# Lessons from
# Hong Kong Taoist Association Wun Tsuen School

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# 5M1 Area (II)

- Recognise and use the formulae for finding the areas of parallelograms, triangles and trapeziums

- Prior Knowledge

- Students learnt areas of squares and rectangles in P4. They can recognize and use the formulae for finding the areas of squares and rectangles.

# Background of NCS students in WTS

- More than half of the students are NCS students in each class/.
- They are weak in calculation.
- They give up more easily.
- They forget mathematics concept after a while.
- They like collaboration tasks.
- They like to express themselves.
- They prefer activities in lesson.
- They like investigation tasks.
- They are competent in using IT tools.

# The objectives of the lesson

- Draw relations between the area of rectangle and the area of triangle and derive the formula of the area of triangle.

- Recognize the formula of the area of triangle.

- Use the formula of the area of triangle.

# Using GeoGebra Applets

- Area of square
- https://www.geogebra.org/m/bubcw2fd
-
  Area of rectangle
- https://www.geogebra.org/m/qzjkg2a9
-
  Area of triangle
- https://www.geogebra.org/m/r5pmyjet
-
  Area of parallelogram
- https://www.geogebra.org/m/yuxekuvu
-
  Area of trapezium
- https://www.geogebra.org/m/zpb2x7nv

# Design of the Worksheet

- Part A

- Using GeoGebra applet to obtain the area of the

- Part B

- Students guess the area of the triangle (Teacher did not explicitly tell them the formula.), Then, students used the GeoGebra applet to check their guesses.

**A. Using the same base but different height, find the area of parallelogram and triangle in the following table.**

| Base (cm) | Height (cm) | Area of parallelogram | Area of triangle |
|---|---|---|---|
| 10 | 2 | | |
| 10 | 3 | | |
| 10 | 4 | | |
| 10 | 5 | | |
| 10 | 6 | | |

From observation, the area of triangle is _____ of the area of parallelogram that with the same base and height.

**B. Estimate the area of triangle in the following table.**

| Base (cm) | Height (cm) | Estimate Area of triangle | Area of triangle |
|---|---|---|---|
| 8 | 2 | | |
| 8 | 3 | | |
| 8 | 4 | | |
| 8 | 5 | | |

# Deriving the formula

- Part C

- Deriving the for the formula for the area of triangle by cutting a parallelogram.

C. Hypothesis "the area of triangle is _____.
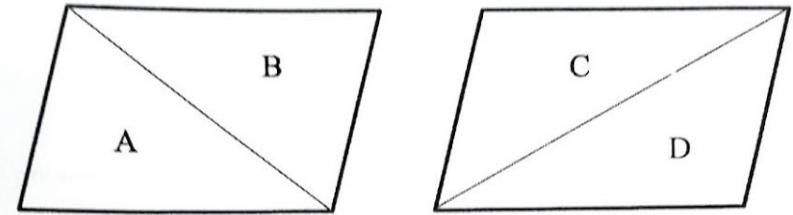


Triangle A is ( equal to / not equal to ) Triangle B.

Triangle C is ( equal to / not equal to ) Triangle D.

A parallelogram can be cut into _____ identical triangles.

The area of triangle is _____ of the area of parallelogram with the same base and height.

The area of parallelogram is **Base × Height. (Mathematical expression)**

So, the area of the triangle is _____. (Mathematical expression)

(with the same base and height)

# Episodes from Mr. Lam's class

- Class CL5 (students with higher ability)

- Teacher demonstrate how to use the GeoGebra applet, stressing the the computer help us to calculate the area of the triangle and students did not need to calculate.

- Episode 1 Pair-work with collaborative investigation (15 seconds)

- Episode 2 Students' exploration with the GeoGebra applet (21 seconds)

- Episode 3 peer helping each other (13 seconds)

- Episode 4 hand-on activities (17 seconds)

- Episode 5 Student presentation (51 seconds)

- Episode 6 Student explaining (22 seconds)

- Teacher expectation (15 seconds)

# Another Class (students with lower ability)

- Instead of deriving the formula, the students used the GeoGebra applet to check their guesses.

A. Using the same base but different height, find the area of parallelogram and triangle in the following table.

| Base (cm) | Height (cm) | Area of parallelogram | Area of triangle |
|---|---|---|---|
| 10 | 2 | 20 | 10 |
| 10 | 3 | 30 | 15 |
| 10 | 4 | 40 | 20 |
| 10 | 5 | 50 | 25 |
| 10 | 6 | 60 | 30 |

From observation, the area of triangle is _____ of the area of parallelogram that with the same base and height.

B. Estimate the area of triangle in the following table.

| Base (cm) | Height (cm) | Estimate Area of triangle | Area of triangle | |
|---|---|---|---|---|
| 8 | 2 | 8 | 8 | ✓ |
| 8 | 3 | 14 | 12 | ✗ |
| 8 | 4 | 2×(16 ✓ | 16 | ✓ |
| 8 | 5 | 32×30 ✓ | 30 / | ✓ |

# Features in the lesson

- Happy learning environment.
- Students actively engaged in the lessons.
- All the students stayed on task.
- Few teacher talk. Lots of voices from students.
- Students did

- Continue playing with the GeoGebra. Don't waste your time.

- Tool: GeoGebra, worksheets, paper parallelogram and scissors.

- Talk: Lots of students talk and discussion

- Task: Part A – basic task getting used to

- Pair work, teacher demonstration, teacher-led discussion, student presentation

- the applet; Part B -

- Thanks for the support from Mr. Ho, Mr. Pong, Mr. Lam and Mr. Au.