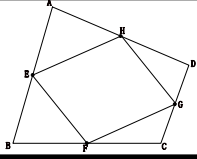
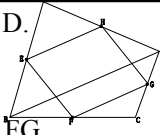


1 Goals of this class

- To become aware of the nature of diagrams by transforming quadrilateral ABCD into various shapes
- To prove that quadrilateral EFGH is a parallelogram

2 Development

Flow	○ Pupils' learning activity	· Teachers' involvement
	<p>[Question] Where the midpoints of sides AB, BC, CD, and DA of quadrilateral ABCD is E, F, G, and H, respectively, what shape does quadrilateral EFGH have?</p>	<p>· Presenting the question</p> 
(5 minutes)	<ul style="list-style-type: none"> ○ Drawing the diagram given with the [Question] and writing findings on the worksheet 	<ul style="list-style-type: none"> · Selecting three pupils from those who have drawn quadrilateral ABCD as a special form such as an infinite quadrilateral, rectangle, and square and directing them to draw their quadrilaterals
(15 minutes)	<ul style="list-style-type: none"> ○ Comparing the diagram drawn on the worksheet and the diagram drawn on the whiteboard and presenting findings *Quadrilateral EFGH is a quadrilateral. *Quadrilateral EFGH may be a rectangle or square. *EF equals half the length of AC. *EF is parallel to AC. 	<ul style="list-style-type: none"> · Stressing the need not to focus too much on one diagram and teaching that various things can be noticed by observing various diagrams · Telling the pupils to present what they have noticed no matter how small it is
(25 minutes)	<ul style="list-style-type: none"> ○ Observing the diagram with a tablet terminal and writing findings on the worksheet ○ Presenting the findings ○ Sharing ideas on the learning task of this class with other pupils, from what has been noticed to what has been guessed even though it is ambiguous 	<ul style="list-style-type: none"> · Teaching the importance of the use of a tablet terminal and directing the pupils to work in pairs to use a tablet terminal ◆ Confirm if the pupils have become aware of the nature of diagrams by transforming diagrams. · Directing the pupils to classify the findings into things they are sure of, things they are not sure of, and things that are incorrect
	<p>[Learning task] Is quadrilateral EFGH always a parallelogram no matter whatever type of quadrilateral it is?</p> <p>Draw a line to connect points B and D. According to the midpoint theorem, EH//BD, EH = 1/2 × BD ... [1] FG//BD, FG = 1/2 × BD ... [2] From [1] and [2], EH//FG and EH = FG. Accordingly, a pair of sides are parallel with the same length. Quadrilateral EFGH is a parallelogram.</p> 	<ul style="list-style-type: none"> ◆ Confirm if the pupils have come up with the proof method based on what they have learned so far. · Confirming the ideas the pupils have used for the proof and directing them to summarize the ideas on the worksheet
(40 minutes)	<p>The sets of conditions for a parallelogram are met because of the midpoint theorem, and therefore, Quadrilateral EFGH is a parallelogram.</p>	<ul style="list-style-type: none"> · Confirming the findings in solving the task which the pupils are sure of
(50 minutes)	<ul style="list-style-type: none"> ○ Writing what the pupils want to clarify in the next class * What shape is quadrilateral ABCD when quadrilateral EFGH is a rectangle or square? 	<ul style="list-style-type: none"> · Determining tasks for the next class

3 Assessing how much the goals of this class have been achieved

- Assessing if the pupils have become aware of the nature of diagrams and have proven that quadrilateral EFGH is a parallelogram by checking the worksheet and observing discussion among pupils