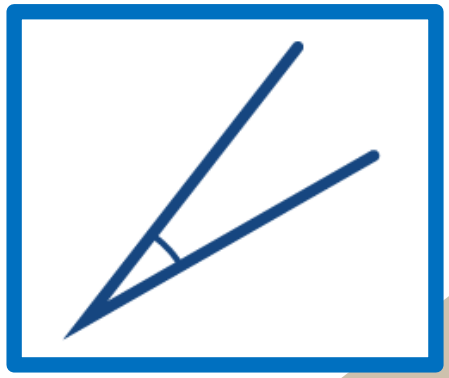
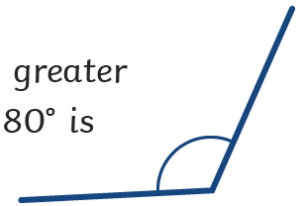
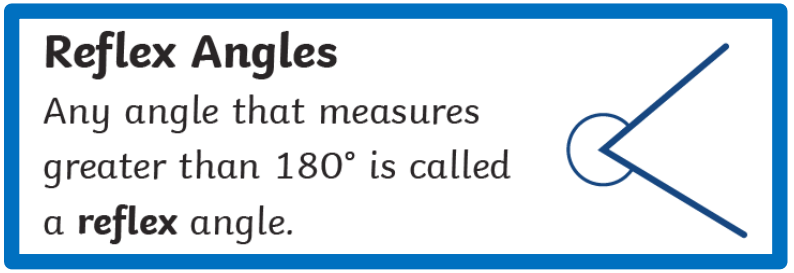
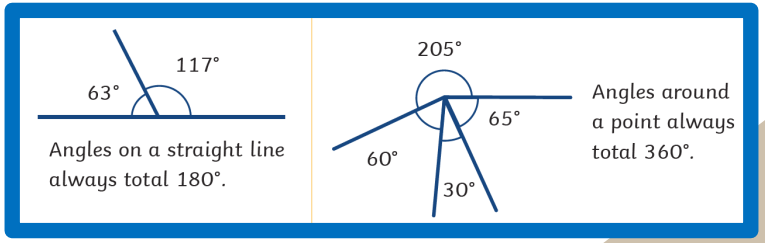
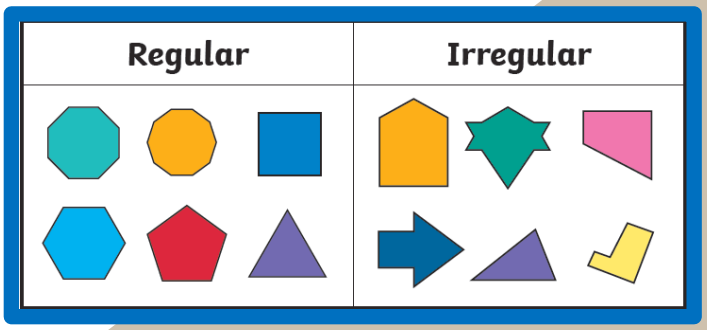
SUMMER 1 TERM OVERVIEW YEAR 5 – Maths

Term 3 Book– Mortal Engines		
Block 2 -Topic: Geometry-Properties of shape		**Guide Time = 2 Weeks**
Assessment:	WRMH End of block / term assessments Weekly Arithmetic Tests Termly Year 5 tests (whole Trust assessment cycle)	**Very Important Points (VIPs):**
Links to prior learning (sequencing) and canon book	Children we be able to use their developing knowledge of acute and obtuse angles to compare against right angles and will be able to estimate the particular size of angles through the use of prior learning in year 4. Children will be able to check and assess the accuracy of their estimations of angle sizes by using manipulatives and protractors. Children will use their understanding of known facts about angles (acute is between 0 and 90 degrees and obtuse is between 90 and 180 degrees) to distinguish and classify unknown angles into appropriate groupings.	
Links to other learning (cross fertilisation)	History Research architectural development beginning in the Stone Age to understand how the development of mathematics (particularly when using angles to create more complex structures) 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 angles and polygon VIPs, which will allow children to apply their knowledge and understanding mentally at another time / lesson e.g. in PE. How angles are used within various sports to score goals, shoot hoops and throw javelins etc. Design and technology-Apply our understanding of angles and polygons when designing a mechanism (cams). Consider how the angle of the cam, the angle of the crank, the shape of the design and the angle of the shaft will affect the level of functionality of the final product.	**Acute angles-** An **acute angle** is an **angle** that measures less than 90 degrees. A triangle formed by **all angles** measuring less than 90˚ is also known as an **acute** triangle. For example, in an equilateral triangle, **all** three **angles** measure 60˚, making it an **acute** triangle. **Obtuse Angles** Any angle that measures greater than 90° and less than 180° is called an **obtuse** angle. 

	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 is our understanding of angles and measurement used within modern architecture and would the creation of super structures be possible without an understanding of angles? Modern Britain: With an ever-increasing population within the United Kingdom comes an ever-increasing demand for more housing. How are angles, degrees and estimation used to maximise the amount of housing within the confines of a particular piece of land? Healthy Bodies & Healthy Minds: Which sports and particular types of athletes rely on the accurate use of angles and estimation to succeed in their particular fields? Culture: Which cultures throughout our history first discovered the concept of angles and degrees and how did they use it to develop their civilizations over time? Technology in Action: Which modern day technologies rely on angles to function efficiently? Would our current levels of technological innovation be possible without and understanding of angles?
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 the properties of shape in year 6. Children will have a secure understanding of known facts about angles, how to estimate angles by using their prior knowledge and will be more able to independently use manipulatives such as protractors to answer reasoning and problem solving tasks based on this particular topic.
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 building a den or shelter. How will the structure withstand rain and wind due to the angles that have been used during its design?



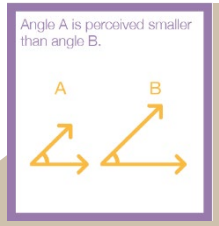




Regular and irregular polygons-A **regular polygon** is a **polygon** in which all sides are of all the same length and at the same angles. An **irregular polygon** is a **polygon** with sides and/or angles of differing lengths and sizes. (Although they still must be straight and joined up.)

	Communicate in a different language – Spanish: children will relate their prior learning in numbers to communicate answers and questions based on angles in Spanish. Awe and wonder – 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)	**Fat Questions:** How has our understanding and mastery of angles aided in the innovation and development of technology throughout history? How has our understanding of angles allowed us to create skyscrapers, bridges and road networks? How has our understanding of angles allowed us to enter space via technological innovation? Why is a mastery of angles and shape essential when attempting to escape or enter the atmosphere of a planet or moon?

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
Properties of shape.	To measure angles in degrees To measure with a protractor (1) To measure with a protractor (2) To draw lines and angles accurately To calculate angles on a straight line To calculate angles around a point To calculate lengths and angles in shapes	Identify 3-D shapes, including cubes and other cuboids, from 2-D representations. Use the properties of rectangles to deduce related facts and find missing lengths and angles. Distinguish between regular and irregular polygons based on reasoning about equal sides and angles. Know angles are measured in degrees: estimate, compare acute, obtuse, and reflex angles. Draw given angles, and	quadrilaterals triangles right angle acute angle obtuse angle reflex angle degrees protractor angles rays vertex perpendicular parallel regular irregular polygon shape apex curved face edge surface vertices Equilateral triangle Isosceles triangle Right-angle triangle	GD: Children are introduced to more complex and wider reasoning and problem-solving questions / concepts. This will include a project based on the design of several structures, which must withstand a variety of weather. Design choices will rely on the application of newly developed skills learnt during this topic. Children will have multi-step reasoning problems to solve, applying prior learning as well as current. Children will need to use depth of mathematical knowledge to provide clear mathematical explanation and	• When measuring angles using a 180° degree protractor children often confuse the upper and lower scale. Understanding basic angle properties such as acute and reflex angles helps with this. • Children may not recognise that the size of two angles are the same due to one having longer rays than the other does. They may assume that the angle with longer rays will be larger and will not see that the vertex produces the same sized angle.  	Pre-teaching of key concepts to allow students to commence tasks immediately within lessons. DTMs to be created using the following resources and based on CTs AFL of their class/cohort. Further cross-curricular links can be made to the 6 these during these also, for a wider context. WRMH: https://wrm-13b48.kxcdn.com/wp-content/uploads/2019/SoLs/Primary/Summer_Term_SOL/Year-5-2018-19-Summer-Block-2-Properties-of-Shape.pdf Third Space Learning: https://thirdspacelearning.com/ Classroom Secrets: https://classroomsecrets.co.uk/category/maths/year-5/summer-block-2-properties-of-shapes/ NCETM – resources / activities for DTMs Mastery_Assessment_Y5_High_Res.pdf Maths Frame: https://mathsframe.co.uk/en/resources/category/403/y5-Multiplication-and-Division

	Regular and irregular polygons Reasoning about 3-D shapes	measure them in degrees. 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°		reasoning to problems. This will be applied to real world scenarios such as building a catapult to test how different angles effect how far a projectile can be thrown. SEND: Assessment and analysis of prior knowledge is needed. Teacher to assess, plan and produce resources in a bespoke manner. Children will focus and use pictorial and practical resources to support and develop their understanding, of different sizes of angles. SEND children will use angles guides to classify and categorise acute, obtuse, right angles and reflex angles.		Slides / resources saved on trust shared.

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: Properties of shape

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Fat Questions:

How has our understanding and mastery of angles aided in the innovation and development of technology throughout history?

How has our understanding of angles allowed us to create skyscrapers, bridges and road networks?

How has our understanding of angles allowed us to enter space via technological innovation?

Why is a mastery of angles and shape essential when attempting to escape or enter the atmosphere of a planet or moon?

Key vocabulary

right angle

acute angle

Obtuse angle

Reflex angle

degrees

Protractor

rays

regular

irregular

polygon

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

Intent

We aim to develop and progress our skills in properties of shape 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 angles and shape in order to influence technological innovation.

VIPs (very important points)

Angles-When two straight lines come together, they make an **angle**. The two lines are called the sides or rays of the angle, and they meet at a point. A flat surface (called a plane) also forms an angle when it meets another.

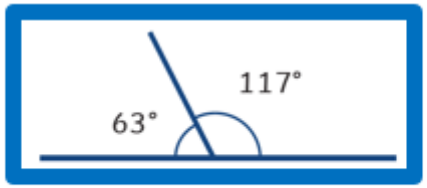
Regular/irregular polygons- A **regular polygon** is a **polygon** in which all sides are of all the same length and at the same angles. An **irregular polygon** is a **polygon** with sides and/or angles of differing lengths and sizes.

Types of angles

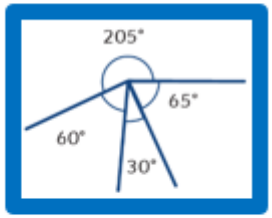
Acute angle-Measures more than 0 degrees but less than 90 degrees.

Obtuse angle-Measures more than 90 degrees but less than 180 degrees.

Reflex angle-Measures more than 180 degrees but less than 360 degrees.

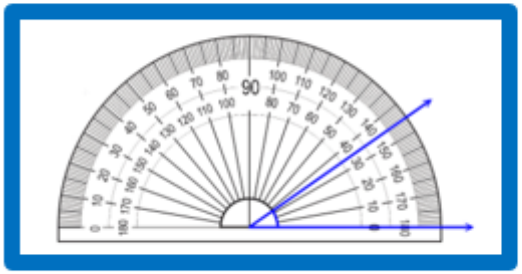


Straight-line angles total 180 degrees.



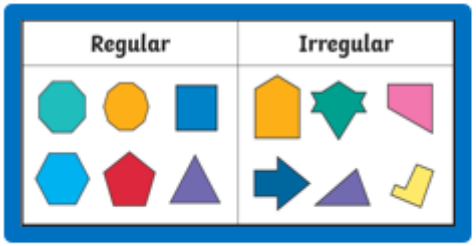
Angles around a point always total 360 degrees.

Protractor



- Place the midpoint of the protractor on the VERTEX of the angle.
- Line up one side of the angle with the zero line of the protractor (where you see the number 0).
- Read the degrees where the other side crosses the number scale

Polygons



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