

RAFFLES WORLD ACADEMY



RAFFLES
WORLD ACADEMY

MATHEMATICS - SHAPE AND SPACE
RWA SCOPE AND SEQUENCE

RWA Scope and Sequence - Mathematics - Shape and Space

MISSION AND CORE VALUES

Raffles World Academy (RWA) was founded in September 2008. It is an independent co-educational private international day school operated by Innoventures Educational Investments LLC (aka Innoventures Education). The school began its history as Raffles International School (West Campus) and changed its name to Raffles World Academy in September 2012. The Academy is authorised to provide IBPYP in KG1-G5, IBMYP curriculum in G6-10 and IB Diploma and Courses to G11-12. It is an IB World School and a centre for Cambridge International Examinations. The school also provides other programmes including College Board PSAT and SAT, Trinity, and Mother Tongue language programmes including CNED and DELF for French. Raffles World Academy is regulated by the Dubai Knowledge and Human Development Authority (KHDA).

Our Guiding Statements

Our Vision

Providing world class education.

Our Mission

To empower students with a rigorous, holistic and international education for success in an ever-changing world.

Our Philosophy

To be recognized by the success of our students in achieving their personal goals

To make student development the centre of all school decisions

To aspire to the highest internationally recognized performance standards

To build and celebrate a culture based on internationalism

To enable the staff to become life-long learners through the development of their professional practice

Our Core Values

Achievement | Collaboration | Integrity | Respect | Responsibility

The RWA Motto

Towards Excellence

The RWA Mascot

Arabian Stallion

The RWA definition of International-Mindedness:

International Mindedness begins when we are open to and curious about the world in which we live, respect our own culture and want to know about the culture of others. We progress to acknowledge our common humanity and to recognize and value diversity existing within our communities, whether local, national or global. We exercise our individual and collective responsibilities as world citizens to safeguard the planet we share, promote peace, challenge injustice and engage in improving welfare for all, especially the disadvantaged. We seek to develop a deep understanding of the complexity, diversity and motives that underpin human actions and interactions. We strive to foster mutual respect, dialogue and cooperation through being open and willing to see the world through the lens of all those who share it with us.

As an IB school, international-mindedness is embodied in our implementation of the IB Learner Profile, which challenges students to be communicators in multiple languages, principled in their promotion of international justice, risk-takers in the spirit of exploring new cultures, knowledgeable about world issues, thinkers about complex problems, caring and committed to service, inquirers about the world, open-minded toward other perspectives, balanced in their approach to life, and reflective about their own personal development.

IB MISSION STATEMENT

IB mission statement The International Baccalaureate aims to develop inquiring, knowledgeable and caring young people who help to create a better and more peaceful world through intercultural understanding and respect. To this end the organization works with schools, governments and international organizations to develop challenging programmes of international education and rigorous assessment. These programmes encourage students across the world to become active, compassionate and lifelong learners who understand that other people, with their differences, can also be right.

IB Learner Profile

The aim of all IB programmes is to develop internationally minded people who, recognizing their common humanity and shared guardianship of the planet, help to create a better and more peaceful world.

IB learners strive to be:

Inquirers: They develop their natural curiosity. They acquire the skills necessary to conduct inquiry and research and show independence in learning. They actively enjoy learning and this love of learning will be sustained throughout their lives.

Knowledgeable: They explore concepts, ideas and issues that have local and global significance. In so doing, they acquire in-depth knowledge and develop understanding across a broad and balanced range of disciplines.

Thinkers: They exercise initiative in applying thinking skills critically and creatively to recognize and approach complex problems, and make reasoned, ethical decisions.

Communicators: They understand and express ideas and information confidently and creatively in more than one language and in a variety of modes of communication. They work effectively and willingly in collaboration with others.

RWA Scope and Sequence - Mathematics - Shape and Space

Principled: They act with integrity and honesty, with a strong sense of fairness, justice and respect for the dignity of the individual, groups and communities. They take responsibility for their own actions and the consequences that accompany them.

Open-minded: They understand and appreciate their own cultures and personal histories, and are open to the perspectives, values and traditions of other individuals and communities. They are accustomed to seeking and evaluating a range of points of view, and are willing to grow from the experience.

Caring: They show empathy, compassion and respect towards the needs and feelings of others. They have a personal commitment to service, and act to make a positive difference to the lives of others and to the environment.

Risk-takers: They approach unfamiliar situations and uncertainty with courage and forethought, and have the independence of spirit to explore new roles, ideas and strategies. They are brave and articulate in defending their beliefs.

Balanced: They understand the importance of intellectual, physical and emotional balance to achieve personal well-being for themselves and others.

Reflective: They give thoughtful consideration to their own learning and experience. They are able to assess and understand their strengths and limitations in order to support their learning and personal development.

RWA Scope and Sequence - Mathematics - Shape and Space

Phase 1

Overall Expectation Phase 1: Learners will understand that shapes have characteristics that can be described and compared. They will understand and use common language to describe paths, regions and boundaries of their immediate environment.

PYP Conceptual Understanding:

- Shapes can be described and organized according to their properties.
- Objects in our immediate environment have a position in space that can be described according to a point of reference.

Learning Outcomes:

P1	P2	P3	P4	P5	P6	P7	P8
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RWA Scope and Sequence - Mathematics - Shape and Space

<p>KG 1</p>	<p>P1:</p> <ul style="list-style-type: none"> Notices simple shapes and patterns in pictures. Beginning to categorise objects according to properties such as shape or size. Begins to use the language of size. 	<p>P2:</p> <ul style="list-style-type: none"> Shows an interest in shape and space by playing with shapes or making arrangements with objects. <i>C: I can use shapes to play</i> <i>T: I can show an interest in shape and space by playing with shapes or making arrangements with objects.</i> <i>A: I can use shapes creatively to build, design or make patterns</i> Shows awareness of similarities of shapes in the environment. <i>C: I understand shapes exist in a real-life environment</i> <i>T: I can show awareness of similarities of shapes in the environment</i> <i>A: I can organize real-life objects in an environment by their shape</i> Uses positional language. <i>C: I can understand that common language can be used to describe position and direction, for example, inside, outside, above, below, next to, behind, in front of, up, down.</i> <i>T: I can use positional language.</i> <i>A: I can apply common language used to describe position to solve problems in real-life</i> Uses shapes appropriately for tasks. Beginning to talk about the shapes of everyday objects, e.g. 'round' and 'tall' 	<p>P3:</p> <ul style="list-style-type: none"> Beginning to use mathematical names for 'solid' 3D shapes and 'flat' 2D shapes, and mathematical terms to describe shapes. <i>C: I can understand that 2D and 3D shapes have characteristics that can be described and compared</i> <i>T: I can begin to use mathematical names for 'solid' 3D shapes and 'flat' 2D shapes, and mathematical terms to describe shapes.</i> <i>A: I can use language to identify 2D and 3D shapes in a real-life environment</i> Selects a particular named shape. <i>C: I understand language used to identify shapes</i> <i>T: I can select a particular named shape.</i> <i>A: I can identify shapes of real-life objects</i> Can describe their relative position such as 'behind' or 'next to'. <i>C: I can understand that common language can be used to describe position and direction, for example, inside, outside, above, below, next to, behind, in front of, up, down.</i> <i>T: I can describe my relative position such as 'behind' or 'next to'.</i> 		<p>P5:</p> <ul style="list-style-type: none"> Children use everyday language to talk about size, weight, capacity, positions, distance, time and money to compare quantities and objects and to solve problems. <i>C: I can understand that common language can be used to describe size, weight, capacity, positions, distance, time and money</i> <i>T: I can use everyday language to talk about size, weight, capacity, positions, distance, time and money to compare quantities and objects and to solve problems.</i> <i>A: I can apply language to compare quantities and objects to solve problems</i> 	<p>P6:</p> <ul style="list-style-type: none"> Children recognize, create and describe patterns <i>C: I can understand that patterns can be repetition of shapes, colors, sizes, etc</i> <i>T: I can recognize, create and describe patterns</i> <i>A: I can identify patterns in real-life objects and create patterns using real-life objects</i> 	<p>P7:</p> <ul style="list-style-type: none"> Using quantities and objects, they add and subtract two single-digit numbers and count on or back to find the answer <i>C: I can use shapes to understand quantities</i> <i>T: I can use quantities and objects, they add and subtract two single-digit numbers and count on or back to find the answer</i> <i>A: I can add and subtract real-life objects to solve problems</i> 	<p>P8:</p> <ul style="list-style-type: none"> Children explore characteristics of everyday objects and shapes and use mathematical language to describe them <i>C: I can understand that 2D and 3D shapes have characteristics that can be described and compared</i> <i>T: I can explore characteristics of everyday objects and shapes and use mathematical language to describe them</i> <i>A: I can identify 2D and 3D shapes in a real-life environment</i>
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RWA Scope and Sequence - Mathematics - Shape and Space

Phase 2

Overall Expectation Phase 2: Learners will continue to work with 2D and 3D shapes, developing the understanding that shapes are classified and named according to their properties. They will understand that examples of symmetry and transformations can be found in their immediate environment. Learners will interpret, create and use simple directions and specific vocabulary to describe paths, regions, positions and boundaries of their immediate environment.

PYP Conceptual Understandings:

- Shapes are classified and named according to their properties.
- Some shapes are made up of parts that repeat in some way.
- Specific vocabulary can be used to describe an object's position in space.

Learning Outcomes:

Shape and Space

KG2 Shape and Space: Shape

Recognize and name common 2D and 3D shapes, including rectangles, squares, circles and triangles, cuboids, pyramids and spheres.

- *C: I can understand that there are relationships among and between 2D and 3D shapes*
- *T: I can recognize and name common 2D and 3D shapes, including rectangles, squares, circles and triangles, cuboids, pyramids and spheres.*
- *A: I can analyze and use what they know about 3D shapes to describe and work with 2D shapes*

Describe position, direction and movement, including whole, half, quarter and three quarter turns

- *C: I can understand that directions can be used to describe pathways, regions, positions and boundaries of their immediate environment.*
- *T: I can describe position, direction and movement, including whole, half, quarter and three quarter turns*
- *A: I can interpret and use simple directions, describing paths, regions, positions and boundaries of their immediate environment.*

Notes

- Learners need to understand the properties of 2D and 3D shapes before the mathematical vocabulary associated with shapes makes sense to them. Through creating and manipulating shapes, learners align their natural vocabulary with more formal mathematical vocabulary and begin to appreciate the need for this precision

Shape and Space

RWA Scope and Sequence - Mathematics - Shape and Space

Grade 1	<p>Shape and Space: Properties of Shapes</p> <p>Identify and describe the properties of 2D shapes, including the number of sides and line symmetry in a vertical line.</p> <ul style="list-style-type: none">• <i>C: I can understand the properties of 2D shapes</i>• <i>T: I can identify and describe the properties of 2D shapes, including the number of sides and line symmetry in a vertical line.</i>• <i>A: I can identify and describe 2D shapes found in a real-life environment</i> <p>Identify and describe the properties of 3D shapes, including the number of edges, vertices and faces.</p> <ul style="list-style-type: none">• <i>C: I can understand the properties of 3D shapes</i>• <i>T: I can identify and describe the properties of 3D shapes, including the number of edges, vertices and faces.</i>• <i>A: I can identify and describe 2D shapes found in a real-life environment</i> <p>Identify 2D shapes on the surface of 3D shapes, [for example, a circle on a cylinder and a triangle on a pyramid.]</p> <ul style="list-style-type: none">• <i>C: I can understand that there are relationships among and between 2D and 3D shapes</i>• <i>T: I can identify 2D shapes on the surface of 3D shapes, [for example, a circle on a cylinder and a triangle on a pyramid.]</i>• <i>A: I can analyze and use what they know about 2D shapes to describe and work with 3D shapes</i> <p>Compare and sort common 2D and 3D shapes and everyday objects.</p> <ul style="list-style-type: none">• <i>C: I can understand that 2D and 3D shapes can be created by putting together and/or taking apart other shapes</i>• <i>T: I can compare and sort common 2D and 3D shapes and everyday objects.</i>• <i>A: I can identify 2D and 3D shapes found in everyday items - natural and manmade</i> <p>Order and arrange combinations of mathematical objects in patterns and sequences.</p> <ul style="list-style-type: none">• <i>C: I can understand that shapes can be ordered and arranged by their properties</i>• <i>T: I can order and arrange combinations of mathematical objects in patterns and sequences.</i>• <i>A: I can put common everyday shapes into patterns and sequences</i> <p>Use mathematical vocabulary to describe position, direction and movement, including movement in a straight line and distinguishing between rotation as a turn and in terms of right angles for quarter, half and three-quarter turns (clockwise and anticlockwise)</p> <ul style="list-style-type: none">• <i>C: I can understand that directions can be used to describe pathways, regions, positions and boundaries of their immediate environment.</i>• <i>T: I can use mathematical vocabulary to describe position, direction and movement, including movement in a straight line and distinguishing between rotation as a turn and in terms of right angles for quarter, half and three-quarter turns (clockwise and anticlockwise)</i>• <i>A: I can interpret and use simple directions, describing paths, regions, positions and boundaries of their immediate environment.</i> <p>Notes</p> <ul style="list-style-type: none">• Learners need to understand the properties of 2D and 3D shapes before the mathematical vocabulary associated with shapes makes sense to them. Through creating and manipulating shapes, learners align their natural vocabulary with more formal mathematical vocabulary and begin to appreciate the need for this precision.
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RWA Scope and Sequence - Mathematics - Shape and Space

Overall Expectation Phase 3: Learners will sort, describe and model regular and irregular polygons, developing an understanding of their properties. They will be able to describe and model congruency and similarity in 2D shapes. Learners will continue to develop their understanding of symmetry, in particular reflective and rotational symmetry. They will understand how geometric shapes and associated vocabulary are useful for representing and describing objects and events in real-world situations.

PYP Conceptual Understandings:

- Changing the position of a shape does not alter its properties.
- Shapes can be transformed in different ways.
- Geometric shapes and vocabulary are useful for representing and describing objects and events in real-world situations.

Learning Outcomes

Shape and Space	
Grade 2	<p>Shape and Space: Properties of Shapes</p> <p>Recognize angles as a property of shape or a description of turn.</p> <ul style="list-style-type: none"> • <i>C: I can understand an angle as a measure of rotation</i> • <i>T: I can recognize angles as a property of shape or a description of turn.</i> • <i>A: I can apply my knowledge of angles to identify properties of shapes</i> <p>Identify right angles, recognize that two right angles make a half-term, three make three quarters of a turn and four a complete turn; identify whether angles are greater than or less than a right-angle.</p> <ul style="list-style-type: none"> • <i>C: I can understand an angle as a measure of rotation</i> • <i>T: I can identify right angles, recognize that two right angles make a half-term, three make three quarters of a turn and four a complete turn; identify whether angles are greater than or less than a right-angle.</i> • <i>A: I can identify, explain and compare different angles found in a real-life environment</i> <p>Identify horizontal and vertical lines and pairs of perpendicular and parallel lines.</p> <ul style="list-style-type: none"> • <i>C: I can understand lines are continuous and can intersect or stay separate</i> • <i>T: I can identify horizontal and vertical lines and pairs of perpendicular and parallel lines.</i> • <i>A: I can identify and describe types of lines seen in a real-life environment</i> <p>Draw 2-D shapes and make 3-D shapes using modelling materials.</p> <ul style="list-style-type: none"> • <i>C: I can identify 2D shapes that make up different 3D shapes</i> • <i>T: I can draw 2-D shapes and make 3-D shapes using modelling materials.</i> • <i>A: I can analyze and describe 2D and 3D shapes, including regular and irregular polygons, using geometrical vocabulary</i> <p>Recognize 3-D shapes in different orientations and describe them</p> <ul style="list-style-type: none"> • <i>C: I can model different 3D shapes by constructing or drawing models</i> • <i>T: I can recognize 3-D shapes in different orientations and describe them</i> • <i>A: I can analyze and describe 3D shapes using geometrical vocabulary</i> <p>Notes</p> <ul style="list-style-type: none"> • Computer and web-based applications can be used to explore shape and space concepts such as symmetry, angles and coordinates. • The units of inquiry can provide authentic contexts for developing understanding of concepts relating to location and directions.
Shape and Space	

RWA Scope and Sequence - Mathematics - Shape and Space

Grade 3	<p>Shape and Space: Angles</p> <p>Identify acute and obtuse angles and compare and order angles up to two right angles by size.</p> <ul style="list-style-type: none">• C: I can understand an angle as a measure of rotation• T: I can identify acute and obtuse angles and compare and order angles up to two right angles by size.• A: I can identify, compare and order angles that appear in a real-life environment <p>Shape and Space: Shape and Symmetry</p> <p>Compare and classify geometric shapes, including quadrilaterals and triangles, based on their properties and sizes.</p> <ul style="list-style-type: none">• C: I can understand the properties of regular and irregular geometric shapes• T: I can compare and classify geometric shapes, including quadrilaterals and triangles, based on their properties and sizes.• A: I can identify, describe and model congruency and similarity in 2D shapes <p>Identify lines of symmetry in 2D shapes presented in different orientations.</p> <ul style="list-style-type: none">• C: I can understand that lines and axes of reflective and rotational symmetry assist with the construction of shapes• T: I can identify lines of symmetry in 2D shapes presented in different orientations.• A: recognize and explain symmetrical patterns in the environment <p>Complete a simple symmetric figure with respect to a specific line of symmetry</p> <ul style="list-style-type: none">• C: I can understand that lines and axes of reflective and rotational symmetry assist with the construction of shapes• T: I can complete a simple symmetric figure with respect to a specific line of symmetry• A: recognize and explain symmetrical patterns in the environment <p>Shape and Space: Position and Direction</p> <p>Describe positions on a 2D grid as coordinates in the first quadrant.</p> <ul style="list-style-type: none">• C: I can understand that positions can be represented by coordinates on a grid• T: I can describe positions on a 2D grid as coordinates in the first quadrant.• A: I can apply knowledge of position and grids to problem-solving situations. <p>Describe movements between positions as translations of a given unit to the left/ right and up/ down.</p> <ul style="list-style-type: none">• C: I can understand that directions for location can be represented by coordinates on a grid• T: I can describe movements between positions as translations of a given unit to the left/ right and up/ down.• A: I can apply knowledge of transformations to problem-solving situations. <p>Plot specified points and draw sides to complete a given polygon</p> <ul style="list-style-type: none">• C: I can understand that positions can be represented by coordinates on a grid• T: I can plot specified points and draw sides to complete a given polygon• A: I can apply knowledge of position and grids to problem-solving situations. <p>Notes</p> <ul style="list-style-type: none">• Computer and web-based applications can be used to explore shape and space concepts such as symmetry, angles and coordinates.• The units of inquiry can provide authentic contexts for developing understanding of concepts relating to location and directions.
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RWA Scope and Sequence - Mathematics - Shape and Space

Overall Expectation Phase 4: Learners will understand the properties of regular and irregular polyhedra. They will understand the properties of 2D shapes and understand that 2D representations of 3D objects can be used to visualize and solve problems in the real world, for example, through the use of drawing and modelling. Learners will develop their understanding of the use of scale (ratio) to enlarge and reduce shapes. They will apply the language and notation of bearing to describe direction and position.

PYP Conceptual Understandings:

- Manipulation of shape and space takes place for a particular purpose.
- Consolidating what we know of geometric concepts allows us to make sense of and interact with our world.
- Geometric tools and methods can be used to solve problems relating to shape and space.

Learning Outcomes:

Shape and Space	
Grade 4	<p>Shape and Space: Angles</p> <p>Know angles are measured in degrees; estimate and compare acute, obtuse and reflex angles.</p> <ul style="list-style-type: none"> • <i>C: I can understand an angle as a measure of rotation.</i> • <i>T: I know angles are measured in degrees; estimate and compare acute, obtuse and reflex angles.</i> • <i>A: I can identify, estimate and compare types of angles in a real-life environment</i> <p>Draw given angles and measure them in degrees (°).</p> <ul style="list-style-type: none"> • <i>C: I can select the appropriate tools to complete measurements</i> • <i>T: I can draw given angles and measure them in degrees (°).</i> • <i>A: I can select and use appropriate units of measurement and tools to solve problems in real-life situations</i> <p>Identify: angles at a point and one whole turn (total 360°), angles at a point on a straight line and ½ a turn (total 180°) other multiples of 90°</p> <ul style="list-style-type: none"> • <i>C: I can understand an angle as a measure of rotation.</i> • <i>T: I know angles are measured in degrees; estimate and compare acute, obtuse and reflex angles.</i> • <i>A: I can identify, estimate and compare types of angles in a real-life environment</i> <p>Shape and Space: Shapes</p> <p>Identify 3D shapes, including cubes and other cuboids, from 2D representations.</p> <ul style="list-style-type: none"> • <i>C: I can understand that 2D representations of 3D objects can be used to visualize and solve problems</i> • <i>T: I can identify 3D shapes, including cubes and other cuboids, from 2D representations.</i> • <i>A: I can use 2D representations of 3D objects to visualize and solve problems, for example using drawings or models.</i> <p>Use the properties of rectangles to deduce related facts and find missing lengths and angles.</p> <ul style="list-style-type: none"> • <i>C: I can understand the properties of regular rectangles</i> • <i>T: I can use the properties of rectangles to deduce related facts and find missing lengths and angles.</i> • <i>A: I can use geometric vocabulary when describing shape and space in mathematical situations and beyond</i> <p>Distinguish between regular and irregular polygons based on reasoning about equal sides and angles.</p> <ul style="list-style-type: none"> • <i>C: I can understand the properties of regular and irregular polygons</i> • <i>T: I can distinguish between regular and irregular polygons based on reasoning about equal sides and angles.</i> • <i>A: I can use geometric vocabulary when describing shape and space in mathematical situations and beyond</i> <p>Shape and Space: Position and Direction</p> <p>Identify, describe and represent the position of a shape following a reflection or translation, using the appropriate language, and know that the shape has not changed</p> <ul style="list-style-type: none"> • <i>C: I can understand systems for describing position and direction</i> • <i>T: I can identify, describe and represent the position of a shape following a reflection or translation, using the appropriate language, and know that the shape has not changed</i> • <i>A: I can apply the language and notation of bearing to describe direction and position</i> <p>Notes</p> <ul style="list-style-type: none"> • Tools such as compasses and protractors are commonly used to solve problems in real-life situations. However, care should be taken to ensure that students have a strong understanding of the concepts embedded in the problem to ensure meaningful engagement with the tools and full understanding of the solution
Shape and Space	

RWA Scope and Sequence - Mathematics - Shape and Space

Grade 5

Shape and Space: Properties of Shapes

Draw 2D shapes using given dimensions and angles.

- *C: I can understand the properties of regular and irregular polyhedral*
- *T: I can draw 2D shapes using given dimensions and angles.*
- *A: I can use geometric vocabulary when describing shape and space in mathematical situations and beyond*

Compare and classify geometric shapes based on their properties and sizes and find unknown angles in any triangles, quadrilaterals and regular polygons.

- *C: I can understand the properties of regular and irregular polyhedral*
- *T: I can compare and classify geometric shapes based on their properties and sizes and find unknown angles in any triangles, quadrilaterals and regular polygons.*
- *A: I can use geometric vocabulary when describing shapes and their properties in a real-life environment*

Recognize angles where they meet at a point, are on a straight line, or are vertically opposite, and find missing angles.

- *C: I can understand an angle as a measure of rotation.*
- *T: I can recognize angles where they meet at a point, are on a straight line, or are vertically opposite, and find missing angles.*
- *A: I can recognize, measure and find missing angles in our real-life environment*

Shape and Space: Position and Direction

Describe positions on the full coordinate grid (all four quadrants).

- *C: I can understand systems for describing position and direction*
- *T: I can describe positions on the full coordinate grid (all four quadrants).*
- *A: I can apply the language and notation of bearing to describe direction and position*

Draw and translate simple shapes on the coordinate plane, and reflect them in the axes.

- *C: I can understand systems for describing position and direction*
- *T: I can draw and translate simple shapes on the coordinate plane, and reflect them in the axes.*
- *A: I can apply the language and notation of bearing to describe direction and position*

Notes

- Tools such as compasses and protractors are commonly used to solve problems in real-life situations. However, care should be taken to ensure that students have a strong understanding of the concepts embedded in the problem to ensure meaningful engagement with the tools and full understanding of the solution.