

THE MATHEMATICAL ASSOCIATION

Introduction to the revised version of *Chrismaths*

This new edition of *Chrismaths* updates the original 1987 edition with some fresh ideas and new material. The progress of technology in the has enabled us to improve the appearance of the booklet, and make it much more accessible.

The purpose of *Chrismaths* has always been to exploit the opportunities for developing mathematics in the pre-Christmas activities in schools. It has been a popular resource for teachers of young children in nursery, infant and primary schools.

The wide range of suggestions, making mathematics an explicit part of the whole curriculum in the weeks before Christmas, ensures that mathematics is not neglected during this time.

The original ideas and material were the work of Wendy Garrard and Vida Stanton, practising teachers who met at the West Suffolk Teachers' Centre, and this booklet is still substantially theirs. Some variations and additions have been made by Ceri Morgan, Bernard Bagnall and Ian Evans. The production was done as DTP by Bill Richardson who made extensive use of clip-art and provided camera-ready copy.

September 1997

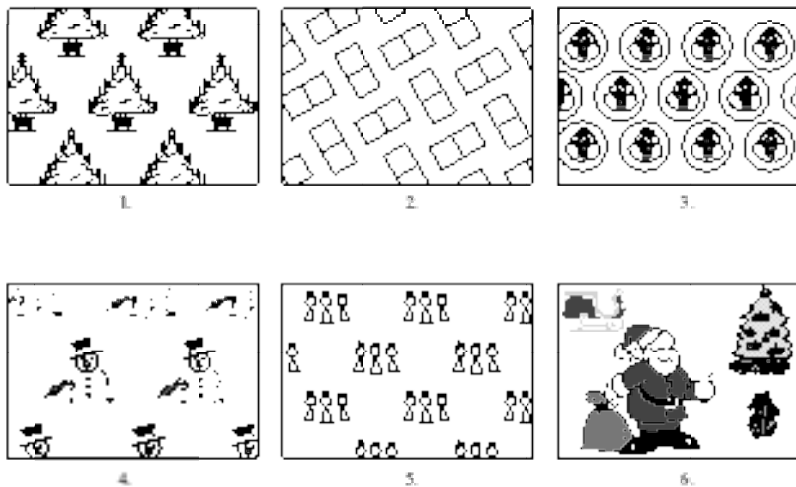
CHRISTMAS WRAPPING PAPER

Resources for Christmas activities can be found in abundance but it is not always obvious how they can be used to generate mathematical activity in the classroom. Here are a few ideas of how Christmas wrapping paper may be used:

Paper to look for

1. Large bright simple designs eg., Christmas trees, decorations etc.;
2. Repeated patterns / designs various sizes;
3. Similar designs but with differences to spot;
4. Square, circular, triangular designs;
5. Multiple designs;
6. Picture designs;
7. Apparently random arrangements.

Eg.,



A variety of games, puzzles, investigations and discussion activities may result from such papers which may be purchased reasonably cheaply.

Wrapping paper provides opportunities to talk about patterns; what we mean by patterns and how we recognise them. Ideas of generation, repetition and extension can be explored. We can look at

- horizontal rows and vertical rows,
- the offsetting of alternate rows,
- diagonals, up to the left down to the right
and down to the left and up to the right
- how the pattern continues beyond the edge of the sheet
- fitting one or more extra sheets of the same pattern in various positions so that they either overlap the first sheet or match it to extend the pattern.

Plenty of ways can be used to develop counting and multiplying skills, for example

- (i) by counting the number of trees in a row and the number of rows
- (ii) by counting the number of kings in each group and the number of groups to find the total number of kings.

In patterns like (6), we can ask questions like,

Where is Santa?

What are behind him?

What is this side of him? (pointing)

What is on the other side of him?

What is to the right/left of him?

What would he see if he looked to *his* right?

Describe where his sleigh is.

TOCKERS OR SIMPLE TIMING DEVICES

These are made using coffee jar tops, small circular tins of various sizes.

The lids are used as templates to draw a cardboard circle, which when cut out is stuck down on top of the lid.

Christmas designs could include Father Christmas, stars, snowmen and Christmas trees.

A ball of plasticine is placed inside the lid and adjusted until the lid rocks for a suitable time after being displaced.

Care should be taken that the card does not impede the rocking motion.

The children can then compare the tockers using such vocabulary as longer than, shorter than, quicker, slower than, stop, first, last, same time, begin, etc.

The tockers can be sorted into sets of larger/smaller, people/not people, and they can be ordered according to size.

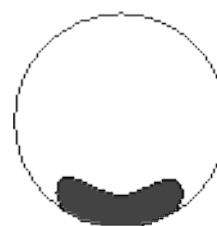
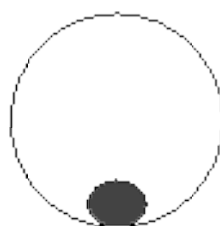
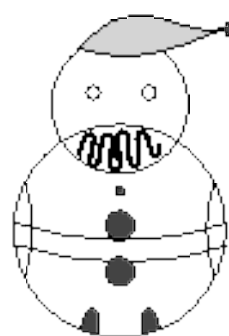
The child can then be given a simple task to be finished before the tocker stops,

eg., changing before PE, threading 10 beads on a thread. They can try to estimate how long the tocker works.

With older children the plasticine should be of a standard weight, say 10g. They can then time how long the tocker rocks until it stops.

Next they can change the ball of plasticine into firstly, a 5cm long sausage, then a 10cm long sausage and test whether this alters the time the tocker rocks.

When they have found the best position and shape of plasticine, ie., that which makes the tocker rock for the longest time, let them use that particular time to time writing the address on a letter to Father Christmas.



CHRISTMAS BELL RINGING

You have three bells (or chime bars) each ringing a different note.

You can make a tune using 3 single rings. What tunes can you make?



Notes

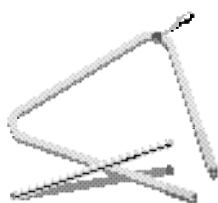
Try tape recording and playing back to identify whether you have played certain tunes before.

You could play a note more than once.

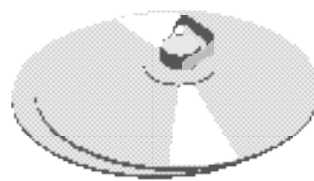
Find ways of recording ranging from colour coding through to notes on a staff.

Change the bells to 3 different instruments.

Get the children to play tunes and make repeated patterns of music to each other.



Triangle



Cymbals



Tambourine

SNOWFLAKES

You will need multilink cubes.

Stage 1

Start with one unit of multilink.



Stage 2

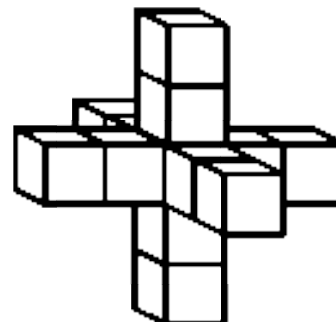
Now add unit cubes of a different colour obeying the following rule.

They may be joined together where they touch the previous unit cube on one face only.



Stage 3

Change to another colour of unit multilink and join to one previous stage following the same rule.



Stages 4, 5, 6, etc,

Continue this way obeying the same rule.

Record how many unit cubes used at each stage.

Having followed the rules again to see if they work, you may need to go back to the beginning to help with your recording.

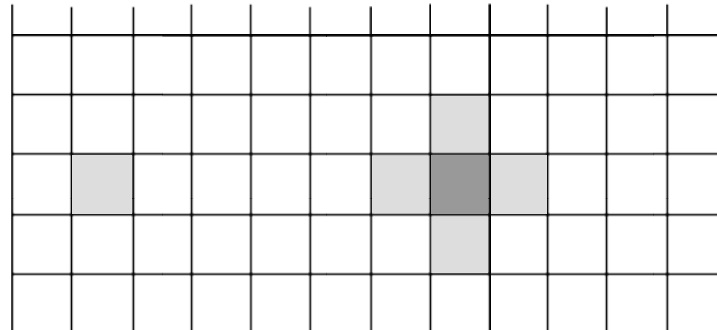
Record

Stage 1	New Cubes	Total Number Cubes
1	1	1
2	6	7

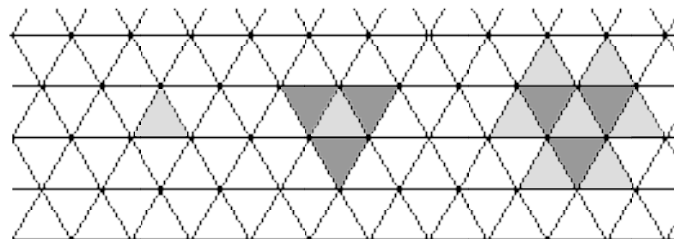
Variations on a theme:

- a) Now record the same investigation on squared paper using the same rules.

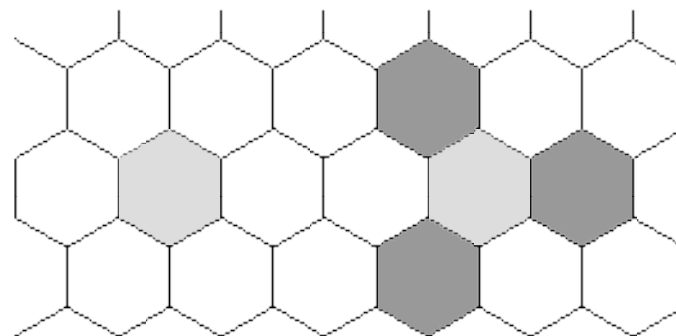
Start by colouring one square. Colour the next square where they join only along the side edge. Using a different colour continue in this manner. Stage 3.....16.



- b) What happens if you change your recording paper to triangular paper. Follow the same rules.



- c) Now use hexagonal paper and follow the same rules.



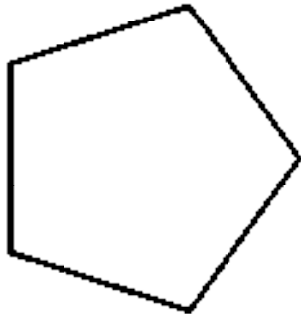
Did you manage to make a snowflake?

SPECIAL TOPIC – STARS

As each Christmas comes, it is tempting to just have a go at anything. It may be worth considering a specific topic such as Santa or presents or snowflakes. We have chosen to look at **STARS** as a possible theme for development. Here are some ideas which may be used across the age range.

Explore ways of drawing and constructing a five pointed star. Challenge the children to look for pattern and shape.

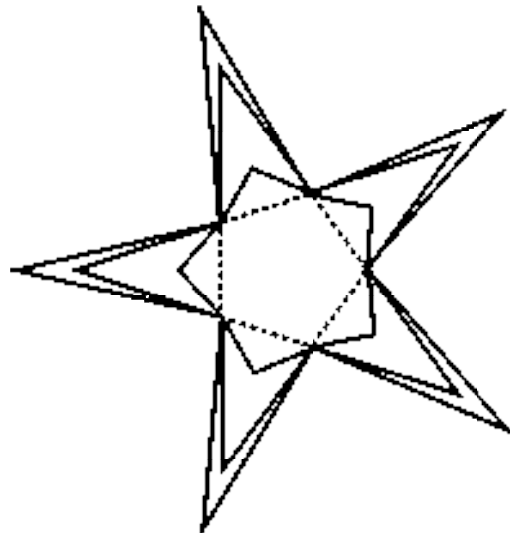
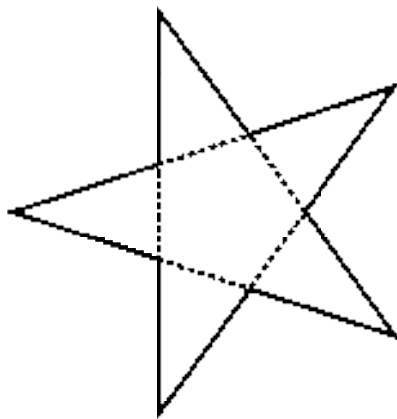
Start with a pentagon: A Regular Pentagon



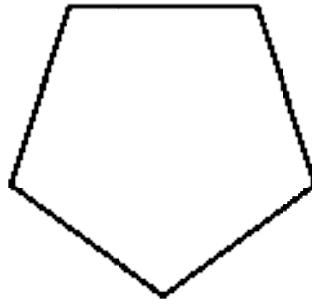
(It is worth making enough for every child to have one.)

Extend all the sides. As if by magic, the five pointed star is formed.

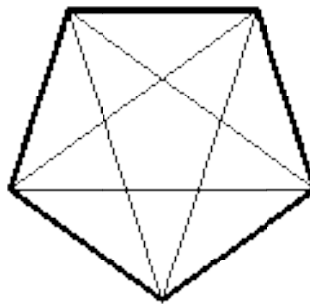
Reduce and extend the points to make them sharp or stubby.



Explain ways of drawing a five-pointed star. Ask the children to look for patterns and shapes.

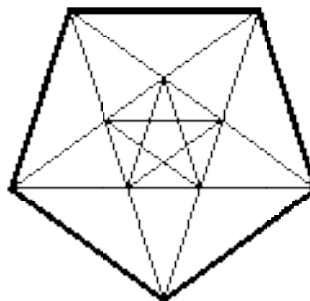


Join the corners of the pentagon.



Can you see the 5 pointed star?
and the pentagon inside?

Draw the same lines in the small pentagon.



What happens?

Do it again and again

This is a glorious example of what mathematicians call an infinite series; it goes on and on forever. Notice that the first magic star you made on the last page could have its points joined to make a pentagon and we could go on outwards, for ever? If we had enough paper!!

Produce other Stars – 6 pointed

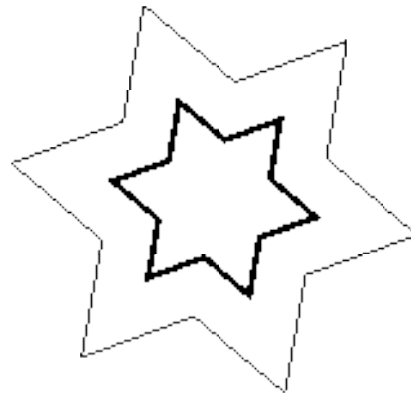
What shape will you start with?

Look for tessellation patterns with stars.

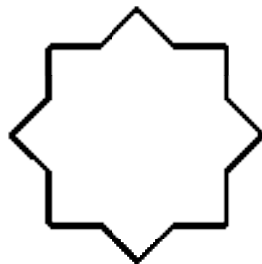
Which stars tessellate?



If any?



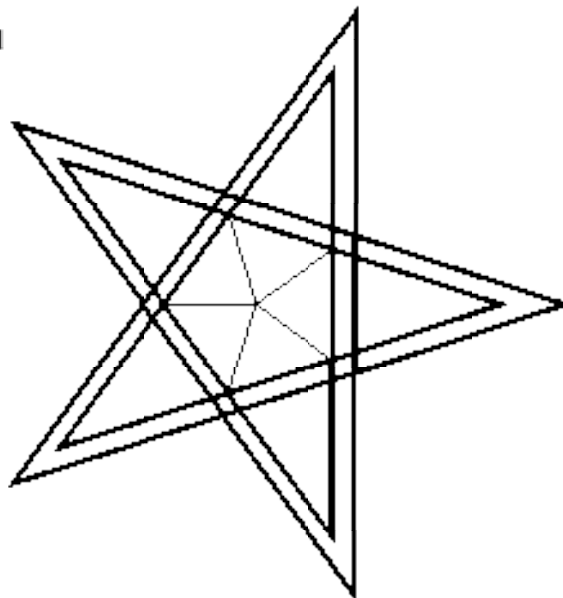
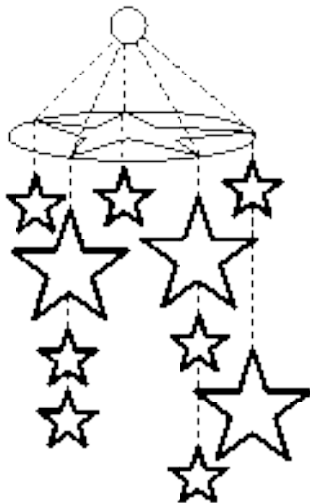
Make an 8 pointed star. What shapes could you use?



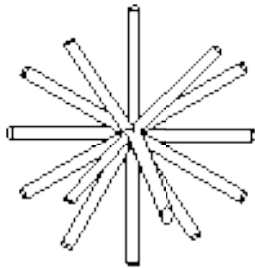
Make Mobiles

Repeated stars, large and small

Incorporate stars inside stars.



Develop into 3 dimensional star work



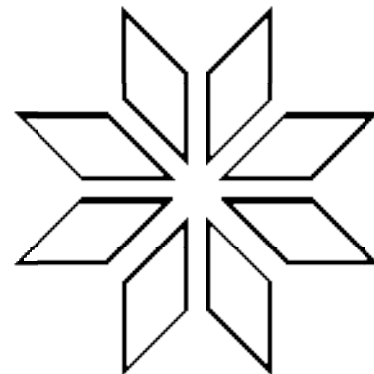
Make 2 and 3-D models using materials such as Polydron, Clix, Multilink, Templates, Mosaic pieces, Geostrips, Straws (Art & Construction), ATM Beer mats, (see Resource Sheet)

Print star designs

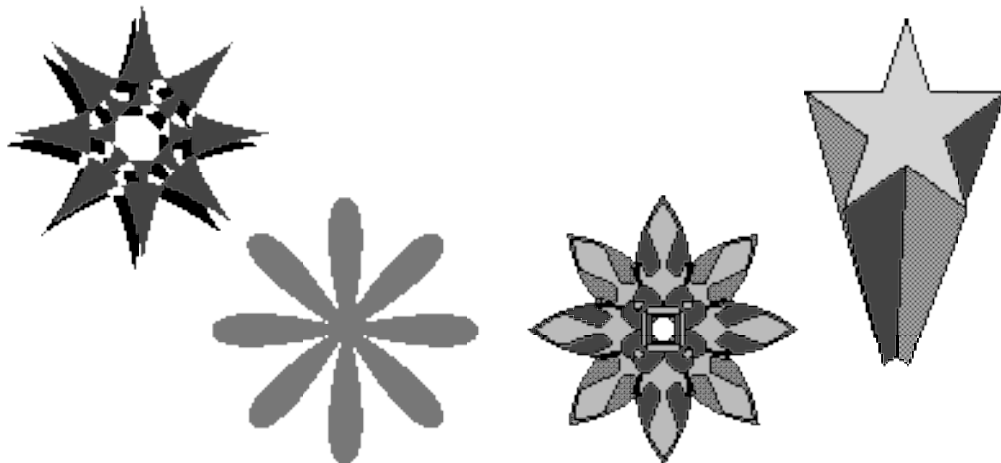
Using triangles only to print with

Using lines only to print with

There are many excellent magazines and books with several ideas for work on stars.



The mathematics to be explored is tremendous. You will have a **startling** time and the displays to be produced could be magnificent.



Santa



Use a die 1 - 6
Roll then colour

1 Red	4 Pink
2 White	5 Green
3 Brown	6 Grey

Colour one part with
each roll of the die