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Links to prior learning/ objectives:	Resources:	Vocabulary:
Basic angle facts: types of angles, finding missing angles from right angles and straight lines. Properties of shapes: triangles, quadrilaterals, other common polygons. Statistics: line graphs, bar charts.	Base10, place value charts, place value counters, multiplication squares, physical objects, bar models, fraction walls,	Angle, acute, obtuse, reflex, opposite, straight, degrees, parallel, perpendicular, right angle, triangle, quadrilateral, 2D, 3D, side, edge, vertex, vertices, surface, face, angle, interior, exterior, net, properties Statistics, data, line graph, axes, y, x, pie chart, circle, radius, diameter, circumference
	Mastery: (where to find some resources) • Teaching for Mastery • White Rose **New and old documents** • Mastery maths stickers • Nrich (curriculum mapping)	

Objectives and Teaching

Week 1 Barriers to ARE (misconceptions): Lack of knowledge of types of angles leading to difficulty in self checking measuring/drawing angles. Using the wrong scale on the angle. Lack of accuracy.	Recognise angles where they meet at a point, are on a straight line, or are vertically opposite, and find missing angles. • To know how to measure angles using a protractor. • To develop my understanding of angles. • To know how to calculate angles. • To understand the relationship between vertically opposite angles.

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Fluency	Problem Solving	Reasoning
Identify the type of angle, and measure the angle using a protractor. a b c Angle ☐ is an ☐ angle. It measures ☐ Estimate, then measure each of the angles in the quadrilateral. W X W: ☐ X: ☐ Y: ☐ Z: ☐ Y Z Work out the size of each angle. Explain how you did it.	If it takes 60 minutes for the minute hand to travel all the way around the clock, how many degrees does the minute hand travel in: • 7 minutes • 12 minutes How many minutes have passed if the minute hand has moved 162°?	Alex measures this angle: He says it is 130° How do you know Alex is definitely wrong? Explain what he has done wrong.

Week 2 Barriers to ARE (misconceptions): Lack of knowledge of types of angles leading to difficulty in self checking measuring/drawing angles. Using the wrong scale on the angle. Lack of accuracy. Insufficient prior knowledge/inability to apply knowledge of properties of shapes. Difficulty in visualising shapes as nets.	Compare and classify geometric shapes based on their properties and sizes and find unknown angles in any triangles, quadrilaterals, and regular polygons Draw 2-D shapes using given dimensions and angles Recognise, describe and build simple 3-D shapes, including making nets • To understand angles in triangles. • To understand angles in quadrilaterals. • To understand angles in polygons. • To know how to draw shapes accurately. • To know how to identify 3D shapes from their nets.

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Fluency	Problem Solving	Reasoning

Fluency

Using different coloured paper of card, make an equilateral, isosceles, scalene and right-angled triangle.
Use your protractor to measure each internal angle, then add them up. What do you notice?
Now take any of the triangles and cut the corners off.
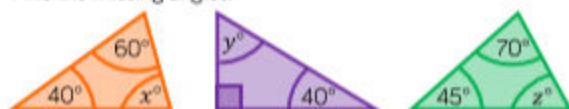Arrange the corners to make a straight line.

The internal angles of a triangle add up to ☐

Find the missing angles and state the type of triangle.

Find the missing angles.
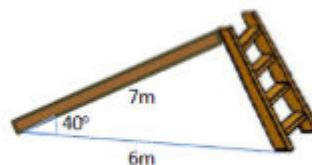
60° 40° x°

y° 40°

70° 45° z°

Problem Solving

Kate says,
My triangle is a scalene triangle. One angle is obtuse. One of the angles measures 56°. The obtuse angle is three times the smallest angle.

Find each of the angles in the triangle.

Mr Harrison is designing a slide for the playground.

7m
40°
6m

Use a scale of 1 cm to represent 1 m.

Draw the scale diagram and use this to find out how long Mr Harrison needs the ladder to be.

Reasoning
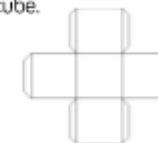
True or False?

A triangle can never have 3 acute angles.

Mo says,
My triangle has two 90° angles.

Can Mo be right? Prove it.

Sally thinks that this net will fold to create a cube.

Do you agree with Sally? Explain your answer.

Week 3
Barriers to ARE (misconceptions):
Children may struggle to interpret the graph.
Children may not read the scale accurately.
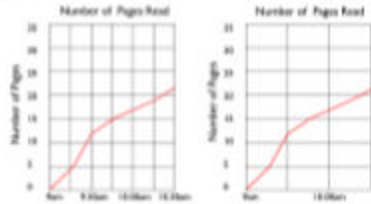Children may not read the axis of the line graph accurately.
Children may not recognise that the pie chart is the whole and is then divide proportionally based on the total of each option.

Interpret and construct pie charts and line graphs and use these to solve problems
Illustrate and name parts of circles, including radius, diameter and circumference and know that the diameter is twice the radius.

- To know how to read and interpret line graphs.
- To know how t construct line graphs.
- To know how to use line graphs to solve problems.
- To understand the parts of a circle.
- To know how to read and interpret pie charts.

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Fluency	Problem Solving	Reasoning

Fluency

What is the same and what is different about the 2 graphs?

Number of Pages Read | Number of Pages Read

Here is a graph showing daily water consumption over two days.
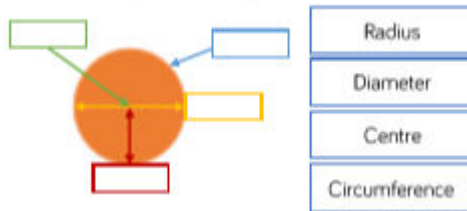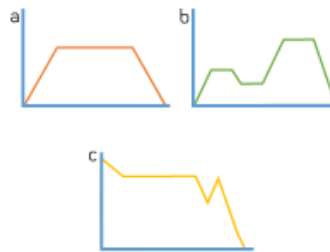

Daily Water Consumption

At what times of the day was the same amount of water consumed on Monday and Tuesday?
Was more water consumed on Monday or Tuesday morning? How much more?

Using the labels complete the diagram:

Radius
Diameter
Centre
Circumference

Problem Solving

Write a story and 3 questions for each of the 3 graphs below.

a | b
c

In a survey people were asked what their favourite season of the year was, the results are shown in the pie chart below. If 47 people voted spring, how many people took part in the survey?

Our favourite time of year

■ Summer   ■ Spring   ■ Autumn   ■ Winter
Explain your method.

Reasoning

Jill has created a graph to track the growth of a plant in her house.

Plant Growth in July

Jill recorded the following facts about the graph.
a) On the 9th of July the plant was about 9 cm tall.
b) Between the 11th and 19th July the plant grew 5 cm.
c) At the end of the month the plant was twice as tall as it had been on the 13th.
Can you spot and correct Jill's mistakes?

Stephanie says:
The bigger the radius of a circle, the bigger the diameter.

Do you agree? Explain your reasoning.

Week 4 Barriers to ARE (misconceptions): Children may struggle to interpret the graph. Children may not read the scale accurately. Children may not read the axis of the line graph accurately. Children may not recognise that the pie chart is the whole and is then divide proportionally based on the total of each option.	Interpret and construct pie charts and line graphs and use these to solve problems Calculate and interpret the mean as an average • To know how to read and interpret pie charts with percentages. • To know how to draw pie charts. • To know how to find the mean.

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Children may forget the steps needed to find the mean.
Children may miscalculate when finding the mean.

Fluency	Problem Solving	Reasoning

Fluency

150 children voted for their favourite ice cream flavours. Here are their results:

Favourite Ice Cream Flavours

- Strawberry
- Banana
- Chocolate
- Vanilla
- Mint Chocolate Chip

How many people voted for Vanilla?
How many more people voted for Chocolate than Mint Chocolate chip?
How many people chose Chocolate, Banana and Vanilla altogether?

There are 200 pupils in Key Stage 2 who chose their favourite hobbies.
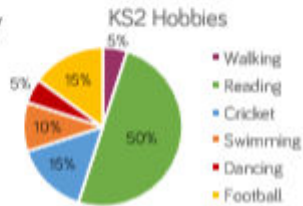
How many pupils chose each hobby?

KS2 Hobbies

- Walking
- Reading
- Cricket
- Swimming
- Dancing
- Football

Calculate the mean number of crayons:

Crayon colour	Amount
Blue	14
Green	11
Red	10
Yellow	9

Hassan is the top batsman for the cricket team. His scores over the year are: 134, 60, 17, 63, 38, 84, 11
Calculate the mean number of runs Hassan scored.

Problem Solving

13 people in this survey have no siblings. Use this information to work out how many people took part in the survey altogether.

Number of Siblings

- No siblings
- 1 siblings
- 2 siblings
- 2 siblings
- 4 siblings
- 5 siblings
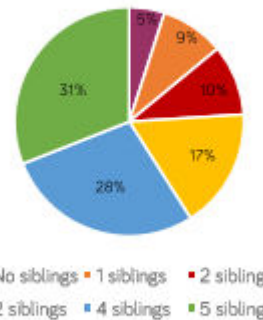
Now work out how many people each segment of the pie chart is worth. Can you represent the information in a table?

Reasoning

120 boys and 100 girls were asked which was their favourite subject. Here are the results:

Boys Favourite Subjects
- Maths
- English
- Science

Girls Favourite Subjects
- Maths
- English
- Science
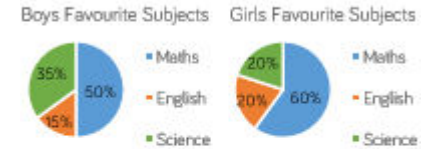
Craig says:

More girls prefer Maths than boys because 60% is bigger than 50%.

Do you agree? Explain why.

Week 5
Barriers to ARE (misconceptions):

SATs

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Fluency	Problem Solving	Reasoning

Week 6
Barriers to ARE (misconceptions):

Fluency	Problem Solving	Reasoning