



Class	Subject	Time slot	Lesson	Topic
IX	Mathematics	35+35 Mins 2 Pds	Area of Parallelograms and Triangles	☐ Proof of Relation between parallelogram and triangle on the same Base and Between the same Parallels ☐ Ex 9.2

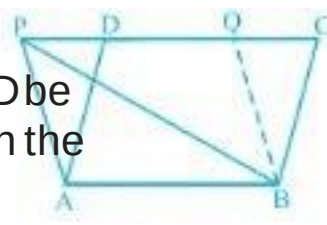
Expected Learning Outcome: Learners will be able to

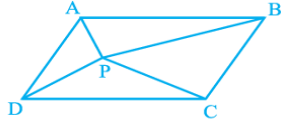
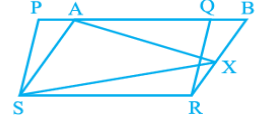
- 1) Relate the area between parallelogram and triangle on the same Base and Between the same Parallels
- 2) Apply the concept to solve the problems

Expected skill development:

- 1) Procedural thinking
- 2) Communicating using mathematical terminology relating to geometry
- 3) Representation skill while drawing the figure as per the requirement of the question
- 4) Developing connections between different properties of Parallelogram and Triangles

FLOW OF LESSON WITH RESPECT TO TIME (Introduction/ warm-up, Content, Think Line, Closure)

<u>Pedagogy</u>	<u>Content</u>
<u>(10 mins) Warm Up</u> <u>(Individual work)+ Black Board</u> <u>Demonstration by learners</u> Facilitator will discuss the Proof in the class. Theorem : Parallelograms on the same base (or equal bases) and having equal areas lie between the same parallels	Theorem 9.1 : Parallelograms on the same base (or equal bases) and having equal areas lie between the same parallels.
<u>(50 mins) Demonstration by Facilitator on Board</u> Thinkline If a triangle and a parallelogram are on the same base and between the same parallels, then prove that the area of the triangle is equal to half the area of the parallelogram.	Response by Learners Proof: Let $\triangle ABP$ and parallelogram $ABCD$ be on the same base AB and between the same parallels AB and PC (see Fig.). You wish to prove that $\text{ar}(\triangle PAB) = \frac{1}{2} \text{ar}(ABCD)$ Draw $BQ \parallel AP$ to obtain another parallelogram 

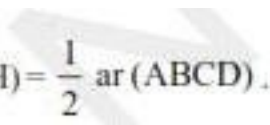
	ABQP. Now parallelograms ABQP and ABCD are on the same base AB and between the same parallels AB and PC Therefore, $\text{ar}(\text{ABQP}) = \text{ar}(\text{ABCD})$ (By Theorem 9.1) (1) But $\triangle \text{PAB} = \triangle \text{BQP}$ (Diagonal PB divides parallelogram ABQP into two congruent Triangles.) So, $\text{ar}(\text{PAB}) = \text{ar}(\text{BQP})$ (2) $\text{ar}(\text{PAB}) = \frac{1}{2} \text{ar}(\text{ABQP}) \quad [\text{From (2)}] \quad (3)$ $\text{ar}(\text{PAB}) = \frac{1}{2} \text{ar}(\text{ABCD}) \quad [\text{From (1) and (3)}]$ 4. In Fig. 9.16, P is a point in the interior of a parallelogram ABCD. Show that (i) $\text{ar}(\text{APB}) + \text{ar}(\text{PCD}) = \frac{1}{2} \text{ar}(\text{ABCD})$ (ii) $\text{ar}(\text{APD}) + \text{ar}(\text{PBC}) = \text{ar}(\text{APB}) + \text{ar}(\text{PCD})$ [Hint : Through P, draw a line parallel to AB.]  Fig. 9.16 5. In Fig. 9.17, PQRS and ABRS are parallelograms and X is any point on side BR. Show that (i) $\text{ar}(\text{PQRS}) = \text{ar}(\text{ABRS})$ (ii) $\text{ar}(\text{AXS}) = \frac{1}{2} \text{ar}(\text{PQRS})$  Fig. 9.17
<u>(10 mins) In Class Exercise: Closure Ex9.2</u> Facilitator will take rounds and intervene while the learners attempt the exercise.	Q2. If E, F, G and H are respectively the mid-points of the sides of a parallelogram ABCD, show that $\text{ar}(\text{EFGH}) = \frac{1}{2} \text{ar}(\text{ABCD}) .$

- Proposed Questions (must include the questions asked in the classroom and the ones given as class-work in the notebook

If E, F, G and H are respectively the mid-points of the sides of a parallelogram ABCD, show that

$$\text{ar}(\text{EFGH}) = \frac{1}{2} \text{ar}(\text{ABCD}) .$$

- Evaluation/ Assessment: Peer discussion will be done. Teacher will assess the children randomly and also through student teacher interaction.

Learners on the way Draw the figure of Q.2 If E,F,G,H are respectively the mid points of the sides of a parallelogram ABCD.	Advanced Learner Q2. If E,F,G and H are respectively the mid-points of the sides of a parallelogram ABCD, showthat  $\text{ar (EFGH)} = \frac{1}{2} \text{ar (ABCD)} .$
Materials needed/ Resources:- Chalk, Duster, NCERT textbook.	
Common Misconceptions:	Addressing the misconceptions:

Home **Ass**ignments: Attempt Q3, Q4, Q5 And Q.6 of Ex – 9.2 of NCERT Text Book Class 9.