The logo for 'INSPIRE MATHS' features the word 'INSPIRE' in a bold, dark blue, sans-serif font. A small, light blue spiral icon is positioned above the letter 'I'. Below 'INSPIRE', the word 'MATHS' is written in a lighter blue, sans-serif font.

INSPIRE MATHS

Year 6 Home Activities

Teacher Guidance

The *Inspire Maths* Home Activities provide opportunities for children to explore maths further outside the classroom. The engaging Home Activities help you to involve parents and carers in their child's mathematical learning. To support this, you might want to hold a short *Inspire Maths* meeting to fully explain what is expected.

Each Home Activity contains a practical activity to be completed using the activity sheets provided, or using common household items. A list of key words and phrases is given to support parents with modelling mathematical language for their children, and the activities also offer advice on specific strategies or misconceptions that parents could look out for.

Home Activities are only developed for units where home support is appropriate, so there may not be activities for all units. For those units without activities, you can refer to Home Maths sections in the *Inspire Maths* Pupil Textbooks for ideas for how a parent may support their child.

Parent/Carer Guidance

The *Inspire Maths* Home Activities give your child an opportunity to practise the maths that they have been doing at school, and give you an opportunity to support their learning.

Each Home Activity takes between ten and twenty minutes. The activities contain information on how the activity will help your child, important words and phrases that your child is learning, further opportunities to talk about your child's ideas, and particular strategies or issues to look out for. You are not expected to teach your child the mathematical concepts themselves.

You won't need any special equipment as most objects required for the activities can be found around the home. Some activities also include an activity sheet that contains illustrations or further questions to support your child's learning.

3 Nets

This activity will help your child visualise how nets are folded to form different shapes.

Important words and phrases:

- net
- tab

You will need:

- pencil
- ruler
- scissors
- sticky tape
- squared paper (optional)

What to do:

- Look around the home for some packaging for toiletries and foodstuffs, such as tissue boxes, food packaging, cardboard tubes and so on.
- Ask your child to carefully cut open the shape and lay it flat to reveal the net. You may wish to suggest to your child that they try to cut only along the edges of the shape, where two faces of the shape are joined.
- When your child has successfully cut the packaging open, ask: *“Do you think that there are any other possible nets of this shape?”* Discuss your child’s answers.
- Ask your child to cut each net into the individual shapes that make up the net (so, for example, a cereal box will give you a set of rectangles of different sizes). Then ask them to rearrange the shapes to make a new net for the same 3D shape.
- You could ask your child to draw the new nets they have made as a record.

Talk about:

- You could ask your child to look around the house for 3D shapes such as cuboids, cylinders, prisms or cones that cannot be cut open, and draw the net they think the shape might have on squared paper.

5 Ratio walk

This activity gives your child practice in using and applying the concept of ratio in a practical context.

Important words and phrases:

- ratio
- as many
- for every

You will need:

- Activity sheet 1
- a camera (optional)

What to do:

- Explain to your child that you are going on a ratio walk, and you are going to find ratios of common objects around your home and record them in the table on Activity sheet 1. You could also take photos of the objects that you are analysing.
- Start in the living room, and ask your child to look for ratios in their surroundings. For example, they could record the ratio of pens to pencils in their pencil case, or the ratio of books to DVDs on the shelves.
- You can then move to the kitchen and investigate ratios in there, for example the ratio of teaspoons to dessert spoons in the cutlery drawer; the ratio of glasses to mugs; or the ratio of plates to bowls in the cupboards.
- Once you have recorded some ratios from inside the home, you can continue the ratio walk outside. Ask: *“How many doors are on the outside of the house? How many windows are there? What is the ratio of doors to windows?”*
- Some ratios can be simplified. For example, a ratio of 6 : 4 can be simplified to 3 : 2.

Talk about:

- If your child is confident, you could also look for ratios of different coloured cars and complete a three-part ratio. For example the ratio of blue cars to red cars to black cars.
- You could ask your child why they think that objects are in certain ratios. For example, ask: *“Why are there more mugs than glasses in the kitchen? Why are there more windows than doors on the outside of the house?”*

Activity sheet I

This activity sheet is for use with Y6 Home Activity 5

Room	Item A	Item B	Ratio (A:B)
living room	pens	pencils	1 : 3

6 Percentage play

This activity will give your child practice in calculating percentages.

Important words and phrases:

- whole amount
- increase
- decrease
- percentage, per cent

You will need:

- Activity sheet 2
- a dice
- two or more players
- for each player: a counter, a pencil and one or more pieces of paper

What to do:

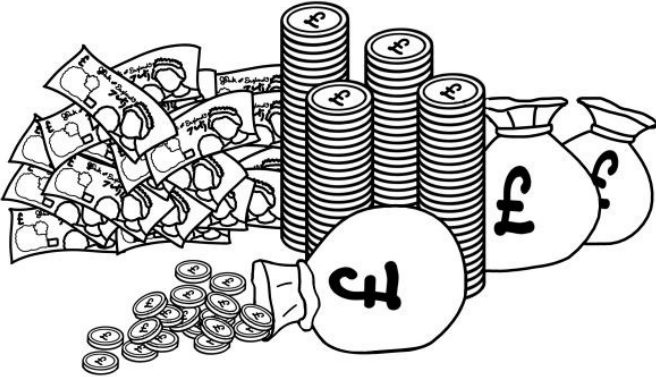
- Ask each player to write £150 at the top of a piece of paper. This is the money they start with.
- Players take turns to throw the dice and move their counter around the board on Activity sheet 2.
- When a player lands on a square, they should write down the new amount of money they have according to the instructions on the square. Money should be rounded to the nearest pound.
- The game ends when a player lands on the start/finish square after having gone round the board, or when a player runs out of money.
- The winner is the player with the most money at the end of the game.

Talk about:

- Look out for real-life examples of percentage increases, and 'percentage extra free' offers. Ask: *"Which offer the best value?"*

Activity sheet 2

This activity sheet is for use with Y6 Home Activity 6

Miss a turn. If any players pass you before you roll again, you need to pay them 5% of your money.	You lose half your money!	You win a prize. You get 17% of the money you already have.	You spend 30% of your money on a present for your friend.	You find £3 down the back of the sofa.
Miss a turn. If any players pass you before you roll again, they need to pay you 10% of their money.				You buy a bike that's worth £60. You get 20% off!
You buy a tennis racket. It costs you 25% of your money.				Go forward three squares.
The number you have written down is only 80% of your actual total. Correct it!				You give 17% of your money to your friends.
You lose 5% of your money down the back of the sofa.				Roll the dice again. You get that many pounds.
You give 10% of your money to the player to your left. Smile at them!				Your wealth increases by 30%.
Start and Finish ↑				You buy some tickets to a football match. You are left with 60% of what you had!

7 Average speed

This activity will help your child consolidate their understanding of the relationship between speed, time and distance.

Important words and phrases:

- journey
- distance
- time
- speed
- average speed

You will need:

- paper and pencil
- calculator (optional)

What to do:

- Talk about some journeys your child does or knows about (for example, the journey to school, a journey to see a relative, or the journey a relative makes to visit you).
- Ask your child to draw a table with five columns and write down each journey in the first column of the table.
- Find out or estimate the distance of each journey in kilometres using the internet. Write these distances in the second column of the table.
- Discuss how long each journey takes, and why. Write these times in the third column.
- Discuss the fact that some of the journeys aren't the same speed all the way. Talk about how long the different parts of the journey take. Encourage your child to sketch a diagram of each journey in the fourth column.
- Help your child to calculate the average speed of each journey and write this in the fifth column of the table. (Speed = Distance \div Time). In the example table below, the average speed is Distance \div Time, or $28 \div 1 = 28$ km/h.
- For journeys that aren't the same speed all the way, you could challenge your child to calculate the average speed of each part of the journey.

Journey	Distance	Time	Diagram	Average
To Nan's house	28 km	1 hour		28 km/h

Talk about:

- Remind your child that they have calculated the average speed for a single journey, not the average speed for the journey done several times.
- Discuss what can affect the speed of parts of a journey, and the journey as a whole (speed limits, traffic, weather, delayed buses, and so on).

8 Measuring circles

This activity will give your child practice in using the formulae linking the area, radius, diameter and circumference of a circle.

Important words and phrases:

- cross-section
- radius
- diameter
- circumference
- area
- calculator

You will need:

- a visit to the local park
- one or more trees
- string
- tape measure or ruler

What to do:

- Visit a local park with a number of trees, and ask your child to choose a tree. Explain to your child that you can find out how old a tree is by counting the rings of the tree. When we count the rings of a tree that has fallen down, we're looking at a cross-section of the tree trunk, which is roughly circular. Ask your child how you could measure the cross-section of a tree without cutting the tree down.
- Wrap a length of string around a tree about 1.5 metres above the ground. Make sure the string is level with the ground, so it makes a shape as close as possible to a circle. This may need two people.
- Measure the length of string you used. Say: *"This length of string was wrapped around a cross-section of the tree. What does it give us a measure of?"* (The circumference)
- Ask your child to record the circumference of the cross-section of the tree. Later, they can calculate the radius, area and diameter of the cross-section.
- If possible, repeat with other trees. If you can, take a photograph of each tree you measure. Your child can then draw a diagram of the cross-section, with the radius, area, diameter and circumference labelled, and display it alongside the photograph.

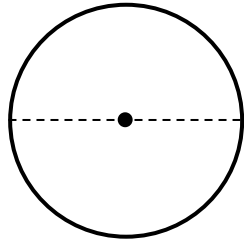
Talk about:

- You could also look around the home for circular objects to measure and test the formulae linking the diameter, radius, circumference and area of a circle, for example lampshades, saucepans, mugs, glasses and plant pots.

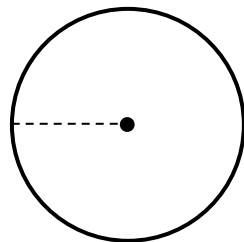
Look out for:

- A cross-section is the two-dimensional shape created by making a straight cut through a three-dimensional object.
- The circumference of a circle is the distance all the way around the circle. It is also called the perimeter.

- The diameter of a circle is any straight line that goes from one side of a circle to the other, passing through the centre:



- The radius of a circle is any straight line from the centre of a circle to the circumference:



- Here are the formulae linking the diameter, radius, circumference and area of a circle. Your child will need to use these in this activity:
 - Diameter = Circumference \div π
 - Radius = Diameter \div 2
 - Area = $\pi \times$ Radius \times Radius, or πr^2
- Your child has been using either $\frac{22}{7}$ or 3.14 as the value of π .

9 Pie chart jigsaw

This activity will help secure the concepts your child has learned for interpreting pie charts.

Important words and phrases:

- pie chart
- graph
- segment

You will need:

- Activity sheet 3, cut into individual pie chart segments
- scissors

What to do:

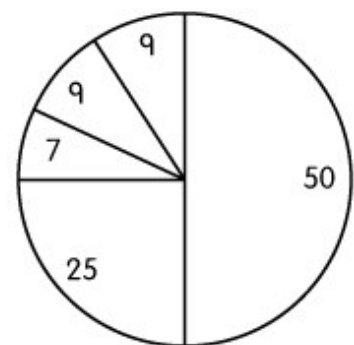
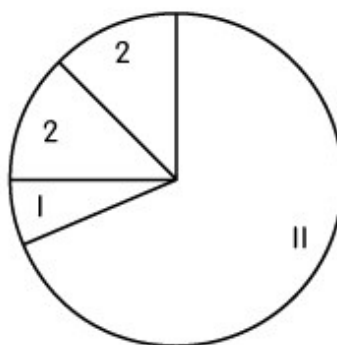
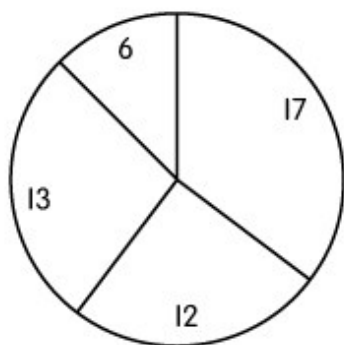
- Cut the segments of the pie charts out from Activity sheet 3, and mix them up for your child. Ask them to manipulate them to make three pie charts.
- Say: *“Some pieces are the same size – could they be swapped between the charts?”* Although some pieces are the same size, they are not necessarily interchangeable between the charts because they represent different numbers. Ask your child to explain how they have chosen which pie chart to put the different segments in.
- For each chart, ask your child to work out the total value of the data.
- Ask your child to imagine what each pie chart might show.

Talk about:

- Look out for real-life examples of pie charts, for example in newspapers or on the internet. Discuss what information they show, why the information has been presented in a pie chart and what interesting facts we can see by having the information presented in this way.

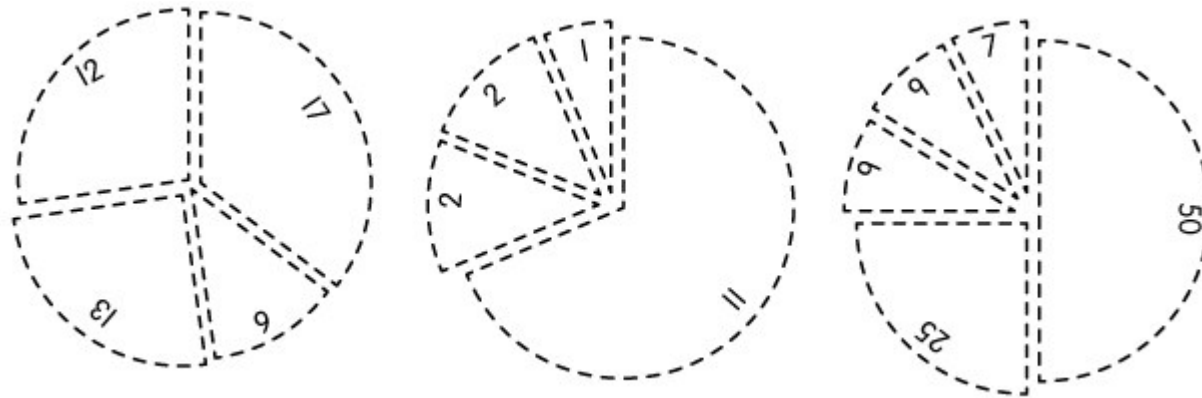
Look out for:

- Pie charts are graphs that show how a ‘whole’ is divided up. For example, they might show the make-up of the population of a country, or people’s opinions when the opinions are expressed using multiple choice.
- The completed pie charts from Activity sheet 3 are as follows:



Activity sheet 3

This activity sheet is for use with Y6 Home Activity 9



10 Area of composite shapes

This activity will give your child practice in calculating the area of composite shapes.

Important words and phrases:

- area
- rectangular
- right-angled triangle
- parallelogram
- semicircle
- radius

You will need:

- Activity sheet 4
- squared paper
- pencil
- ruler

What to do:

- Look together at Activity sheet 4, which describes the layout of a patio.
- Ask: *“After Melanie has finished, what area of the patio will still be visible? Is there enough information to answer?”* (Yes – The visible part of the patio is 133.34 m^2).
- When your child has worked out the area, ask them to draw a plan of the patio. Ask: *“Is there only one way to draw the patio as described? What things might change? Can you draw it again in a different way that still follows the instructions?”*
- Encourage your child to change the shape of some of the items, as well as changing the layout, but without changing the area of the patio that is visible.

Talk about:

- The area of a shape doesn't tell us about its length or width; it just tells us something about the relationship between them. Discuss why sometimes it can be difficult to see that two objects have the same area. Two shapes can have the same area but look very different – for example a square could have the same area as a very long and thin rectangle.
- Ask your child to estimate the dimensions of a real object, and then work out its area by sketching the object as a composite shape.

Look out for:

- A composite shape is a shape made up of two or more simple shapes (such as squares, rectangles or triangles).

Activity sheet 4

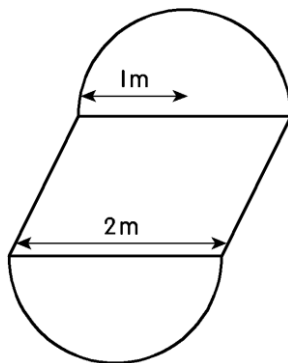
This activity sheet is for use with Y6 Home Activity 10

Melanie Moneybags is redesigning some space outside her house. The space is 12m long and 15m wide. She has decided to make the whole space a patio.

There will be a rectangular swimming pool 10m long and 3m wide. Her luxury hot tub has an area of 3m^2 . She will have seven palm trees in pots, and each one has an area of 0.36m^2 .

She also has a modern art sculpture by a famous local artist. The sculpture's base is a right-angled triangle with 3m, 4m and 5m sides.

Melanie uses outside during the summer. The rug is in a shape made up of a parallelogram that is 1m high with a base 2m long, and two semicircles, each with radius 1m.



11 Volume

This activity will give your child practice in calculating the volume of a cuboid.

Important words and phrases:

- volume
- cubic centimetre (cm³)
- millilitre
- litre
- litres per minute
- cubic metre (m³)
- cubic metres per second

You will need:

- a rectangular container such as a fish tank or recycling box (if you don't have any of these you could use a kitchen sink, but a container without rounded corners would be better)
- ruler or tape measure
- stopwatch or a watch with a second hand (optional)

What to do:

- Ask your child how big they think the container is. Don't give any more guidance than this at first, but then discuss what the question means – talk about the volume of the container. Your child might answer in litres or cubic centimetres.
- Ask your child how you could measure the volume of the container. Talk about the easiest and/or the most accurate way.
- Suggest to your child that they fill the container with water using a litre bottle filled from the tap. Ask your child to record the volume of the container in this way.
- Your child could then use a ruler to measure the container's dimensions and calculate its volume in this way. Their answers should match.
- Your child will have an answer in cubic centimetres. Ask: *"How many millilitres is that?"*

Talk about:

- You could encourage your child to find out how quickly the tap fills the container. Together, time how long the tap fills the container. Your child should be able to use their calculation of the container's volume to work out the rate of flow from the tap in litres per minute.
- Using the internet, you could look up the flow rate of a local river. The rates are often given in cubic metres per second. One cubic metre is 1000 litres.
- If you have a water meter, you could also show your child your water bill and talk about how it is calculated (the bill will include a charge for usage, measured in cubic metres – m³). You could talk about how to reduce how much water you use.

Look out for:

- The formula for the volume of a cuboid is *length × width × height*.
- 1 cubic centimetre is equivalent to 1 millilitre.
- 1000 cubic centimetres are equivalent to 1 litre.