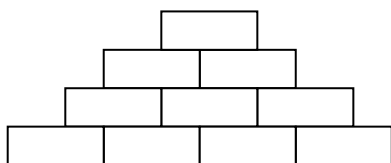


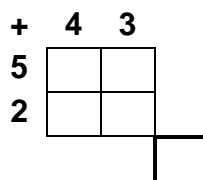
Algebra from problems (KS3)

Activity 1 Castles



- Enter numbers in the bottom row boxes.
- Add 2 adjacent boxes to find the number in the box above.....continue to the top
- With the **same numbers**, make more castles.....find the **highest & lowest castle**.
- Make some castles with a **new set of numbers**.....find highest & lowest.
- Is there a rule to give the highest / lowest?
- Try castles with 3 numbers, 5 numbers, etc

Activity 4 Addition squares

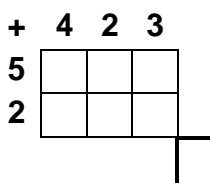


- Find the 4 numbers by adding
- Add your 4 answers & write in the box
- Is the box number double the total for the 4 numbers?
- Does this always work for any 2 by 2 square?

Investigate this with 3 by 3 squares.

- What happens now?
- What happens with 4 by 4 squares, 5 by 5 squares?
- What is the RULE for any square?

Investigate "Addition rectangles"



Activity 2 3 figures

Choose **any 3 digits** from the table. You have to choose 3 different. e.g. 2, 3 and 5

- Make them into a **3 figure number** e.g. 235
- Use these 3 digits make all the other 3 figure numbers.
- ♦ **Add up all the numbers** you made.
- ♦ **Add up the 3 digits** you started with.
- ♦ **Divide** your big total by the sum of the digits.
- ♦ What answer do you get?

Try again with another set of 3 digits. What happens? Use algebra to prove that this always happens.

Further work

- What happens with just 2 figures?
- Predict what will happen if you have 4 figures.'

Activity 5 3's and 5's

- What numbers can be made by adding just 3s and 5s? (eg 9=3+3+3, 10=5+5, 11=3+3+5,.....)
- Try to make all numbers up to 30.
- Which are impossible?
- What is the **largest impossible**?
- **Change the numbers**. [eg. 4 and 7, 5 and 8, etc]

Find a formula / rule to work out the **largest impossible** from any pair of numbers.

- Some pairs do not work [e.g. 2 and 6].
- Find some others.
- Why do they not work?

Activity 3 School prize problem

- A primary school has 120 children on roll. The Headteacher wants to award vouchers as prizes.
- One third of the boys will receive a £15 voucher and one quarter of the girls will receive a £20 voucher.
- How much will it cost?
- What will it cost if the Head of a high school uses

Activity 6 Simpson's problem

[featured in MT (Summer 2011)]

- Marge Simpson is 33 years old.
- Lisa is 10, Bart is 7 and baby is 0.

In how many years will Marge's age be the same as the sum of the kids' ages?

the same rule with 1000 children on roll?

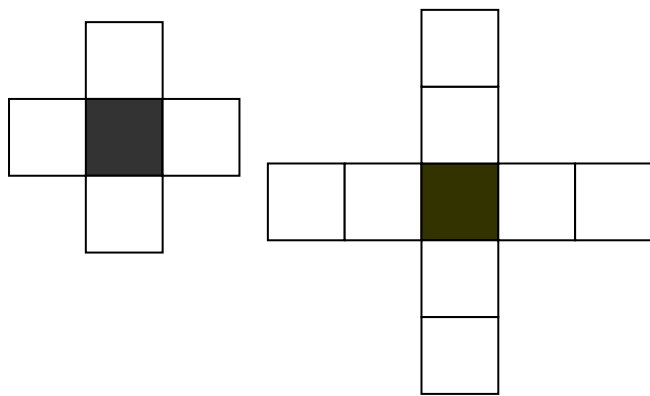
Activity 7 Missing Fibs

Here are some Fibonacci sequences which have numbers missing. Try to find the missing numbers.

3						55
2				19		
	4				23	
					18	29
		11			49	

Make some more. Long and short.

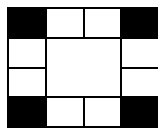
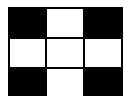
Activity 8 Algebra from square patterns



	Black	White	Total
1	1	4 [1 x 4]	5
2	1	8 [2 x 4]	9
3			
4			
5			
n			

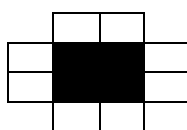
Make more patterns like this and count the squares

What about?

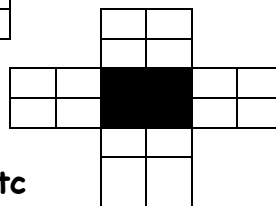


.....etc

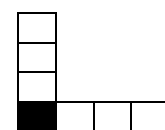
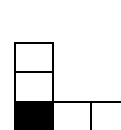
.....or



...etc

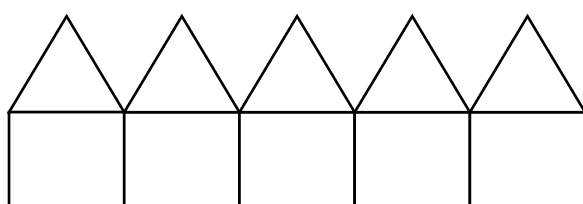


...or even!!



...etc

Activity 9 Houses [based on idea in DIME pre-Algebra]



Houses	Lines	Nodes
1	6	5
2	11	8
3	16	?
4	?	?
5		

Make some more houses and count lines and nodes

n ?