PATTERNS IN CALCULATIONS

- To develop wide range of methods for calculation (including the children's own methods).
- To help children to look for quicker ways to calculate
- To improve mental arithmetic
- To help children to use patterns and simple number facts to break down more complex calculations
- To examine the relative merits of calculators, mental methods and pencil and paper work

Introducing the topic

- What's 10+8? How did you do it?
- Write down on a large sheet of paper as many different ways of mentally working out 19+8 as you can collect from the children. (Include the use of fingers as an equally valid method of calculation).

Questions during activities

- How many different ways have you found?
- Have you checked them all?
- How might you work it out? Try it and see
- Does it work for other numbers too?
- Which was the quickest way?
- Do you think everyone does it your way?

Things to think about

- A quick way to add 9 is to add 10 and take 1 off. Does this always work?
- What might be a quick way to add 99?
- Do you know any quick ways to multiply by 9?
- Is the calculator always the quickest way to work anything out?

- When do you use a lot of mental arithmetic?

Experiences to build on

- Shopping – costs, finding money, checking change
- Scoring systems – darts, games

Organizational Points

- Activities can be worked on by individual children, but would benefit from discussion with other children
- You will often need a calculator for each child participating

Assessment Observations

- Are children able to devise alternative ways of calculating?
- Can children use patterns and simple number facts to do calculations?
- Do children appreciate how quick mental arithmetic can be (quicker than calculators sometimes)?
- Do children use their own methods of calculating in their normal number work, and not always follow a given method?
- Can children explain their own methods of calculating and test them out?
- Can children find their own ways to record different calculating methods?

Before showing children the video clip

- What is 19+8? Ask a few people to do it and ask them how they worked it out.

What you may need

- Calculators, large sheets of paper, pens, crayons, pencils

Things to do

- Survey. Ask a whole range of people to add 19 and 26 in their heads. Have a piece of paper ready to jot down how they did it. Try to collect as many different ways as you can.
- Lists of Numbers. Write down a very long list of single digit numbers, down the page. Add 10 to every number and try to describe the effects. Try adding 9 to every number. Try other constants eg x10, +99, +11
- Broken Calculator. Choose a key on your calculator eg 9 and pretend that it

is broken so you can never use it. Now write out lots of calculations including the broken key eg 9+109, 65x9. Try to devise ways to calculate them using other keys on your calculator. What if the x sign was broken?

○ Hundreds First. Try calculating some hundreds, tens and unit addition sums starting with hundreds first eg 337+195 = 400+120+12 = 532. Write some out for each other. Try some in your head. Check them on a calculator.

More activities

○ 73-29. Try to work this out by adding on from 29. Can you find some short cuts eg counting in 10s?

○ 17x12. By 'doubling' and 'halving' 17x12 = 38x6 = 68x3 = 204. Do you see how it works? Make up some yourself for others to try.

○ What is the answer to 2+3x4? What answer does the calculator give? What answer does a different calculator give? Is it the same? Can there really be two answers? Why? Try to explain.

Ideas for the whole class

○ **Play Beat the Calculator<**

You need three groups of children

○ a group with calculators

○ a group with pencils and paper

○ a group to calculate mentally

Prepare a list of calculations to call out so that sometimes the mental arithmetic group will answer first eg 2+3, 100-10, 5x10, sometimes the calculator group will answer first eg 624-56, 23x8 and sometimes the pencil and paper group will answer first (this is harder!) eg 6496-122. Focus on how children did the calculations rather than the answers. Set each group the task of designing calculations that they think would favour another group. Try them out. This activity must be done for fun!