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INVESTIGATION

3 coins in my hand

MathSphere

Three coins Investigation

Starter

Hi!
I've got three coins in my hands.
Can you guess how much I have got?

Well, I know that he's pretty broke at the moment, so I think he has only got 3 one penny coins in his hands!

Well, what do you think?

Can you find all the possible amounts that he might have in his hands?

It might be a good idea to list all the possible coins he might have first. Above are just three of the possible coins.

Some Ideas

Work in a methodical way, recording your results carefully as you go.

First of all make a list of all the possible coins he could have. I've made a start for you:

1p 2p

It might be a good idea to limit yourself to three coins (1p, 2p, 5p) to begin with and work in order, so he could have:

1p 1p 1p which makes 3 pence

or 1p 1p and 2p which makes 4 pence

or....

There are lots and lots of possibilities in this investigation - could work with a friend and make sure you do not both do the same coins?

Is it possible to make every amount with just three coins?

Which totals can not be made?

If you solve this question you might like to go on to a different number of coins, maybe two coins, or even four or five coins.

Answer Guide

This investigation is harder than it looks as there are a large number of possibilities. It is useful for consolidation of recognition of coins as well as addition skills.

With younger children it might be better to limit the number of coins that they can choose from - perhaps starting with 1p, 2p, 5p and 10p coins.

It would be very useful to have a set of plastic/card coins available. At first children might make up sets of three coins in piles rather than record on paper.

A whole class introduction could concentrate on listing the possible coins and then getting suggestions for the amounts that can be made.

This investigation is ideal for partners or small groups to work together.

It would also be a good idea to have a whole class solution written up in a logical way, with a framework set up beforehand. Most children will begin this in a fairly random way and they need to be encouraged to have a system when finding the possibilities. By writing class contributions down they will be able to see the value of working systematically. The teacher could ask,
"Who has an answer that uses 2 one pence coins?.... and another.."
until all the possibilities have been found.

Totals that can not be made can also be looked at - can children see why they can not be made, even though larger totals are possible?

For very able pupils the possibility of looking at 4 or 5 coins will be a real challenge.

1p 1p 1p = 3p
1p 1p 2p = 4p
1p 1p 5p = 7p
1p 1p 10p = 12p
1p 1p 20p = 22p
1p 1p 50p = 52p
1p 1p £1 = £1.02
1p 1p £2 = £2.02
1p 2p 2p = 5p
1p 2p 5p = 8p
1p 2p 10p = 13p etc

Possible answers with 3, one pence coins, then 2, one pence coins then beginning 1, one penny coin)