ELEMENTARY SCHOOL GEOMETRY: AN ANALYSIS OF CHINESE AND INDONESIAN MATHEMATICAL PROGRAMS

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Abstract: This study compares the teaching of geometry in China and Indonesia at the Elementary School (ES) level. Even though geometry is an essential component of mathematics, learning it can be challenging. The purpose of this study is to pinpoint basic problems as well as parallels and discrepancies between the subject matter geometry. Two primary areas are the focus of the analysis: (1) the curriculum's structure, including the distribution of materials and time; (2) the learning goals to be met, such as problem-solving, spatial skill development, or conceptual understanding; It is anticipated that this study shed light on the similarities and differences between the two countries' approaches to teaching geometry, as they both use a linear curriculum model with roles for the central government and local modifications. With the goal of creating a stronger mathematical foundation for upcoming generations in China and Indonesia, the findings highlight pedagogical implications for raising the standard of geometry instruction in elementary schools.

Keywords: geometry material, elementary school, and comparative study

INTRODUCTION

Fundamental mathematics education plays a crucial role in shaping children's core cognitive abilities, such as logical, analytical, and adaptive problem-solving skills (Chen, 2024). Among the various branches of mathematics, geometry stands out with its unique characteristics (Vikulova, 2025). Geometry doesn't just focus on numerical aspects; it also actively develops spatial understanding, visualization skills, and intuitive reasoning, all of which are essential for a child's holistic cognitive development. A strong foundation in geometry at the Elementary School (ES) level is a vital prerequisite for mastering more complex mathematical concepts in subsequent educational stages, and it holds broad relevance in daily life and various disciplines like art, architecture, and engineering(Fritz, 2024).

Despite its universally acknowledged urgency, geometry instruction at the elementary level frequently encounters various challenges (Nazarovich & Kurudirek, 2024). Students often struggle to visualize three-dimensional objects, grasp more abstract concepts such as symmetry or transformations, or even apply geometric formulas in varied problem contexts (Karaca, 2023). These difficulties are multifactorial, not solely stemming from the inherent complexity of geometry itself, but also strongly influenced by the prevailing curriculum design, the teaching strategies adopted by educators, and the evaluation methods used to measure student learning outcomes.

In the global context, education systems in various countries are continuously innovating and striving to enhance the quality of mathematics education to prepare younger generations for the challenges of the 21st century (Arsiya & Naseeha, 2025). In this pursuit of quality improvement, conducting comparative studies of educational practices between countries becomes highly relevant and can provide invaluable insights. China and Indonesia are two large Asian nations, each possessing distinct education systems and different socio-cultural characteristics.

Both China and Indonesia adopt a basic education curriculum model characterized by its linear nature. This means there's a clear structure and sequence of material from elementary to secondary levels, with a planned progression of concepts. In this model, the central government plays a pivotal role in setting national curriculum standards and frameworks (Fan et al., 2025). However, this mechanism also grants flexibility to local educational units to adapt and develop curriculum implementation to be more relevant to the specific needs and cultural contexts of their respective communities.

Despite similarities in their basic curriculum structure, the underlying educational philosophies, classroom learning cultures, and practical curriculum implementations in China and Indonesia can differ significantly (Laka et al., 2024). For instance, China consistently demonstrates very high achievement in prestigious international education surveys like PISA (Programme for International Student Assessment) and TIMSS (Trends in International Mathematics and Science Study), particularly in mathematics. Conversely, Indonesia continues to strive to improve its students' achievements in these international studies, indicating room for improvement and learning from global best practices (Sari & Aslamiah, 2025).

Given the substantial potential of comparative studies, this research specifically focus its analysis on the comparison of mathematics curricula at the elementary school level between China and Indonesia, with a particular emphasis on geometry. The analysis be conducted based on four comprehensive key aspects: the subject matter about geometry based on curriculum (how material is organized and progressed across grades) and learning objectives. Through a deep understanding of the differences and similarities in the two countries' approaches to geometry instruction, this research is expected to provide relevant and practical pedagogical recommendations for improving the quality of geometry education in Indonesia, and potentially serve as a valuable reference for future curriculum development.

METHOD

The study employs a qualitative research approach, specifically utilizing the comparative method. Researchers not intervene or administer treatments; instead, it focus on identifying cause-and-effect relationships between variables through comparison. The Chinese curriculum under analysis is the Mathematics education curriculum issued by the Chinese Ministry of Education in 2022. For Indonesia, the curriculum analyzed is an integrated mathematics curriculum officially implemented in 2021. The primary goal is to explore the differences, similarities, and potential for mutual learning between the basic education mathematics curricula of China and Indonesia.

RESULT AND DICSUSSION

This section presents the findings from a comparative analysis of primary school mathematics curricula in China and Indonesia, with a specific focus on geometry. The findings are structured according to four key aspects: the structure of the geometry curriculum, learning objectives, and materials used. Following the presentation of these findings, this section will proceed with an in-depth discussion of the implications of the identified differences and similarities. It's hoped that this analysis will provide relevant and practical pedagogical recommendations for improving the quality of geometry education in Indonesia, and also serve as a valuable reference for future curriculum development. The research findings will be detailed in two main sub-sections, explaining the geometry characteristics of each country, namely China and Indonesia.

1. Geometry Learning in China Based on Curriculum Mathematics Standard

In China, the primary school mathematics curriculum, including geometry, is meticulously designed to foster a robust conceptual understanding and develop strong problem-solving skills. Here's a general overview of the geometry curriculum structure in primary schools based on the Mathematics Standard 2022 Curriculum, divided by phase.

Table 1. Graphics and Geometry in China (Curriculum China, 2022)

Field	**Semester Term**			
	Section 1 (Grades 1~2).	**Section 2 (Grades 3~4)**	**Stage 3 (Grades 5~6)**	**Stage 4 (Grades 7~9)**
Graphics and geometry	1. Recognition and measurement of graphics	1. Recognition and measurement of graphics 2. The position of the figure is related to the movement	1. Recognition and measurement of graphics 2. The position of the figure is related to the movement	1. The nature of the figure 2. Changes in graphics 3. Graphics and coordinates

Geometry education at the elementary school (ES) level in China is known for its systematic, structured approach, and strong emphasis on building a solid foundation. The mathematics curriculum in China, including geometry, is centrally regulated by the government (Ministry of Education), which then serves as the primary guideline for schools across the country. Although national standards exist, some degree of local adaptation can occur.

Graphics and geometry are important areas of mathematics learning for students in the compulsory education stage, which include two themes at the primary school level:

1. **Recognition and Measurement of Figures" and "Position and Movement of Figures**

Recognition and measurement of figures" includes the recognition of three-dimensional figures and plane figures, the measurement of the length of line segments, and the calculation of the perimeter, area and volume of figures. The perception of graphics is mainly the abstraction of graphics. Students experience the process of abstracting several figures from actual objects, recognize the characteristics of figures, and perceive the relationship between points, lines, planes, and bodies. Accumulate experience in observation and thinking, and gradually form a spatial concept. The recognition of the figure is closely related to the measurement of the figure. The measurement of a graph focuses on determining the size of the graph. Students experience the process of unifying the unit of measurement, feel the meaning of the unified unit of measurement, and understand the length, angle, perimeter, area, and volume of the figure based on the unit of measurement. In the process of deriving some common calculation methods for the perimeter, area and volume of figures, we can perceive the mathematical measurement methods and gradually form a sense of quantity and reasoning (林, 2025).

"Position and Motion of Figures" includes determining the position of points, understanding the translation, rotation, and axis symmetry of figures. Students judge the position of objects based on actual situations, explore the use of number pairs to represent the position of points on the plane, and enhance spatial concept and application awareness. Students experience the abstract process of graphic movement in real life, recognize the characteristics of translation, rotation and axis symmetry, experience the change and unchanged of graphics before and after movement, feel the beauty of mathematics, and gradually form spatial concepts and geometric intuition.

1. **1st Phase (Grades 1~2)**

Content Requirements

1. Recognition and measurement of graphics

    (1) Identify simple three-dimensional graphics and plane graphics through physical objects and models, be able to classify graphics, and use simple graphics puzzles.

(2) Combined with the reality of life, understand the importance of establishing a unified unit of measurement, and understand the length unit meters and centimeters. Able to estimate the length of some objects and measure them.

(3) In the process of graphic recognition and measurement, a preliminary spatial concept and sense of volume are formed.

Academic Requirements

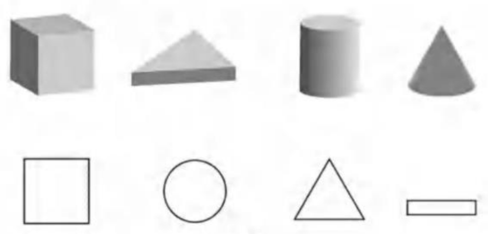
1. Recognition and measurement of graphics

Be able to recognize three-dimensional figures such as cuboids, cubes, cylinders, and spheres, and be able to visually describe the characteristics of these three-dimensional figures; Able to recognize rectangles, squares, parallelograms, triangles, circles and other plane figures, and can visually describe the characteristics of these plane figures. Figures can be easily classified according to the characteristics described.

Able to use simple graphic puzzles, and be able to name the components of the graphics in the combined figures; Be able to name a plane figure corresponding to a face in a three-dimensional figure (Example 24). Forming a preliminary concept of space.

Example 24: Find the corresponding figure. As shown in Figure 1, which of the plane figures in the second row can be traced by the solid figure models in the first row? Connect them.

Figure 1. Connecting Figures Model



Based on picture, Let students, through some operational activities, feel the relationship between solid figures and corresponding plane figures, understand the characteristics of figures, and form spatial concepts. Students can also use a method similar to stamping to print one surface of an object on paper to obtain a plane figure. On the one hand, this can cultivate spatial imagination; on the other hand, it can help students appreciate the traditional Chinese seal culture.

Perceive the importance of a unified unit, be able to appropriately choose the length unit of meters, centimeters to describe the length of common objects in life, and be able to convert between units; Able to estimate the length of some common objects around you, and measure the length of objects in your daily life with the help of tools (Example 25). Based an example, 25 Let students combine their daily life experiences to understand the meaning of length units in real situations, choose appropriate length units, and compare the lengths of objects. In teaching, let students find the length of a familiar object as a reference to make more accurate judgments.

2. **2nd Phase (Grades 3~4)**

Content Requirements

1. Recognition and measurement of graphics

(1) Recognize line segments, rays and straight lines with examples; Experience that the line segment between two points is the shortest, and know the distance between two points; A line segment with a ruler and compass is equal to a known line segment (Example 26); Understand the position of two lines in the same plane.

(2) Recognize the angle in combination with the life situation and know the relationship between the size of the angle; Will use a protractor to measure angles, and will use a protractor or triangle to draw corners.

(3) Know the length unit kilometer, know the decimeter and millimeter; Recognize the area unit centimeters2, decimeters, meters; Ability to perform simple unit conversions; The length and area of some objects can be estimated in units that can be appropriately selected, and measurements will be made.

(4) Recognize triangles and quadrilaterals, and classify triangles and quadrilaterals according to their graphic characteristics.

(5) Combine examples to understand the perimeter and area; Explore and master the formulas for calculating the perimeter and area of rectangles and squares. (6) Be able to identify simple objects observed from different angles according to specific things, photographs or visual diagrams.

(7) In the process of graphic recognition and measurement, enhance the spatial concept and sense of volume.

2. Position and movement of the figure

(1) Combine examples to experience translation, rotation, and axisymmetric phenomena (Example 27). Example 27 Understanding Translation and Rotation

(1) Among the following phenomena, which ones are translations and which ones are rotations? ① The rotation of a car's steering wheel; ② The linear movement of a train; ③ The up and down movement of an elevator; ④ The movement of a pendulum.

Figure 2. Understanding Translation and Rotation

(2) In Figure 2, which figures can be made to coincide with each other through translation? Based on Figure 2, Guide students to recognize translation and rotation by combining familiar life scenarios. They should be able to understand the changes and invariances of figures before and after translation and rotation based on life experiences, and then make figures coincide through translation and rotation. In the process of feeling the position and movement of the figure, the spatial concept and preliminary geometric intuition are formed.

Academic Requirements

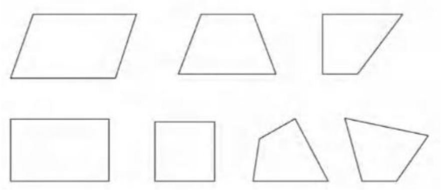
1. Recognition and measurement of graphics

Be able to tell the commonalities and differences between line segments, rays and straight lines; Know that the line segment is the shortest among all the connections between two points, and be able to use the "shortest line segment between two points" to solve simple problems in specific situations; Recognize whether two straight lines in a plane are parallel or perpendicular; Be able to recognize photographs or visual drawings of simple objects from different angles. Formation of spatial concepts and preliminary geometric intuition.

The students will compare the size of the corners; Able to tell the characteristics of right, acute, and obtuse angles, and be able to identify flat and circumferential angles; Able to measure the size of the angle with a protractor, and be able to draw an angle of a specified degree with a ruler and a protractor; Can draw angles of 30, 45°, 60, 90 with a triangle.

Triangles will be classified according to the characteristics of angles, and right-angled triangles, acute triangles and obtuse triangles will be recognized; According to the equality relationship of the sides, isosceles triangles and equilateral triangles can be recognized. Able to name the characteristics of rectangles, squares, parallelograms, trapezoids; Be able to identify the similarities and differences between figures (Example 28). Formation of spatial concepts and preliminary geometric intuition. Example 28 Commonalities and Differences of Figures. As shown in Figure 3, recognize quadrilaterals through corresponding figures and distinguish among parallelograms, trapezoids, rectangles, and squares.

Figure 3. Recognize Quadrilaterals



Able to describe length units in kilometers, decimeters, millimeters, and convert between length units; Able to choose the appropriate length unit in a real-world situation. Able to describe the unit of area in centimeters, decimeters, and meters through specific examples, and can convert between units of area.

Go through the process of drawing the three sides of a triangle into a straight line with a ruler and compass, intuitively feel the circumference of the triangle (Example 29), and know what is the perimeter of the figure; Trigonometry is measured the perimeter of shapes, rectangles, and squares; The perimeter and area of rectangles and squares are calculated.

Example 29: Recognizing the perimeter of a triangle through drawing

Draw the three sides of the triangle in sequence onto a straight line to understand the perimeter of the triangle.

Figure 4. A Triangle Through Drawing

Based on the example, Let students start from understanding the perimeter of a triangle to intuitively understand what the perimeter of a shape is. The specific method is: Use a ruler to draw a straight line, then use a compass to measure the three sides of the triangle one by one, connect the ends to draw onto the straight line, obtaining a line segment. Intuitively perceive that the length of this line segment is the perimeter of the triangle, and the additivity of the line segment length.

In the process of solving the practical problems of the perimeter and area of the figure, the experience of operation is gradually accumulated experience, forming a sense of volume and preliminary geometric intuition.

2. Position and movement of the figure

In the actual situation, it can identify the translation, rotation and axisymmetric phenomena in life, intuitively perceive the characteristics of translation, rotation and axisymmetry, and use translation or rotation to explain the phenomena in real life and form spatial concepts.

3. rd3 Phase (Grades 5~6)

Content Requirements

1. Recognition and measurement of graphics

(1) know that the sum of any two sides of the triangle is greater than the third side (Example 32); Know that the triangle and the sum of the inner angles are 180°

(2) Recognize circles and fans, and be able to draw circles with compasses; Recognize pi (example 22); Explore the formulas for calculating the circumference and area of a circle to solve simple practical problems.

(3) know the area in kilometers and hectares; explore and master the formulas for calculating the area of parallelograms, triangles and trapezoids; The area of an irregular figure is estimated (Example 33).

(4) Understand the meaning of volume (or volume) through examples, know the unit of measurement of volume (or volume), and be able to convert between units; Experience the method of measuring the volume of an irregular object.

(5) Recognize cuboids, cubes and cylinders, understand the expansion diagram of these figures, explore and master the formula for calculating the volume and surface area of these figures, recognize the conic and explore the formula for calculating its volume, and be able to solve simple practical problems with these formulas.

(6) For simple objects, be able to recognize shapes in different directions (front, side, top) (Example 34).

(7) In the process of graphic recognition and measurement, the sense of quantity, spatial concept and geometric intuition are further formed.

2. Position and movement of the figure

(1) The position of the object can be determined according to the direction and distance of the reference point; A simple roadmap will be described in a real-world scenario (Example 35).

(2) The position of a point can be represented by an ordinal pair of numbers (limited to natural numbers), and the correspondence between an ordinal pair of ordinal pairs and a point on graph paper can be understood (Example 36).

(3) Understand the scale bar, and be able to use graph paper to enlarge or reduce simple shapes in proportion.

(4) Able to translate and rotate simple figures on graph paper; Recognize axisymmetric figures and axes of symmetry, and complete simple axisymmetric graphs on graph paper.

(5) Be able to appreciate the patterns in life from the perspective of translation, rotation and axis symmetry, design simple patterns with the help of graph paper, feel the beauty of mathematics, and form a spatial concept.

Academic Requirements

1. Recognition and measurement of graphics

Explore and explain the reason that the sum of any two sides of a triangle is greater than the third side; By manipulating the figure, the sum of the inner angles of the triangle is perceived to be 180°, and the degree of the third angle can be calculated according to the degree of the known two angles.

Able to calculate the area of parallelograms, triangles, and trapezoids, and can solve practical problems with corresponding formulas.

Able to draw circles with compasses and describe the characteristics of circles and fans; Know the circumference, radius and diameter of a circle, understand that the ratio of the circumference of a circle to its diameter is a fixed value, and know pi; Able to calculate the circumference and area of a circle, and be able to solve simple practical problems with corresponding formulas.

Recognize cuboids, cubes, and cylinders, be able to name the characteristics of these figures, be able to identify the expanded drawings of these figures, and calculate the volume and surface area of these figures; Recognize the cone, be able to tell the characteristics of the cone, and calculate the volume of the cone; Able to use the corresponding formula to solve simple practical problems, and form spatial concepts and preliminary application awareness.

Able to name the area unit kilometer 3, hectare and volume unit m 3, decimeter 3, centimeter 3, and volume unit liter and milliliter, can perform unit conversion, can choose the appropriate unit to describe the actual problem. For simple objects, they can recognize the shape of the map in different directions (front, side, top) (Example 34), and can correspond the direction of observation to the corresponding shape map, forming a spatial concept.

2. Position and movement of the figure

Describe the position of an object according to the specific direction and distance of the specified reference point; A simple road map (Example 35) can be described in a familiar situation to form a geometric intuition.

It is possible to determine the position of a point on graph paper with ordinal pairs (limited to natural numbers), understand the relationship between ordinal pairs and corresponding points (Example 36), and form a spatial concept.

Recognize the scale and be able to say the meaning of the scale; In the actual scenario, the distance on the graph is converted to the actual distance according to the given ratio; On graph paper, simple figures can be enlarged or reduced according to a given scale, forming spatial concepts and reasoning awareness.

Be able to describe the position of a figure on graph paper, identify and imagine the figure after the translation and rotation of a simple figure, draw the figure after the translation of a simple figure in the horizontal or vertical direction, and the figure after the rotation of 90 (Example 30); With the help of graph paper, you can understand the changing characteristics of the translation and rotation of the figure. Knowing the axis of symmetry of axisymmetric figures (Example 31) can complete axisymmetric figures on graph paper and form a sense of reasoning. For a given simple figure, you can use translation, rotation and axis symmetry to design a pattern on graph paper, and you can tell the relationship between the design pattern and the simple figure.

2. Geometry Learning in Indonesia

The Merdeka Curriculum in Indonesia, which focuses on a more flexible and in-depth approach, features a geometry learning structure in primary schools (SD) designed to build conceptual understanding gradually and relevantly. Unlike previous curricula that might have been more rigid in material allocation per grade, the Merdeka Curriculum emphasizes Learning Outcomes (Capaian Pembelajaran - CP) per phase. This allows teachers to adjust the pace and depth of the material according to students' needs. Here's a general overview of the geometry curriculum structure in primary schools based on the Merdeka Curriculum, divided by phase:

Table 2. Phase Learning Geometry in Indonesia

Phase	Learning Outcomes	Subject Matter
Phase A (Grades 1 and 2)	In this phase, geometry learning heavily emphasizes the introduction and understanding of basic concepts through concrete experiences and manipulation.	**Geometric Shapes:** Students will learn to recognize and identify various 2D shapes (triangles, quadrilaterals, circles) and 3D shapes (cubes, rectangular prisms, cylinders, spheres, cones) in different orientations. **Characteristics of Shapes:** Students will get to know and describe the characteristics of simple 2D and 3D shapes. For example, they'll learn about the number of sides, angles, and vertices for 2D shapes, and the number of faces/sides, edges, and vertices for 3D shapes. **Patterns Based on Shapes:** Students will create and continue patterns using geometric shapes.

Phase	Learning Outcomes	Subject Matter
		Simple Transformations (Intuitive): This involves an initial introduction to concepts of translation (sliding), rotation (turning), and reflection (flipping) through hands-on activities. **Position and Direction:** Students will use basic vocabulary to describe position (above, below, left, right, front, back) and direction.
Phase B (Grades 3 and 4)	In this phase, students begin to develop a more detailed understanding of the properties of shapes and the relationships between them, as well as an introduction to measurement concepts.	**Properties of 2D Shapes:** Students will identify and describe the properties of 2D shapes in more detail, such as different types of quadrilaterals, and triangles based on their sides and angles. **Symmetry:** Students will learn about line symmetry (reflectional symmetry) and rotational symmetry in 2D shapes. **Properties of 3D Shapes:** Students will identify the properties of 3D shapes (number of faces/sides, edges, vertices) and recognize the nets of simple 3D shapes (cubes, rectangular prisms). **Perimeter and Area:** Students will measure and calculate the perimeter and area of simple 2D shapes (squares, rectangles) using standard units. **Volume (Initial Introduction):** Students will understand the concept of volume by filling simple 3D shapes (cubes, rectangular prisms) with unit cubes.
Phase C (Grades 5 and 6)	In the final phase of elementary school, students are expected to analyze the properties of shapes in greater depth, perform more complex transformations, and apply measurement concepts to various situations.	**Relationship Between Lines and Angles:** Students will identify and understand the relationships between lines (parallel, intersecting, coincident) and the types of angles (acute, right, obtuse, straight, reflex). **Advanced 2D Shape Properties:** Students will analyze the properties of various 2D shapes (e.g., parallelograms, trapezoids, rhombuses, kites) and the relationships between them. **Advanced Perimeter and Area:** Students will calculate the perimeter and area of various 2D shapes, including combinations of simple 2D shapes. **Advanced 3D Shape Volume:** Students will calculate the volume of cubes and rectangular prisms, and be introduced to the concept of volume for other 3D shapes. **Nets of 3D Shapes:** Students will create and identify the nets of various 3D shapes. **Geometric Transformations (Formalization):** Students will understand the concepts of translation (sliding), reflection (flipping), and rotation (turning) on a simple Cartesian coordinate plane.

Phase	Learning Outcomes	Subject Matter
		Cartesian Coordinates: Students will determine the position of points on a Cartesian coordinate plane.

Geometry Learning Objectives for Primary School Children Based on the Merdeka Curriculum. In the Merdeka Curriculum, geometry learning objectives for primary school children aren't detailed per grade, but rather per phase in the form of Learning Outcomes (Capaian Pembelajaran - CP). This provides flexibility for teachers to adjust the depth and pace of the material. Here are the geometry learning objectives in primary school based on the Merdeka Curriculum, divided by phase:

Table 3. The Differences in Primary School Geometry Curricula: China vs. Indonesia

Phase A (Grades 1 and 2)	Phase B (Grades 3 and 4)	Phase C (Grades 5 and 6)
Recognize and describe the characteristics of various 2D shapes (quadrilaterals, triangles, polygons, and circles) and 3D shapes (cuboids, cubes, cones, and spheres).	Describe the characteristics of various 2D and 3D shapes.	Classify various 2D shapes according to their characteristics.
Compose and decompose 2D shapes (triangles, quadrilaterals, and polygons).	Compose and decompose various 2D shapes in more than one way, if possible.	Compare various 3D shapes (including pyramids, cones, and spheres, in addition to cubes and cuboids).
Determine the position of an object relative to other objects (e.g., right, left, front, back).	Measure and estimate area and volume using non-standard and standard units of whole numbers.	Connect simple 3D shapes (cubes and cuboids) with their nets.
Group 2D shapes that have the same characteristics and state their names.	Recognize line symmetry and rotational symmetry in 2D shapes.	Calculate the area of various 2D shapes (including composite 2D shapes).
The main focus of this phase is to build initial conceptual understanding through concrete experiences and shape identification in the surrounding environment	Recognize nets of simple 3D shapes (cubes and cuboids).	Calculate the volume of cubes and cuboids.
		Understand the concept of simple Cartesian coordinates to determine position.
		Understand the concept of simple geometric

Phase A (Grades 1 and 2)	Phase B (Grades 3 and 4)	Phase C (Grades 5 and 6)
		transformations (translation, reflection, rotation) more formally.

The main focus of this phase is to analyze shape properties in more depth, perform more complex area and volume calculations, and introduce the basics of analytic geometry and transformations. Overall, the geometry learning objectives in the Merdeka Curriculum are designed to build a strong and applicable understanding, starting from shape recognition to property analysis and calculation, and preparing students for more complex geometry concepts at higher levels.

3. The Similarities in Primary School Geometry Curricula: China vs. Indonesia

Despite their distinct approaches and structures, the primary school geometry curricula in China and Indonesia share several fundamental similarities, reflecting common pedagogical goals in early geometry education.

Table 4. The Similarities in Primary School Geometry Curricula: China vs. Indonesia

Feature of Comparison	China	Indonesia	Core Similarity
1. Phased Learning Progression	Curriculum structured into four distinct sections (Grades 1-2, 3-4, 5-6, 7-9), with content building progressively.	Merdeka Curriculum organized into three phases (Phase A: Grades 1-2, Phase B: Grades 3-4, Phase C: Grades 5-6), with learning outcomes advancing through each phase.	Both curricula adopt a structured, progressive, and phased approach to geometry education, ensuring that foundational knowledge is established before moving to more advanced concepts.
2. Early Focus on Basic Shapes	Section 1 (Grades 1-2) explicitly includes identifying simple 3D (cuboids, cubes, cylinders, spheres) and 2D (rectangles, squares, parallelograms, triangles, circles) graphics.	Phase A (Grades 1-2) focuses on recognizing and identifying various 2D (triangles, quadrilaterals, circles) and 3D (cubes, rectangular prisms, cylinders, spheres, cones) shapes.	Both curricula prioritize the introduction, recognition, and understanding of fundamental 2D and 3D geometric shapes from the very earliest stages of primary education.

Feature of Comparison	China	Indonesia	Core Similarity
3. Emphasis on Spatial Concept & Intuition	Explicitly aims for students to "gradually form a spatial concept" and "geometric intuition" through recognizing figures and experiencing graphic movement.	Phase A emphasizes building initial conceptual understanding through "concrete experiences and shape identification in the surrounding environment," which inherently fosters spatial awareness and intuition.	A core objective in both is to develop students' spatial reasoning abilities and geometric intuition, moving from concrete experiences to more abstract spatial understanding.
4. Introduction of Measurement Concepts	Introduces length units (meters, centimeters) in Section 1 (Grades 1-2), then expands to area, volume, perimeter, and area calculations for various shapes in Sections 2 and 3.	Introduces perimeter and area of simple 2D shapes (squares, rectangles) in Phase B (Grades 3-4), followed by initial understanding and calculation of volume for basic 3D shapes in Phase C.	Both curricula progressively introduce fundamental measurement concepts related to geometric figures, starting with basic units and advancing to calculations of perimeter, area, and volume for various shapes.
5. Inclusion of Geometric Transformations	The "Position and Motion of Figures" theme (Sections 2 and 3) covers "translation, rotation, and axis symmetry" through practical examples.	Phase A provides an "initial introduction to concepts of translation (sliding), rotation (turning), and reflection (flipping) through hands-on activities," with later formalization in Phase C.	Both curricula incorporate the foundational concepts of geometric transformations (translation, rotation, and reflection/symmetry), introducing them through practical and intuitive approaches in primary school.

4. The Differences in Primary School Geometry Curricula: China vs. Indonesia

While both curricula share common goals, there are notable differences in their structure, depth, pedagogical approach, and specific content allocation.

Table 5. The Differences in Primary School Geometry Curricula: China vs. Indonesia

Feature of Comparison	China	Indonesia
1. Curriculum Regulation & Flexibility	- "Meticulously designed" and "centrally regulated" by the Ministry of Education. - Emphasis on a standardized and systematic approach across the country. - More prescriptive curriculum with less local adaptation.	- "More flexible and in-depth approach" (Merdeka Curriculum). - Emphasizes "Learning Outcomes (Capaian Pembelajaran - CP) per phase." - Allows teachers to "adjust the pace and depth of the material according to students' needs," indicating greater autonomy.
2. Curriculum Structure & Specificity	- Highly detailed, breaking down content and academic requirements for each phase. - Provides specific examples and outlines expected student actions (e.g., "Able to use a protractor to measure angles").	- Focuses on broader "Learning Outcomes" per phase. - Provides more general subject matter descriptions. - Offers less prescriptive detail on how objectives should be achieved or specific examples of mastery.
3. Analytical Geometry (Cartesian Coordinates)	- Groundwork for "number pairs" (position on plane) laid in 3rd Phase (Grades 5-6) primary level. - "Graphics and coordinates" introduced in Stage 4 (Grades 7-9). - Suggests an earlier, foundational introduction.	- Formally introduces "Cartesian Coordinates" to "determine the position of points on a Cartesian coordinate plane" in Phase C (Grades 5-6). - Appears as a more explicit introduction within primary school.
4. Depth of Transformation Formalization	- Discusses "translation, rotation, and axis symmetry" descriptively. - Focuses on recognizing phenomena in real life and experiencing changes/invariances.	- Introduces transformations intuitively in Phase A. - Moves towards a "more formal" understanding in Phase C, including transformations on a "simple Cartesian coordinate plane." - Suggests a more analytical approach at the primary level.
5. Specific Content & Timing (e.g., Triangle Angle Sum, Pi)	- Explicitly states exploration of "sum of the inner angles are 180°" for triangles in 3rd Phase (Grades 5-6). - Explicitly mentions "Recognize pi (example 22)" and exploring formulas for circle circumference/area in 3rd Phase (Grades 5-6).	- Explicit mention of triangle angle sum property at this level not detailed. - Explicit introduction of Pi not detailed in the provided information for primary school, though circle area/perimeter are covered.
6. Irregular Object Volume Measurement	- Specifically includes "Experience the method of measuring the volume of an irregular object" in the 3rd Phase (Grades 5-6). -	- Not explicitly detailed in the provided Indonesian curriculum overview.

Feature of Comparison	China	Indonesia
	Suggests a practical, inquiry-based element.	
7. Cultural Context	- Subtly incorporates cultural elements (e.g., using stamping figures to appreciate "traditional Chinese seal culture").	- The provided text does not explicitly mention the integration of local cultural elements within geometry learning objectives.
8. Emphasis on Reasoning & Problem Solving	- Frequently mentions fostering "strong problem-solving skills" and forming a "sense of quantity and reasoning." - Indicates a strong emphasis on application of concepts and logical thinking.	- Aims to build a "strong and applicable understanding." - Explicit emphasis on "reasoning" as a distinct academic requirement is less prominent in the provided objectives.

The primary school geometry curricula in China and Indonesia, while sharing foundational goals like a phased learning approach, early emphasis on basic shapes, fostering spatial intuition, introducing measurement, and including geometric transformations, diverge significantly in their implementation. China's curriculum is characterized by its centralized, highly detailed, and prescriptive nature, explicitly outlining specific content, academic requirements, and a strong focus on problem-solving and logical reasoning, often incorporating cultural elements. Conversely, Indonesia's Merdeka Curriculum offers a more flexible, outcomes-based approach with broader learning objectives, granting teachers greater autonomy, and formalizing analytical geometry concepts and transformations at later stages in primary school, though with less explicit detail on specific skill development or real-world problem-solving emphasis compared to China's documented approach. These differences reflect distinct national educational philosophies, balancing standardization with adaptability and varying priorities in pedagogical depth.

CONCLUSION

The study uncovered the features of elementary school geometry instruction in China and Indonesia. Despite both countries' pursuit of fundamental educational goals, such as gradual learning progress, a preliminary focus on basic geometric shapes, and the development of spatial reasoning and transformations, their approaches differ greatly.

Chinese curricula are unique in that they are highly centralized and prescriptive, offering detailed information for every stage of instruction. This encourages a strong emphasis on problem-solving skills, quantitative literacy, and logical reasoning, while also discreetly incorporating cultural values. The Merdeka Curriculum in Indonesia, on the other hand, offers more flexibility and teacher autonomy due to its more expansive Learning Outcomes, which allow for more flexible pacing and in-depth study of the material. It is crucial to comprehend these disparate characteristics. The information gathered from this analysis can be used to inform curriculum development and instructional strategies in both nations, which will ultimately result in a more thorough and successful geometry education for elementary school students and guarantee that they build a solid mathematical foundation for their future pursuits.

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