



Digit Add

Student Material

Start with any 2-digit number.

Add the digits together.

Take this answer away from the number you started with.

Do this for other numbers.

What do you notice?

Try 3-digit numbers
... 4-digit numbers

$$\begin{array}{r} 46 \\ 10 \\ \hline 46 - 10 = 36 \end{array}$$

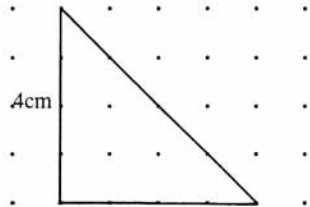
Dotty Triangles

Student material

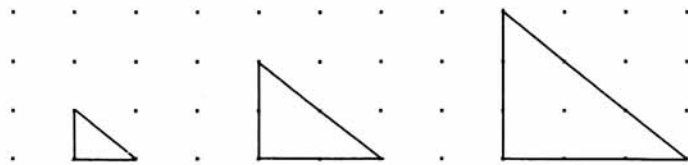


This triangle is 4cm tall.

1. How many dots are there on the perimeter of this triangle?
2. How many dots are there inside this triangle?
3. How many dots on the perimeter and inside altogether?
4. What is the area of the triangle?



Do the same for these triangles:



Choose one question to investigate for bigger triangles.

Can you find any rules?

* Exercise

Write on the following pieces of students' work (*Digit Add* and *Dotty Triangles*), which investigative processes you think are occurring.

Digit Add

I am going to start with 10 and then go up

$$10 \rightarrow 9$$

$$11 \rightarrow 11 - 2 \rightarrow 9$$

$$12 \rightarrow 12 - 3 \rightarrow 9$$

$$13 \rightarrow 9$$

$$14 \rightarrow 9$$

Every number goes to 9

$$46 \rightarrow 36$$

$$47 \rightarrow 47 - 11 \rightarrow 36$$

$$48 \rightarrow 48 - 12 \rightarrow 36$$

$$49 \rightarrow 49 - 13 \rightarrow 36$$

$$45 \rightarrow 45 - 9 \rightarrow \cancel{44} 36$$

$$44 \rightarrow 44 - 8 \rightarrow 36$$

These all go to 36

$$21 \rightarrow 18$$

$$22 \rightarrow 18$$

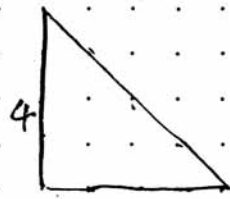
$$23 \rightarrow 18$$

$$24 \rightarrow 18$$

They will all go to a number in the three times table.

They stay the same because as you add one on you take it off.

Dotty Triangles



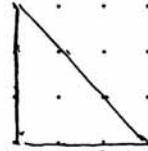
1. 12 dots
2. 3 dots
3. 15 dots
4. 8 sq. cm.



3
0
3
 $\frac{1}{2}$



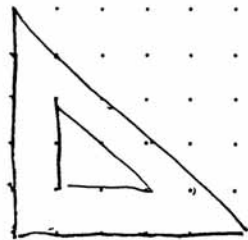
6
0
6
2



9
1
10
 $4\frac{1}{2}$

The dots on the edge is in the three times table.

The area is half the square



15. The first number is three times the side.

6. That is the same as the little one.

21. That is in the three times table as well.

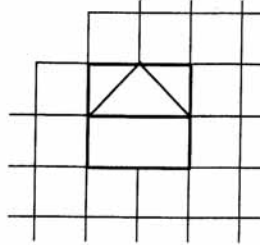
$12\frac{1}{2}$

Conclusion

1. This number is always in the three times table
2. This number goes up slowly.
3. This number is usually in the three times table
4. This is half the square because half a square is a triangle.

Colours

Student material



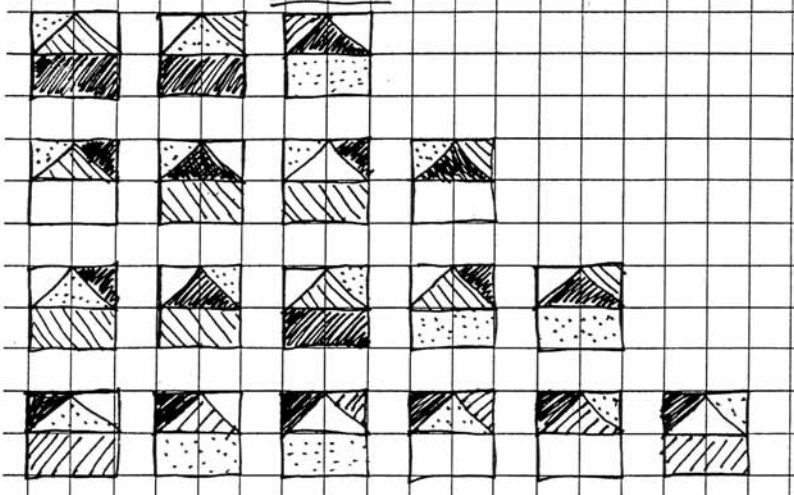
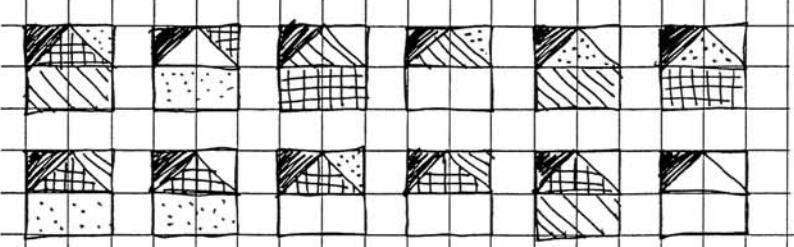
Choose four colours.

Copy this pattern and colour it in, using a different colour for each piece of the pattern;

You have now found one way to colour the pattern.

How many different ways can you colour it?

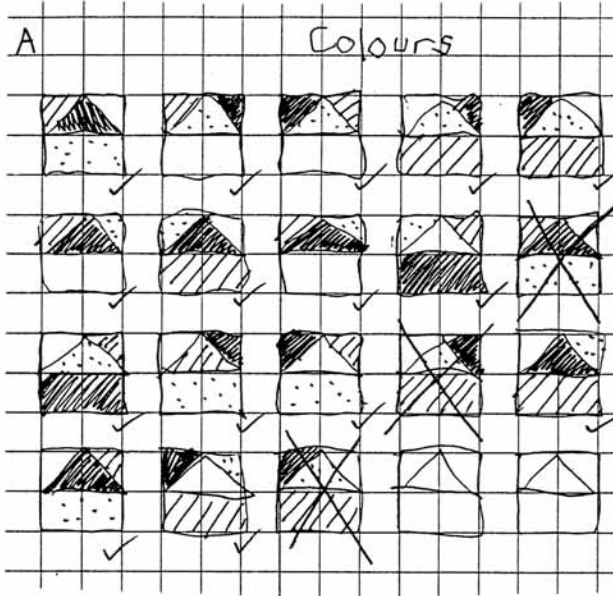
Example of Student's Work Annotated with Processes

<p style="text-align: center;"><u>Colours</u></p> 	<p>Generating Results</p> <p>Being Systematic</p>
<p>There are six different ways if I keep one the same.</p>	<p>Making an Observation</p>
<p>There are 24 ways altogether</p>	<p>Making an Observation</p>
<p>5 colours</p> 	<p>Generating Results</p> <p>Being Systematic</p>
<p>There are six ways if I keep 2 the same</p>	<p>Making an Observation</p> <p>Looking for a Pattern</p>
<p>There are always six ways with 3 colours.</p>	<p>Generalising</p>
<p>There is 2 ways for 2 colours because you can swop them round.</p>	<p>Justifying</p>

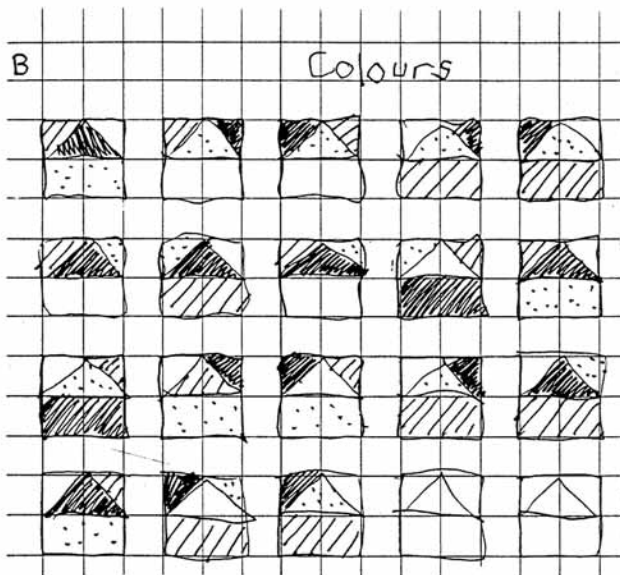
Ways of Marking

**** Exercise

Here are two identical pieces of students' work. The first is marked badly. The second is marked well. Make a list of the things which you think make the first bad and the second good.



Use a ruler!
Only 11
There are lots more!



Well done.
How many different
ways did you find?

SMP 11-16
ASSESSMENT SHEET FOR OET
(INVESTIGATIONAL)

Candidate's name		Brief title of task	
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Grade	
Final mark	
Teacher code	

Stage	Process	Code	The pupil at grade F will be able to	The pupil at grade C will, in addition be able to	The pupil at grade A will, in addition, be able to	Teacher's comments in addition to shading boxes
IDENTIFYING	QUESTIONING/ EXTENDING (linked with EX)	QE	Decide the relationship to be established, the features to be investigated, and information to be obtained.			
	PLANNING	PL	Decide on the steps to be carried out and the order in which to carry them out.	Adopt a methodical approach by selecting variables and deciding which are important or can be ignored.	Apply reasoning to plan the approach and determine what might go wrong or recognise key results and use them to structure subsequent work and extensions.	
	GETTING STARTED/ SIMPLIFYING	GS	Explore by looking at some particular cases.	Structure a simple start in order to approach a difficult task.	Use efficient methods to simplify a complex task.	
IMPLEMENTING	WORKING SYSTEMATICALLY	WS	Find and list all possibilities in a simple situation by haphazard trial and error.	Develop a system to find all the pertinent data in some of the cases used.	Work with a system which leads directly to generalising or proving.	
	CLASSIFYING	CL	Categorise information according to given criteria.	Decide to categorise information in relation to chosen criteria.	Produce general classifications.	
	SYMBOLISING/ RECORDING	SR	Record results in a simple diagrammatic or tabular form.	Decide to record using conventional symbolic representations or novel diagrams.	Make use of a novel symbol system in an elegant manner.	
	CONJECTURING/ GENERALISING	CG	Recognise, describe and extend patterns.	Make a conjecture about a relationship and attempt to verify.	Make and test conjectures and formulate general rules.	
	CHECKING/ PROVING	CP	Check that a pattern applies to all data available.	Predict a further case in order to check a generalisation or prove a situation is not possible.	Prove a generalisation by analytic explanation.	
REVIEWING	SUMMARISING	SU	Summarise the results and describe some valid observations or interesting features	Draw some valid conclusions.	Interpret the results achieved concisely including the key valid conclusions.	
	COMMUNICATING	CO	Explain orally and in writing the problem, the route to the solution and the outcome using a step by step approach.	Give a clear general description, orally and in writing, of the progress with, and outcome of the task.	Give a clear verbal and concise written account of the task including the assumptions made and the strategies used.	
	EXTENDING (linked with QE)	EX		Describe or follow further enquiries to extend the scope of the work.	Explain any limitations to the work and relevant further enquiries, modifications or extensions.	