WESTMINSTER ABBEY

MATHS TRAIL

Name: _____

School: _____

Date of Visit: _____

Key Stage 2

About this Maths Trail

This is a trail around Westminster Abbey where you are asked to look at things from a mathematical point of view. Visit each of the places on the numbered plan and use what you see and the information to carry out the activity.

Patricia McLean
2004

i   Did you know? Useful information for reference and to help answer some of the questions.
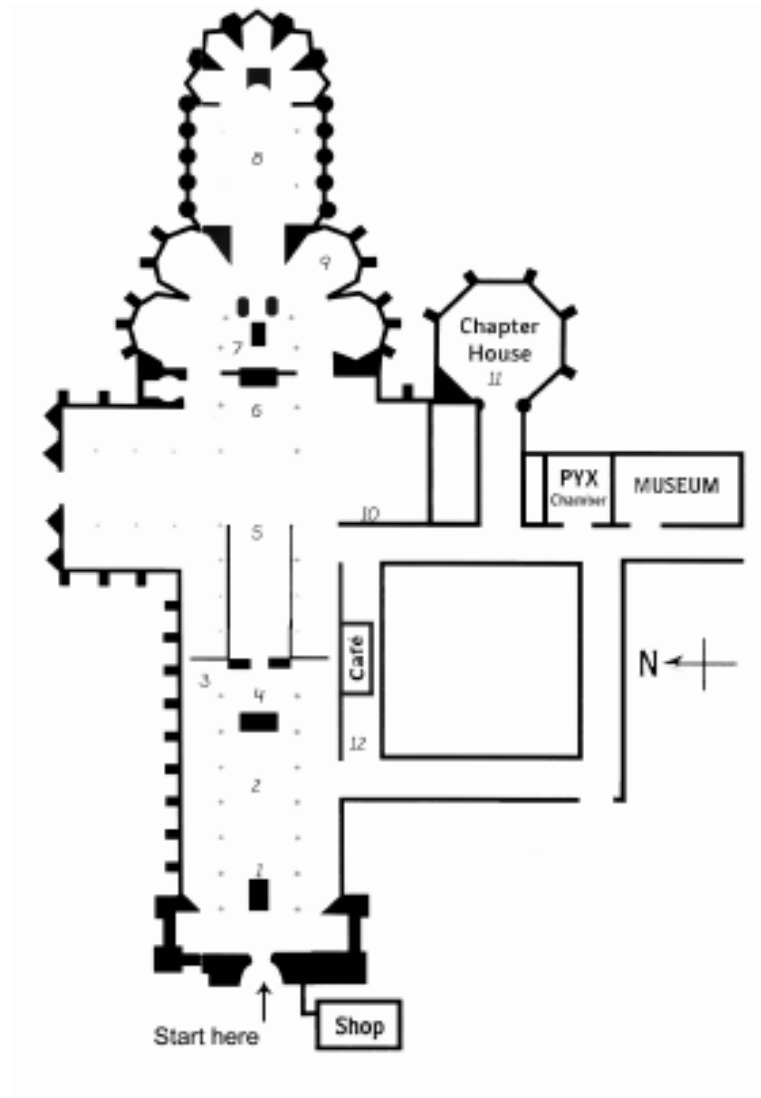
Things to look at.

?   Answer a question. Sometimes it will be a numerical answer, sometimes it will concentrate on shape or space. Sometimes the answer will be a drawing or gap filling activity.

? Puzzle Question
At the end of each activity there is a square to write the answer to a quick calculation or a number fact. All the answers are between 1 and 100. At the end of the booklet there is a puzzle to complete.
The back cover of the booklet has useful facts and figures to help you.

1   Grave of the Unknown Warrior

This grave contains the body of a British soldier who died in the First World War. He was brought back from France and buried in the Abbey on 11/11/1920. The coffin was covered with the Padre's (Chaplain's) flag you can see hanging in St. George's Chapel.
The grave reminds us of all the people who died but have no known grave. Poppies have become a symbol of all those who died.

In the nave, look at the grave and the poppies surrounding it.

Nobody knows exactly how many poppies are around the grave. Estimate the number like this:

Step 1. Count how many poppies you can see in the corner of the grave indicated.
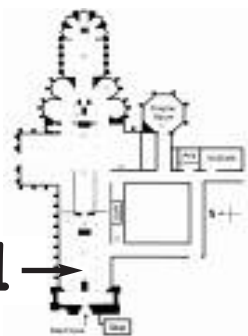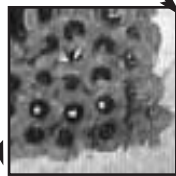
Step 2. Estimate how many of these squares would fit round the perimeter.

Step 3. There are _____ poppies in one box.

You could fit about _____ around the perimeter.

There would be roughly _____ poppies all together.

Work in tens and round your answer to the nearest hundred.

puzzle question

For how many years did the First World War last?

2   The Chandeliers

The chandeliers were installed in 1965 to commemorate the 900th anniversary of the Abbey. They were made in Ireland of Waterford Crystal.
Each one is over 3 metres (about 10 feet) high and weighs 127 kilograms (about two and a half hundredweight).

Stand in the middle of the Nave and look up at the chandeliers in the roof.
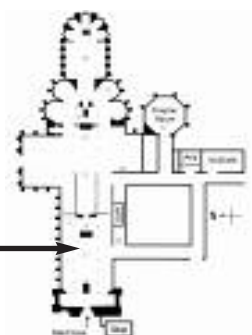
I am about _____ cm tall.

I estimate that _____ people of about my height would equal the height of one chandelier.

I weigh about _____ kilograms.

I estimate that _____ people of about my weight would balance the weight of one chandelier.

puzzle question

How many chandeliers are there in the Nave?

3   Newton's Tomb

Sir Isaac Newton was a scientist and mathematician. He was famous for his theory of gravity, his mathematical discoveries and his invention of the reflecting telescope.

He was also Master of the Mint and the youngest professor of Mathematics ever appointed at Cambridge.

All these aspects of his life are shown somewhere on his tomb.

Have a close look at all the different carvings on the tomb.

The mathematical name of the shape this boy is holding is called a _____.
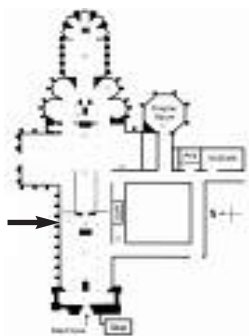
Name two other 3D shapes you can see on the tomb.

_____
_____

The line beneath tells us when Sir Isaac was born and when he died.

NAT. XXV DEC. A.D. MDCXLII. OBIIT. XX MAR. MDCCXXVI

Sir Isaac Newton lived from _____ to _____. He was _____ years old when he died.

puzzle question
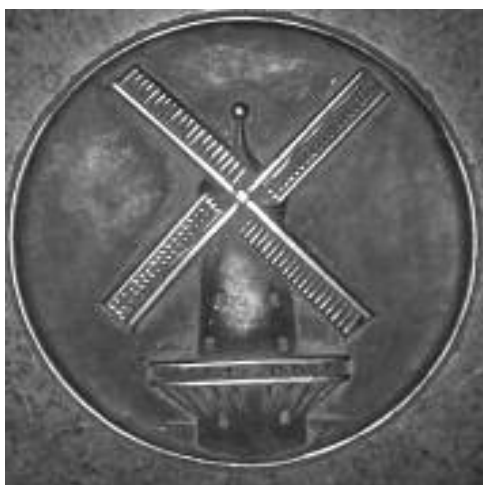
3 →

? How many signs of the Zodiac are there?

4   George Green

i

,George Green was a mathematician who lived at the beginning of the nineteenth century. George's father was a miller and baker, and George became a miller and did a lot of his studying on the top floor of his mill.
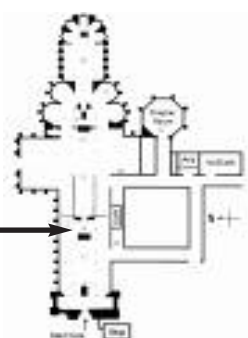
The memorial to George Green is in the floor of the Nave just in front of Isaac Newton's tomb.

The memorial to George shows a windmill. The sails on the mill are interesting. Look at their reflection and rotational symmetry.
What is the order of rotational symmetry? _____
How many mirror lines could you draw? _____

GEORGE
GREEN
MATHEMATICIAN
& PHYSICIST
–1793–
1841

4 →

puzzle question

?   *In which century did George Green live?*

5   The Quire

The choir was originally the part of the Abbey in which the monks worshipped, but there is now no trace of how it looked. It was changed in the eighteenth and nineteenth centuries.
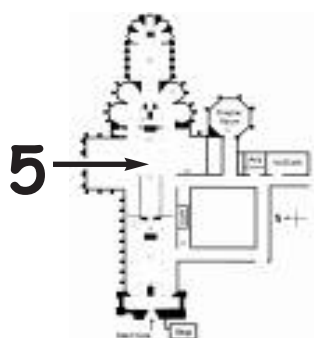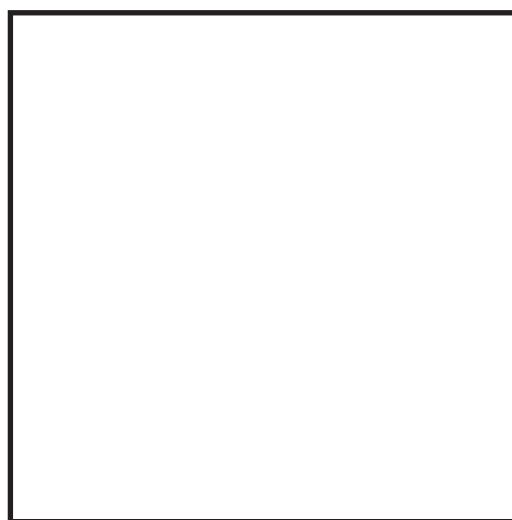
Here the choir, of twenty four boys and twelve Lay Vicars (the name given to the men of the choir), sings the daily Services.

Look at the carving on the choir stalls.

Choose one of the shapes and draw it here.

puzzle question

? How many sides has a hexagon?

6   High Altar

The transepts are the crossing arms of the Abbey, aligned north-south. Their length is 62 metres.
The North Transept Rose window shows some of the Apostles.
The South Transept Rose window has 32 figures in the outer circle. The inner circle has 16 angels.

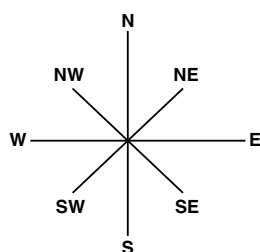*Stand in front of the High Altar where you can see along both Transepts.*

The High Altar (Sanctuary) is in the _____ of the Abbey.
The Nave is at the _____ end of the Abbey.

There are Rose windows at the end of both the North and South Transepts.
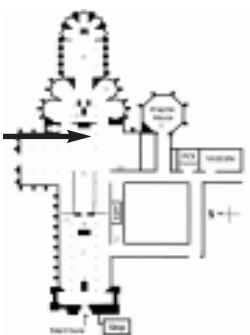
The Rose windows have different orders of rotational symmetry. Look carefully and work them out.

The North Transept Rose window order   _____

The South Transept Rose window order   _____

6

puzzle question

How many chandeliers are there in the whole of the Abbey?

7   St. Edward the Confessor's Shrine

St. Edward the Confessor was the founder of the Abbey. He probably never saw the completed building. He died in 1065, a few days after it was consecrated. He was buried in front of the High Altar in 1066 and was later made a saint.
His shrine was originally decorated with colourful mosaic.

Go past the High Altar to the chapel which commemorates St. Edward the Confessor and look at his tomb.

Circle the names of all the different 2D shapes you can see on Edward's tomb.
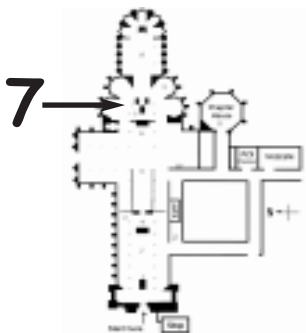
trapezium

octagon

square

rectangle

diamond

star

triangle

circle

hexagon

cross

pentagon

semicircle

puzzle question

? How many arches are there in the two levels above the shrine itself?

7

8 Lady Chapel (Henry VII Chapel)

The Lady Chapel is also known as Henry VII Chapel. It is the Chapel for the Knights of the Bath.
There are always thirty four senior Knights of the Bath and this number never changes. Each one has his own stall and banner.

Look at the carved stalls where the Knights of the Bath sit.
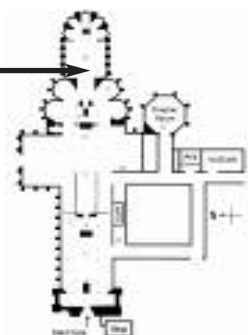
I estimate that the Chapel will seat _____ people.

Look upwards over the stalls to the banners hanging there.

There are _____ banners.

8

puzzle question

How many senior knights of the Bath are there?

9   Chapel of St Nicholas

The Chapel once contained relics which included a finger of Saint Nicholas. It is decorated with a frieze of shields and roses
It also contains the vault of the Percy family where the Dukes of Northumberland and their families are buried.

Look at the memorial to the Dukes of Northumberland on the right of the chapel as you enter.

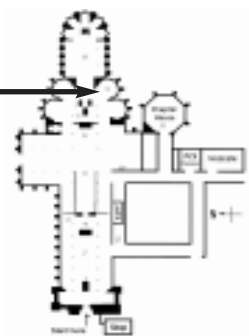The missing Dukes are the

_____th and the _____th

Read about the death of Nicholas Bagenall on his memorial stone.

Nicholas Bagenall was _____

weeks old when he died. The

cause of his death was

_____

_____.

puzzle question

Multiply the numbers of the 2 missing Dukes.

10   Handel's Monument

George Frederick Handel was a German composer who lived in London. The words from the Book of Kings: 'Zadok the priest and Nathan the prophet anointed Solomon king' have been sung at each coronation since the coronation of King Edgar in AD 973. Handel 's setting was first used at George II's coronation in 1727.

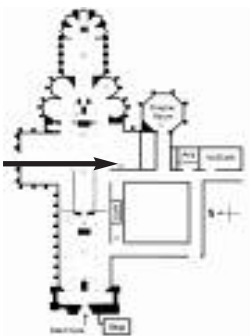*Go into the South Transept and look at the dates on the memorial to Handel.*

Handel was born on ___ _____ _____.

He died on ____ _____ _____.

born February XXIII MDCLXXXIV.
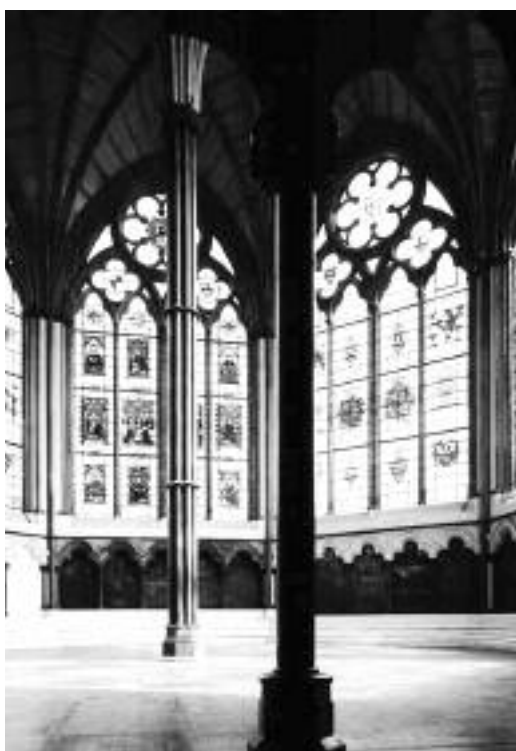**died April XIV MDCCLIX.**

puzzle question

? *Which day of the month was Handel born on?*
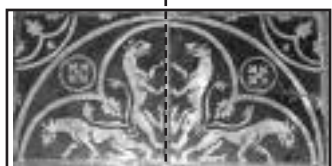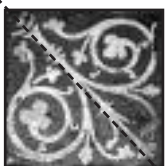
11 The Chapter House

The Chapter House is in the East Cloister and was the place where the Abbot and monks met to discuss the day-to-day business. It was also the place where Parliament met in the 14th century before it moved to the Palace of Westminster across the road. The tiles in the Chapter House are mediaeval.

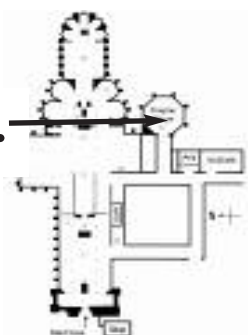*Look closely at the variety of tiles on the floor.*

Choose a tile and draw it here.

How many mirror lines does your tile have? _____
Does it have rotational symmetry? Yes/No

11→

puzzle question

How many degrees are there in one eighth of a turn?
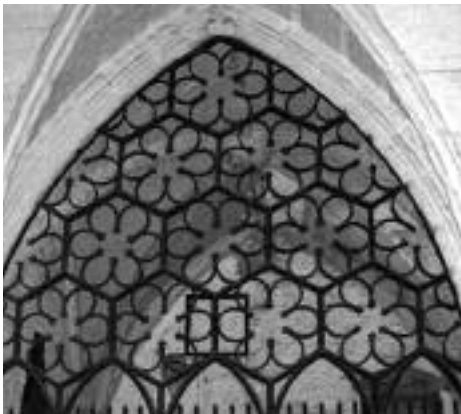
12   Cloisters

The Cloisters were where the monks who lived in the Abbey spent most of their time when not at prayer or taking part in the daily services. In the west cloister the novices were taught and for relaxation they played a popular game of marbles called "nine holes". The monks studied in the north cloister. In the south cloister was the entrance to the Refectory. In the east cloister was the Chapter House where the community met each day to have a chapter of the Rule of St Benedict read to them. It was also the place where punishments were meted out. The Cloisters were rebuilt after the Great Fire of 1298.

Carved in the stone benches in the North Cloister are sets of holes. These were used for Nine Men's Morris.

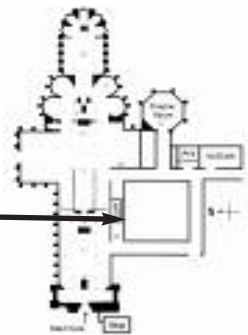How many hexagons are there in the screen at the corner of the East and South cloisters? _____

Calculate the perimeter of the cloisters.

Step 1. Each cloister measures about 30 metres (100 feet).

Step 2. The approximate perimeter of the four Cloisters is _____ metres x _____.

Answer: _____ metres.

puzzle question

? *How many holes in the game played by the monks?*

Puzzle Question

For each number you found during the trail there is a letter.

Decode the puzzle and you will find the name of a famous 20th century British Prime Minister who has a memorial in the Abbey.

Write the number you found to each question:

Place number	1	2	3	4	5	6	7	8	9	10	11
Answer											
	C	H	I	L	N	O	R	S	T	U	W

Write the correct letter under each number:

45	12	6	34	63	16	6	4	8	23	28	4	8	12	19	19

The name of the Prime Minister is

_____

Facts and Figures

Important measurements

Floor area:	2972 m²	32,000 square feet
Extreme length exterior:	161.5 m	530 feet
Height of West Towers:	68 m	225 feet 4 inches
Extreme length interior:	156 m	511 feet
Height of Nave interior:	31 m	101 feet 8 inches
Width of Nave & aisles:	21.5 m	71 feet 9 inches
Length of Nave:	50 m	166 feet
Length of Transepts:	62 m	203 feet 2 inches
Length of Henry VII chapel:	31.5 m	103 feet 9 inches
Height of Henry VII chapel:	18.5 m	60 feet 7 inches
Width of whole chapel:	21 m	70 feet 1 inch

Seating capacity at normal Services: about 2,000
Seating capacity at 1953 coronation: about 8,200

Nat. born
Obiit died
Vixit lived
annos: years
menses: months
dies: days

Roman Numerals
I	1
II	2
III	3
IV	4
V	5
VI	6
VII	7
VIII	8
IX	9
X	10
L	50
C	100
D	500
M	1000

Conversions

Metric to imperial
1 m is about 3 feet or 39 inches
1 cm is.0.39 inches
1 km is about 0.6 miles

1 kg is about 2.2 pounds (lb)

1 square metre is about 1.2 square yards

Imperial to metric
1 inch is about 2.5 cm
1 foot is about 30 cm
1 yard is about 91 cm

1 hundredweight (cwt) about 112 pounds
1 pound is about 454 grams

1 square foot is about 900 square centimetres
1 square yard is about 0.83 square metres

Rough conversions to use in your head

Five centimetres is just less than two inches.
Five millimetres is just less than a fifth of an inch.
A foot is slightly more than 30 centimetres (think of a ruler).
A metre is a few inches more than a yard.
A kilometre is over half a mile.

Compass directions

There are four points of the compass – **North**, **South**, **East** and **West**.
The direction halfway between North and West is described as **North West.**
The direction halfway between South and East is described as **South East**, the direction halfway between South and West is **South West** and the direction halfway between North and East is **North East.**

```
           N
  NW               NE


W                       E


  SW               SE
           S
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