

Activity 1

STACKING SHAPES

Discussion

Students need to be able to visualise the arrangements of cubes, oranges and cans stacked in several layers.

The stacks of oranges and cans use either a triangular base or square base and have the shapes stacked on the intersection of the ones below rather than one on top of another.

The final stack does not follow a simple pattern and students will need to visualise how the blocks are stacked and find a way to organise their count. This will influence the building of their own structures and how they visualise and keep track of the individual cubes.

Activity 4

HOW MANY DIGITS?

Discussion

These questions explore students' ability to reason about the number system and keep track of the possibilities they find. Students need to discuss what it means to say a number as opposed to writing a digit.

When pronouncing certain numbers, it is important for students to include numbers with the pronunciation of the word part 'four' within 'fourteen', 'forty', 'forty-one', etc.

If students take the question further and try other number ranges as suggested, they will find a different pattern altogether for the three hundreds as opposed to the four hundreds. After the five hundreds, the patterns begin to repeat. When students notice this, they will have really come to terms with the strategic thinking needed to organise and solve problems with several interacting conditions.

Activity 12

THE BIG RACE

Discussion

There are several ways these questions can be solved. One way is to work backwards or 'backtrack' from the final position. Counters can be used to model the process of cars passing and being passed. Other students may prefer to base their solution on the diagram on the page to model what has happened.

Alternatively, students may choose a position for Lucy and work through each of the events in the race. If Lucy does not end up in eighth place, an adjustment can be made to determine the original starting position.

Activity 16

HERB MARKET

Discussion

These investigations involve addition, subtraction and multiplication. Students may find it helpful to draw a diagram to work out what is happening in the story and to determine what needs to be multiplied to find a solution. The problems about selling the bunches of parsley in the morning and afternoon (Questions 5 and 6) also involve information from Question 4. This question explores how many bunches of parsley Simon has not sold and is used in the next problem.

Activity 18

NUMBERS IN COLUMNS (1)

Discussion

With Questions 1 – 4, most students will observe that any number with a 5 in the ones place occurs in Column E. However, they may be surprised that a number with a 0 in the ones place does not also occur in this column. This may lead them to observe how each column contains two different types of numbers. Any number with 2 in the ones place occurs in Column B. Any number with 8 in the ones place is in Column C.

With Question 6, comparing the two arrangements shows that only the digits 4 and 1 remain in the same columns. Some students may be able to observe that 20% of the numbers are unchanged.

Activity 26

SQUARES AND PERIMETERS

Discussion

Students need to be able to understand that the perimeter of the first shape (made from five squares) consists of 12 sides. This can be done by counting all of the sides in a systematic way or by seeing the shape as made up of symmetric parts — two sections with five sides on the top and bottom and two in the middle, for example.

Activity 38

CLOCK WATCHING

Discussion

This page explores students' understanding of 24-hour digital time as they investigate the ways in which the digits can be placed to show possible times and determine the time closest to midday and midnight. The way in which the digit zero is used on a digital clock also needs to be considered. For Question 2, an understanding of two-digit numbers needs to be coordinated with an understanding of how and when the digits change on a digital clock. Thinking about the two-digit numbers suggests where '2' will occur in the ones or tens place and how long the '2' will remain displayed until it changes to a '3'.

Activity 39

ON THE FARM

Discussion

There are several ways these questions can be solved. Emus have two legs and alpaca have four legs. Since there are 38 heads, there must be 38 animals altogether.

One way would be to put multiples of two or four into a table or diagram and systematically check the remaining numbers until a solution is reached. Counters could also be used to model the question, again focussing on groups of two and four.

The second problem can be solved in the same way, while a table or counters will also assist with Question 3.

Activity 53

NUMBERS IN COLUMNS (2)

Discussion

There are many ways to solve the questions in this activity, all involving the concept of factors and multiples; together with searching for patterns in the table of values. The first thing to notice is how the numbers increase from left to right in one column, then right to left in the next.

Prime numbers are important as they provide insight into all numbers and are the basis for security codes for credit cards, bank accounts and building entry cards. This arrangement of numbers does not include one as one is not prime (its only factor is one). 2, 3, 5 and 7 are prime numbers, while 4 and 6 also have 2 as a factor and are not prime numbers.

MAGIC SQUARES (2)

Discussion

Question 4

This last magic square has a number of points of interest aside from just being a magic square – when turned upside down, it is still a magic square and although the numbers change, the magic number stays the same!