# **Creation of supporting video resources for enhanced learning of** geometry concepts.

AmisH Parmar, Sarita Kamat, Pankaj Tadakhe and Deepa Chari Homi Bhabha Centre for Science Education, TIFR, Mumbai.

## What are Learning Units?

Learning Units (LU) are the core part of Vigyan Pratibha<sup>1</sup> project. They are small learning modules that facilitate exploration. They deal with topics closely related to school curricula, but expose students to dimensions of science and mathematics, that go beyond the textbooks. These will be implemented by school teachers as a part of science circles for interested students. The current work is an attempt to create supporting video materials for these learning units based on mathematics.



# **Midpoint Quadrilaterals**<sup>2</sup>

- NCERT Mathematics, Class 8 and 9, Chapters on Quadrilaterals.
- Midpoint Theorem for Triangles, here it's extended to Quadrilaterals.
- Making conjectures through observations, and a geometric approach to proving those conjectures.
- A look at midpoint quadrilaterals of some special quadrilaterals.



# **ENHANCED LEARNING EXPERIENCE**

## **GeoGebra**<sup>3</sup>

- Mathematical freeware helpful in understanding co-relation between Geometry and Algebra, as well as other areas of mathematics.
- GeoGebra facilitates drawing large number of quadrilaterals, giving you a large data set which is helpful in coming up with more informed conjectures from observations.

GeoGebra



## What does the supporting video aim to achieve?

- <u>Familiarization</u> Familiarizes the viewer with the GeoGebra software and its inbuilt tools, as well as the general idea of the Midpoint Quadrilateral Learning Unit.
- <u>Motivation</u> Motivates to explore GeoGebra, and thus the Learning Unit, by asking thought provoking questions.
- <u>Visualization</u> Will help visualize geometrical idea objects and their properties easily.
- <u>Concave Quadrilaterals</u> Briefly shows the case of concave quadrilaterals, asserting the fact that the properties of MPQ are not restricted only to convex quadrilaterals which students are more familiar with. Also, challenges students to explore the idea of midpoint quadrilateral of concave quadrilaterals.
- <u>A Challenge</u> Poses an interesting challenge at the end, which aims to test the student's understanding of the applicability of the conjectures on concave quadrilaterals.



### Making Conjectures -

Introduces students to the process of making conjectures, which is an important aspect of mathematics.

Complete the following statements -
1. The midpoint quadrilateral of any quadrilateral is always a
2. The midpoint quadrilateral of a rectangle is always a
3.The midpoint quadrilateral of a rhombus is always a

4. The midpoint quadrilateral of a square is always a

Examples of conjectures.



### Difference in 'Making' & 'Constructing' -

Addresses this subtle, yet important distinction between these 2 ways of creating quadrilaterals, without giving away the answers.



Construction of a Rhombus.



1 - https://vigyanpratibha.in/

2 - https://vigyanpratibha.in/index.php/mid-point-quadrilaterals/
3 - https://www.geogebra.org/classic

**Acknowledgements** - This work is carried out under Vigyan Pratibha Project. We acknowledge the support of the Govt. Of India, Department of Atomic Energy, under the Vigyan Pratibha Project (No. R&D-TFR-0650). Authors would like to acknowledge the Learning Unit authors and the Vigyan Pratibha team, especially Aaloka Kanhere and Ankush Gupta for their continous feedback during the development of this support video.