

Skewered Fruit

You need

- ★ kebabs table (see copymaster)
- ★ multilink cubes (optional)

TECHNOLOGY

People design a product to have certain attributes (for example, what it will look like or do). The attributes of fruit kebabs could be visual appeal and taste.

Keely's group are going to make fruit kebabs for the school fair.



Activity One

1. If the skewers are 18 centimetres (cm) long and each piece of fruit is about 2.5 cm long, how many pieces of fruit should fit on each kebab? (Leave 5 cm for the handle.)
2. Keely is going to give each person a list of different kebab arrangements to make so that there is a variety of kebabs for sale. Keely starts listing the possibilities, but she realises that there are too many for a list.

Her teacher suggests that she start with 2 kinds of fruit to see whether she can develop a useful system. Keely draws up this chart:

Using 2 kinds of fruit:

1-piece kebab	2-piece kebab	3-piece kebab
	A A A B B A B B	A A $\begin{cases} A \\ B \end{cases}$ A A A A A B A B $\begin{cases} A \\ B \end{cases}$ A B A A B B B A $\begin{cases} A \\ B \end{cases}$ B A A B A B B B $\begin{cases} A \\ B \end{cases}$ B B A B B B

Draw a 4-piece kebab diagram for Keely's chart.

A A A $\begin{cases} A \\ B \end{cases}$ A A A A
A A A B
...



3. Keely wonders how many 5-piece kebab arrangements are possible with 2 kinds of fruit. She counts the number of arrangements in each column of her first table and looks for a pattern:
- What pattern can you see?
 - Using your answer to question 2, count the number of 4-piece arrangements. Does this fit the pattern?
 - How many arrangements can be made using 5 pieces of fruit?

Number of pieces of fruit	Number of arrangements
1	2
2	4
3	8
4	
5	

Activity Two

1. Keely's mum has donated 4 kinds of fruit for the kebabs. Keely wonders if doubling the number of kinds of fruit will double the number of arrangements.



I'll start with 3 kinds of fruit and look for a pattern!

- Use a diagram or a list to work out how many arrangements can be made if you have 3 kinds of fruit and are making:
 - 1-piece kebabs
 - 2-piece kebabs.
- On your copy of the kebabs table, write in your answers from a.
- What pattern can you see?
- Use this pattern to find out how many arrangements are possible if you have 3 kinds of fruit and are making:
 - 3-piece kebabs
 - 4-piece kebabs
 - 5-piece kebabs.

Number of kinds of fruit \ Number of pieces on the kebab	1	2	3	4	5
	2	2	4	8	
3					
4					

- Use the pattern to work out how many 5-piece kebab arrangements Keely can make using 4 kinds of fruit.
- Does doubling the number of kinds of fruit double the number of arrangements? Explain your answer.
- How useful is it for Keely and her group to know all the arrangements that are possible?
 - What might be a better way to ensure a variety of kebabs?

Focus

Listing possible outcomes systematically