

Summer Term 1 Overview Year 5 – Maths

Summer Term Book– Mortal Engines

Topic: Block 3 Geometry: Position and Direction

Guide Time = 2 Weeks

Assessment:

WRMH End of block / term assessments
 Weekly Arithmetic Tests
 Termly Year 5 tests (whole PAT assessment cycle)

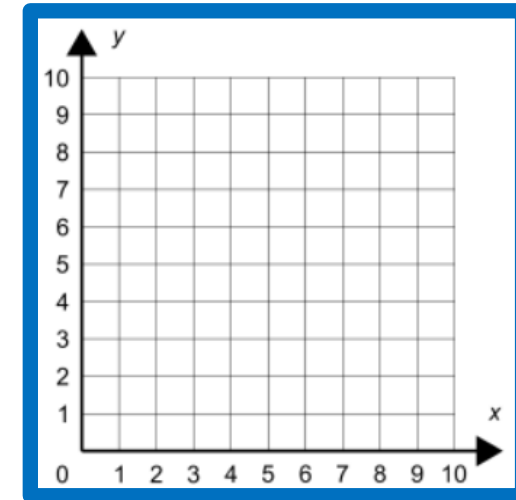
Links to prior learning (sequencing) and canon book

Children recap their use of coordinates from Year 4. They start with an understanding of the origin (0, 0), before moving onto reading other coordinates. They understand that the first number represents the x -coordinate and the second number represents the y -coordinate. Teachers might explain how a coordinate is fixed (does not move) whereas a point can be plotted at different coordinates, so it can be moved.
 Children will transition away from previously invoked vocabulary when working within this topic to better describe data and information.

Links to other learning (cross fertilisation)

History Research architectural development beginning in the Stone Age to understand how the development of mathematics (particularly the properties of shape and position and direction) influenced the development of various civilizations throughout human history. How did we progress from living in small groupings of huts to sprawling cities through the use of mathematics?
Active Maths - provide additional maths questions/ problems based around maps and orienteering VIPs. These will allow children to apply their knowledge and understanding mentally at another time / lesson e.g. in PE: How coordinates can be used to position yourself in the world.
Science / Geography Use the 1st quadrant to plot key points of interest within Pontefract and to apply knowledge of the 1st quadrant to plot graphs, which represent data collected and collated during our science lessons.
 Use the eight points of a compass, four and six figure grid references, symbols and key (including OS maps) to build their knowledge of the United Kingdom and the wider world.

Very Important Points (VIPs):



Coordinates are written as (x, y) meaning the point on the x -axis is written first, followed by the point on the y -axis. Some children may be taught to remember this with the phrase 'along the corridor, up the stairs', meaning that they should follow the x -axis first and then the y .

Quadrant I is the **first quadrant**. It is located on the upper right side of the plane. All points plotted in the **first quadrant** have both positive x -coordinates and positive y -coordinates. **Quadrant II** is the **second quadrant**. It is located on the upper left side of the plane.

Thematic Questions:

The World Beyond Us:

How has our mastery and utilisation of mathematics allowed us to exponentially develop technology? How is this being utilised to colonise new worlds and explore beyond our Solar System? Consider cases such as Space X.

The World Around Us:

How has our understanding of position and direction allowed us to create new towns and cities across our planet?

Modern Britain:

With an ever-increasing population within the United Kingdom comes an ever-increasing demand for more housing. How has position and direction been used to maximise the amount of housing within the confines of a particular piece of land?

Healthy Bodies & Healthy Minds:

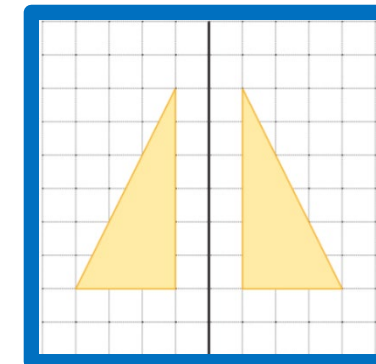
How can we use our knowledge of position and direction to maintain a healthy lifestyle? How can we use coordinates to create activities designed to keep us fit and healthy?

Culture:

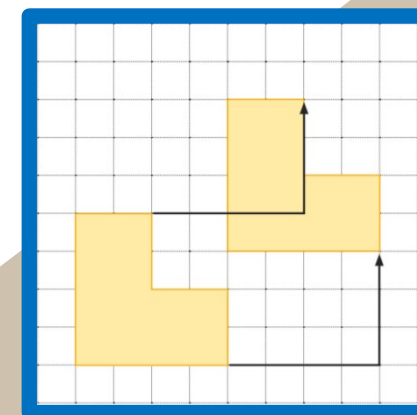
How did the Chinese and Egyptians utilise position and direction when using astronomy to place particular structures such as the pyramids and The Great Wall of China?

Technology in Action:

Which modern day technologies rely on position and direction to function efficiently? How will this technology be used to survey and map out Mars for future colonies?



Reflection is a type of **transformation**. To reflect an object, you need a **mirror line**. When a shape is reflected, its size does not change - the image just appears 'flipped'. Every point on the shape is the same distance away on the other side of the mirror line. The reflected image is congruent to the original image. All angles and sides



A **translation** moves a shape up, down or from side to side but it does not change its appearance in any other way. **Translation** is an example of a transformation. A transformation is a way of changing the size or position of a shape. Every point in the shape is **translated** the same distance in the same direction.

Links to future learning

The skills and knowledge taught in this block will be built upon and deepened throughout the year and will begin to provide a platform for position and direction in year 6.

Children will have a secure understanding of known facts about the 1st quadrant and will use their prior knowledge to plot points on a grid. They will be able to independently use manipulatives such as grid paper, coordinates, map data and compasses to answer reasoning and problem solving tasks.

Character/Wider Development ('50 things', cultural capital, skills)

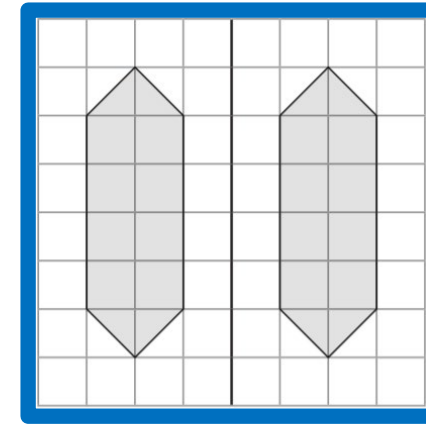
Relate and use this knowledge and understanding in real-life contexts and make these relevant and purposeful links:

When hiking or taking part in orienteering activities.

Creating a map of the local area and plotting points of cultural significance to recognise the historical significance of PonteFract.

Communicate in a different language – Spanish: children will use their understanding of Spanish numbers to verbalise coordinates and plot points when taking part in orienteering activities.

Recognising the contributions of others – The above can also be applied to curriculum learning on architectural design and development throughout history. How has our understanding of mathematics allowed us to create and place super structures? (pyramids, skyscrapers, bridges)



Something is **symmetrical** when it is the same on both sides. A shape has **symmetry** if a central dividing line (a mirror line) can be drawn on it, to show that both sides of the shape are the same.


Fat Questions:

How has our understanding of position and direction influenced the design and implementation of maps throughout history?

How can position and direction be utilised to alleviate issues based on a lack of space in the creation of cities of the future?

Which STEM fields use their understanding of position and direction to create technological advances?

OVERVIEW OF TEACHING SEQUENCE

Key Facts / Learning	Learning Focus or Key Question	Learning Outcomes (NC)	Key Words/ Vocabulary	Greater Depth/SEND	Misconceptions	Activities and Resources
Position and direction.	Position in the first quadrant Reflection Reflection with coordinates Translation Translation with coordinates (Please refer to WRMH lesson by lesson overview for specific objectives)	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.	position direction coordinate point Y axis X axis quadrant reflection mirror line translation vertical horizontal	<p>GD: Children are introduced to more complex and wider reasoning and problem-solving questions / concepts.</p> <p>Children will have multi-step reasoning problems to solve, applying prior learning as well as current.</p> <p>Children will need to use depth of mathematical knowledge to provide clear mathematical explanation and reasoning to problems.</p> <p>SEND: Assessment and analysis of prior knowledge is needed. Teacher to assess and base planning and resources in a bespoke manner.</p> <p>Children will use pictorial and practical resources to support</p>	<p>Children may become confused by putting y co-ordinate before the x, resulting in incorrectly placed position – due to: - lack of knowledge of order or lack of knowledge concerning names of axes.</p> <p>When using the 1st quadrant, misplaced positions due to lack of understanding of order of negative numbers on a scale.</p> <p>Children are only taught using co-ordinates in the first quadrant. They should be able to spot errors in the recording of coordinates.</p> <p>Children are unclear about the difference between reflection and translation: Translation: a transformation in which a shape is slid from one position to another, without turning. Reflection: A transformation in which a shape is reflected in a mirror line</p>	<p>Pre-teaching of key concepts to allow students to commence tasks immediately within lessons.</p> <p>DTMs to be created using the following resources and based on CT's AFL of their class/cohort. DTMs to be appropriately challenging for all children.</p> <p>WRMH: https://wrm-13b48.kxcdn.com/wp-content/uploads/2019/05/Year-5-2018-19-Summer-Block-3-Position-and-Direction.pdf</p> <p>Third Space Learning: https://thirdspacelearning.com/</p> <p>Classroom Secrets: https://classroomsecrets.co.uk/category/maths/year-5/summer-block-3-position-and-direction-year-5/</p> <p>NCETM – resources / activities for DTMs</p>  <p>Mastery_Assessment_Y5_High_Res.pdf</p> <p>Slides / resources saved on trust shared.</p>

				and develop their understanding. Concrete manipulatives will be provided to support their sense of independence when learning within the classroom.	and changed into its mirror image.	
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Context (big picture learning):

Mathematics is an important, creative discipline that helps us to understand and change the world. We want all of our children within the PonteFract Academies Trust to experience all that mathematics has to offer and to develop a sense of curiosity about the subject with a clear understanding. When they leave us we want them to continue their love of maths and use it continuously and positively in their future lives.

We foster a positive 'growth mind-set' attitude and we promote the fact that we believe that all children can achieve in mathematics. We teach for secure and deep understanding of mathematical concepts through manageable, bespoke steps and cross fertilize at every opportunity. VIPs (Very Important Points) are implemented in every lesson to ensure knowledge and skills are revisited and retained over time.

We use mistakes and misconceptions as an essential part of learning and provide challenge through rich and sophisticated reasoning and problem solving activities. At our school, the majority of children will be taught the content from their year group only. They will spend time becoming true masters of content, applying and being creative with new knowledge in multiple ways.

Folder name and link to resources: Trust shared > Primaries > Departments > KS2 > Planning Cycle B > Autumn 1 > Maths > Year 5 > Block 2

Week 5-7

Year 5 Knowledge Organiser: Position and direction

Fat Questions:

How has our understanding of position and direction influenced the design and implementation of maps throughout history?

How can position and direction be utilised to alleviate issues based on a lack of space in the creation of cities of the future?

Which STEM fields use their understanding of position and direction to create technological advances?

Key vocabulary

Coordinate

Quadrant

Y-axis

X-axis

Quadrant

Reflection

Mirror line

Position

Translation

Vertical

Horizontal

Direction

To see the full list of vocabulary, please refer to our resource walls.

Intent

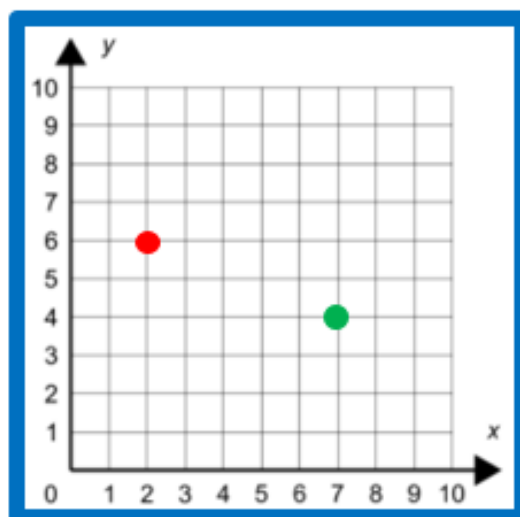
We aim to develop and progress our skills in the understanding of position and direction in order to equip us with the ability to solve real world problems that require a mathematical solution. With these skills, we will be able to enter STEM fields, which require a mastery understanding of quadrants in order to influence technological innovation.

VIPs (very important points)

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Coordinate interpretation

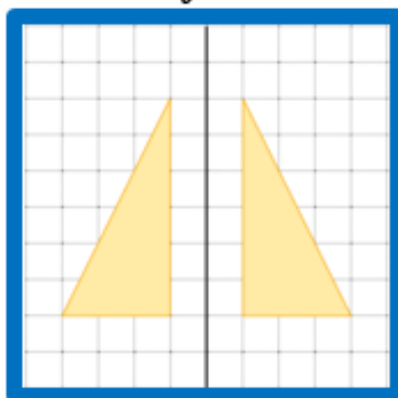


To interpret the information in the first quadrant, you must go horizontally along the x -axis then vertically up the y -axis.

Red dot- $(2, 6)$

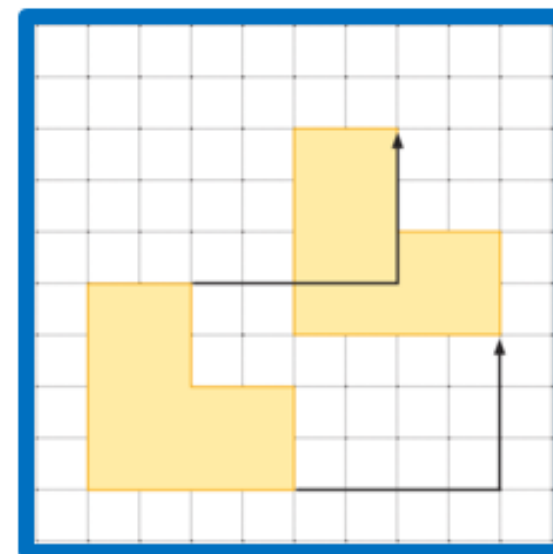
Green dot- $(7, 4)$

Reflection



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