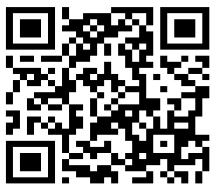
Through the story of Gabru, Champaklal and Bhanumati, the novel explains the practical application of Perimeter and Area.

It also emphasizes that Mathematics is fun, and it can be learned and applied in day-to-day life.

The novel integrates mathematical concepts with the importance of health and values.



To access the comic book and additional interactive digital content, download DIKSHA app from Google Play Store on your Android smart phone or tablet



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