Quadrilaterals (P4)
四邊形（小四）

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LEARNING TARGETS 學習重點

1. Recall and consolidate the concepts of squares, rectangles and parallelograms with a focus on definition and properties **重溫並鞏固正方形、長方形、平行四邊形的性質**
2. Trapeziums (definition and properties) **梯形（定義和性質）**
3. Rhombuses (definition and properties) **菱形（定義和性質）**
4. Inclusive relationship among quadrilaterals (with Venn diagrams) **四邊形的包含關係（以溫氏圖表達）**

LEARNING CHALLENGES FACED BY STUDENTS 學生面對的困難

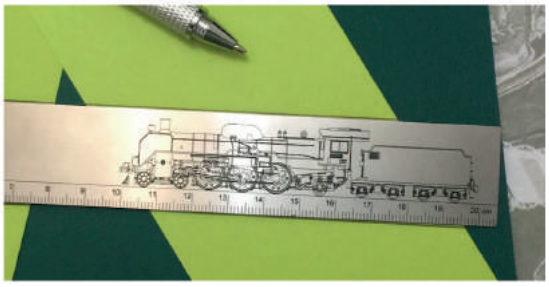
1. From identifying figures by their appearance to identifying figures by their definition and properties
    - Need to check the properties via tools (right angles, lengths, parallel lines, etc.)
    - Need to handle the details of a definition (all sides equal, opposite sides equal, etc.)
2. Language supports are needed in order to use mathematical terms to communicate (may be a burden to non-Chinese speaking (NCS) students as well as native Chinese speaking students with special educational needs (SEN))
3. Venn diagrams, despite being used by some other subjects before, may be abstract to some students

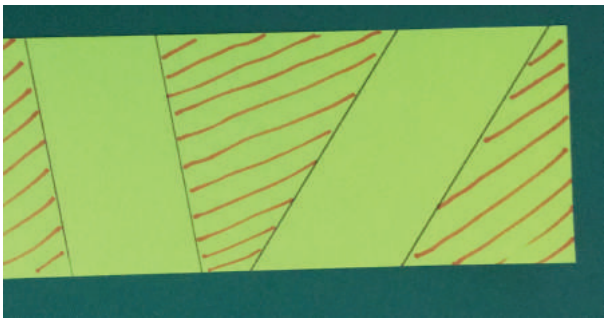
STRATEGIES TO ADDRESS STUDENTS' NEEDS

1. Connecting figures with daily life examples (with an emphasis on properties)
2. Providing figures for each student so that all students have the chance to explore the properties of each kind of figures
3. Providing language support to help students use the properties of figures in reasoning process
4. Explaining how Venn diagrams can be used in daily life to enhance students' understanding

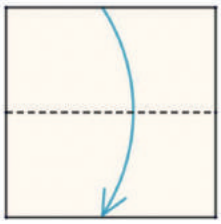
LEARNING & TEACHING STRATEGIES

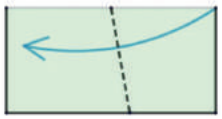
1. Students make their own quadrilaterals set (or get a set from the teacher) for investigation.
    - Use a parallel piece of paper and a ruler to make parallelograms of different shapes with equal heights. Students can measure the height of the paper and the ruler to grasp the concept that "being parallel means having a constant distance between opposite sides". The measuring process strengthens students' understanding of the concepts while reducing the communication gaps commonly found in secondary language learners.

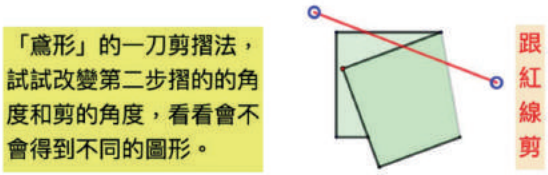




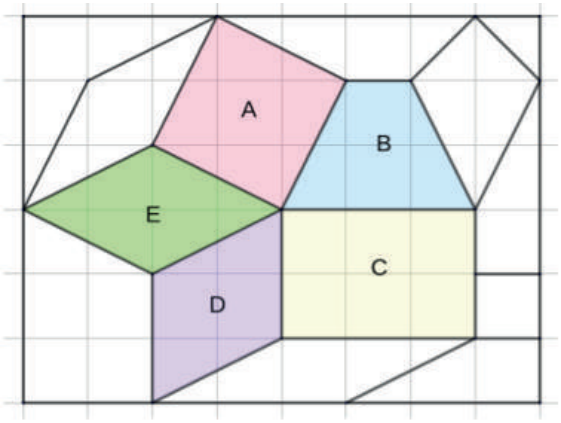
- Trapeziums can also be made with a method similar to the above. Paper strips are used to give a stronger sense of parallel sides.
- Students can make rhombuses and kites by folding and cutting straight. Overlapping the sides gives the idea of equal sides.

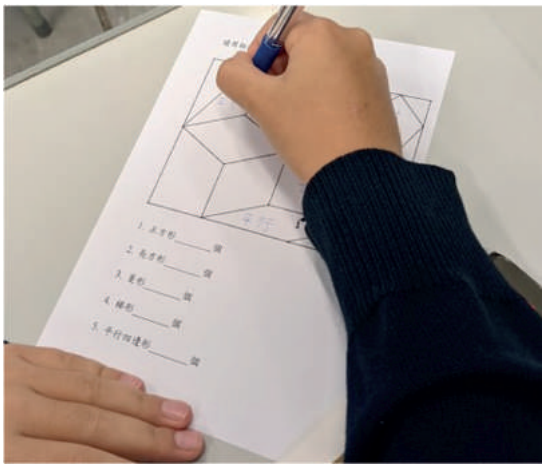






2. In key stage 1, students identify shapes by their appearance. In this topic, students need to identify shapes via their definition and properties.
    - Judging the nature of different shapes provides chances for students to think and use subject terms to communicate.





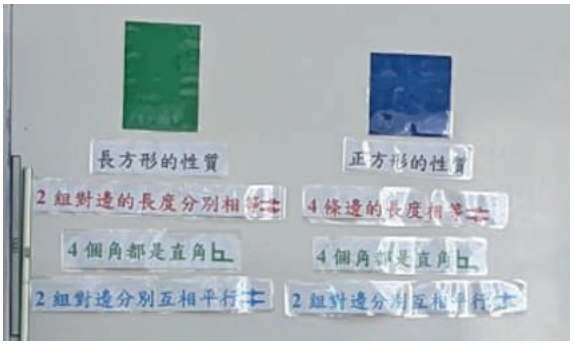
(Remarks: Some students may think figure D is a rhombus so teachers may ask them to measure and make their judgment again. Some students may not be ready to accept the fact that a figure can have multiple identities, say a rhombus as well as a parallelogram. Teachers may say, "If I say this rhombus is also a parallelogram, do you agree? Why?")

- Teachers should provide chances for students to explain in order to enhance their use of subject-specific terms (e.g. all sides are 12 cm, two sides are parallel because they are 25 mm apart, they have 4 right angles). Supporting questions like "How many right angles are there?", "Why do you think these two sides are equal?", "Why are these two sides parallel?" could be asked.

3. When checking students' understanding, tools could be provided so that students with diverse language proficiency are able to show their conceptual understanding.
    - A set of different shapes is given to each student. Each student can answer by showing one or more shapes.

- Language barrier is reduced.
- Teachers are able to get an overview of students' understanding of the properties of shapes.

4. Language support is provided with the properties of different shapes being shown clearly in distinct colours. Similar properties are displayed in the same colours for better comparison. The properties displayed allow students to pick and use when answering questions.



5. When a Venn diagram is used to classify different figures, teachers use daily life examples to help students feel what inclusive relationship is about.
    - For example, 6 students belong to ABC school and 2 of them are in 4A. The 2 4A students are students of ABC school as well. The other 4 students are students of ABC school but not in 4A.
    - Other examples could be all swans are birds but some birds are not swans.
    - When putting shapes into different parts of the Venn diagrams, teachers check each property one by one to explain where they should be put.