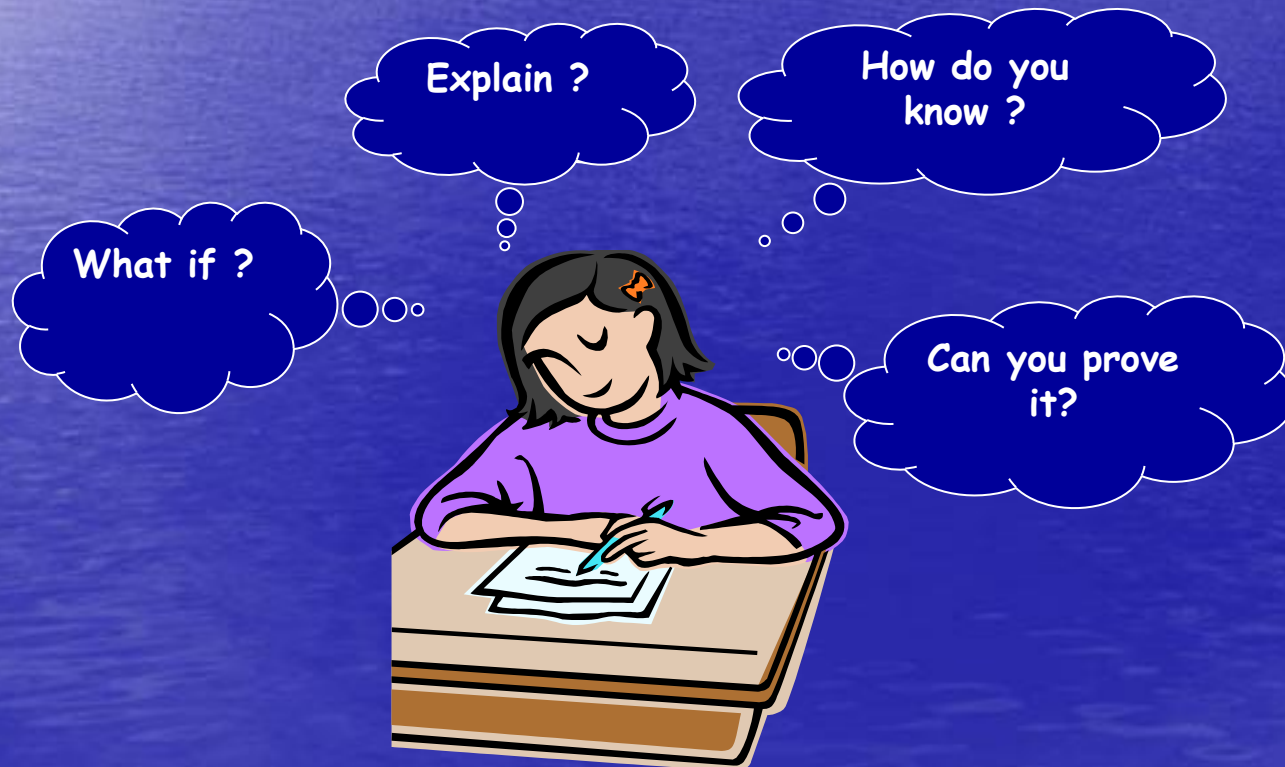


West Kirby Primary School

Maths Reasoning 15.02.17



Have a go while you are waiting.

This is not a test!

Magic Square Challenge



This magic square uses the numbers 3, 5, 7, 12, 14, 16, 21, 23 and 25

a, **e** and **i** are even numbers

$$d + g = 26$$

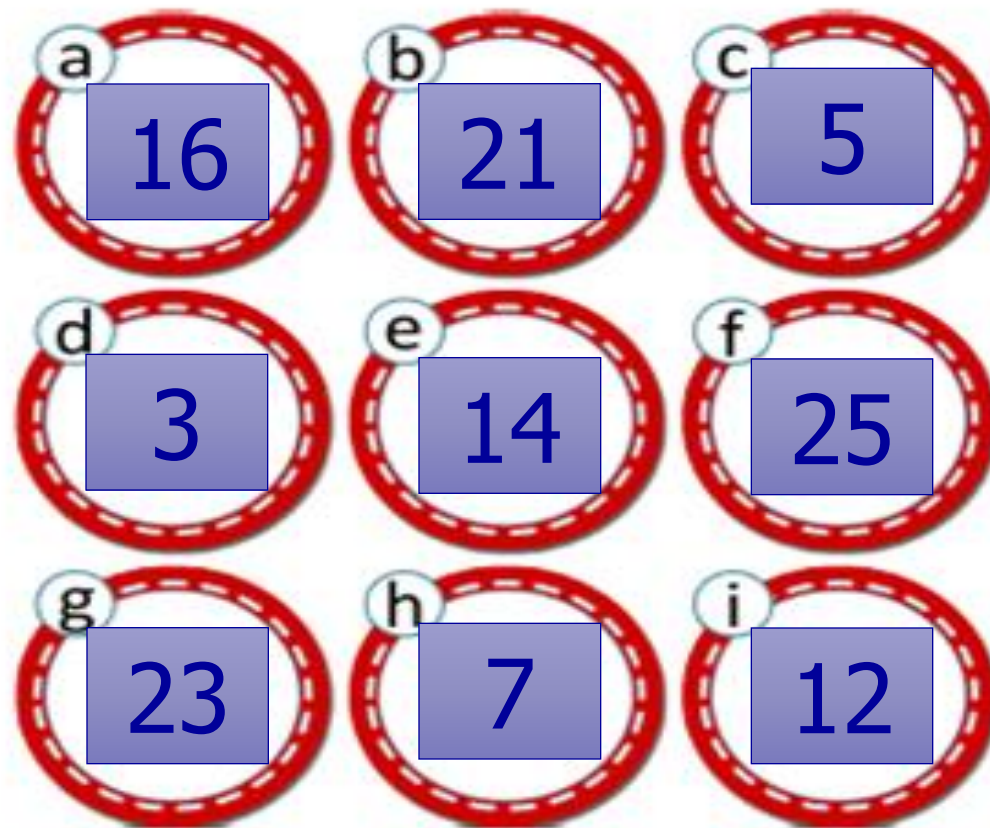
a and **f** are square numbers

$$f = 5 \times e$$

e is double **h**

How did you get on?

Magic Square Challenge



DfEE 1999

- 'Parents who are confident about maths tend to have children who are also confident, and these children are ready to tackle and assimilate new ideas in a way that is impossible for children who feel uncertain about, or even fear, maths.'

Aims / Objectives

- To understand what is meant by reasoning, including why it is taught.
- To look at the methods we use to teach reasoning in our school.
- To understand how children deepen their understanding.
- To look at ways in which parents / carers can help their children.

Expectations – The National Curriculum

- Become **fluent** in the fundamentals of mathematics, including through varied and frequent practice with increasingly complex problems over time, so that pupils develop **conceptual understanding** and the ability to recall and apply knowledge rapidly and accurately.
- **Reason mathematically** by following a line of enquiry, conjecturing relationships and generalisations, and developing an argument, justification or proof using mathematical language.
- Can **solve problems** by applying their mathematics to a variety of routine and non-routine problems with increasing sophistication, including breaking down problems into a series of simpler steps and persevering in seeking solutions.

Assessments

Key Stage 1

Paper 1 – Arithmetic (approximately 20 minutes, not strictly timed)

Paper 2 – Reasoning (approximately 35 minutes, not strictly timed) 5 aural questions and approx 30 minutes written.

Key Stage 2

Paper 1 – Arithmetic (30 minutes, 40 marks)

Paper 2 – Reasoning (40 minutes, 35 marks)

Paper 3 – Reasoning (40 minutes, 35 marks)

However, reasoning is embedded throughout the school...



Odd One Out

Spot the odd one out ...

Which is the odd one out in each of these trios...

1. $\frac{3}{4}$ $\frac{9}{12}$ $\frac{4}{6}$

2. $\frac{9}{12}$ $\frac{10}{15}$ $\frac{2}{3}$

Why?

Explain your answer ...



Would you prefer?

- $\frac{1}{2}$ of £30
- $\frac{1}{4}$ of £20
- $\frac{1}{2}$ of £50
- $\frac{1}{4}$ of £24

Explain why in your answer

Explain to an Alien



- How do you **efficiently** solve calculations that ask you to multiply and divide by 10, 100 or 1000.
e.g. $0.7 = \frac{\quad}{\quad} \div 100 =$

- Why do you not need written methods?

Is Zugg correct?



$$\begin{array}{r} 2132 \\ + 3686 \\ \hline 5718 \\ 1 \end{array}$$

Check the whole calculation carefully. If Zugg is wrong, explain why.



Convince me...

• My friend says that he can draw a right angled triangle which has another angle which is obtuse.

• Is he right?

• Explain why.



Always, Sometimes or Never ?

Is it always sometimes or never true that the difference between two odd numbers is odd.

How do you know?

Explain your reasoning.

Convince me that this child is wrong:

6 Smarties are blue so that means: $\frac{6}{15}$

is the fraction of blue Smarties here.

There are 21 Smarties

What fraction of the Smarties are green?



Draw a diagram to convince me that the fraction of green Smarties is bigger than the fraction of red Smarties.

Smarties Fraction

What is this child doing wrong?

Fraction of red Smarties $\frac{21}{4}$

Explain what you would do to help.

Work with your partner.

- **Critical thinking and reasoning**



"Effective teachers required children to articulate and refine their ideas, focusing on developing their critical thinking and reasoning.

Children need to develop the skills involving mathematical thinking.

*Is it true that all prime numbers,
other than 2 and 3,
are one less or one more than a
multiple of 6?*



Deepening a problem

Which version involves deeper problem-solving skills and why?

Version 1



Version 2



Deepening a problem

Version 2 requires the use of deeper problem-solving skills.

Pupils have to...

- decide where to start.
- think how the total was obtained and work backwards to find the missing cost.
- choose the correct order of steps to tackle the problem.

How to help your child with reasoning



Questioning – How can you help?

When working with your child, you could ask question to deepen their understanding...

- What if...?
- What do you notice...?
- How do you know ?
- Which do you prefer ?
- Why do you think that ?
- Explain how you got your answer from the information
- Do you still think...
- What is the same / different ?
- Are you sure?
- Convince me...

Response from the children

Encourage your children to discuss their ideas with phrases such as...

- It could be...because...
- It can't be...because...
- It won't work because...
- If...then...
- It would only work if...
- So...
- In that case...

This develops links to lots of other areas of the curriculum...

Calculations Policy!

<http://www.westkirbyprimaryschool.co.uk/website>

Workshop Locations



	Location
Early Years Foundation Stage (Resources)	Class 5 / 6
Key Stage 1	Class 5
Lower Key Stage 2	Class 3/4
Upper Key Stage 2	Class 6
Mathletics	Computer suite

Thank you for coming.

- If you have any questions, staff will be available in each of the rooms.
- Please feel free to ask the children questions. They'll be happy to explain.