You need a classmate

Activity
The school tuck shop has a new menu, and they’re offering combos for lunch.

New Tuck Shop Menu
Only $5 for 1 carbohydrate item, 1 piece of fruit, and 1 drink!

<table>
<thead>
<tr>
<th>Carbohydrate</th>
<th>Fruit</th>
<th>Drinks</th>
</tr>
</thead>
<tbody>
<tr>
<td>filled roll</td>
<td>apple</td>
<td>orange juice</td>
</tr>
<tr>
<td>pita bread pocket</td>
<td>orange</td>
<td>milk</td>
</tr>
<tr>
<td>toasted sandwich</td>
<td>banana</td>
<td>cup of soup</td>
</tr>
<tr>
<td>panini</td>
<td>kiwifruit</td>
<td>yoghurt</td>
</tr>
<tr>
<td></td>
<td>plum</td>
<td></td>
</tr>
</tbody>
</table>

You could have a different lunch every school day for the whole term!

1. Mark and Sanjit want to work out if the tuck shop’s claim is true. They look at a diagram of the old menu:

- pita bread pocket
- filled roll
- apple
- orange
- banana

The old menu only had 2 carbohydrate and 3 fruit items: that’s 6 combinations. There are about 50 school days in a term – there can’t be that many options with the new menu!

a. How could you adapt this diagram to include the extra carbohydrate and fruit options and the drinks? Describe what you’d change.

b. Is the tuck shop’s claim true?
How many items need to be in each category to offer a choice of at least 50 different basic toasted sandwiches?

Toasted Sandwiches
Basic toastie: 1 item from each category

<table>
<thead>
<tr>
<th>Bread</th>
<th>Meat and dairy</th>
<th>Vegetables</th>
<th>Sauce</th>
</tr>
</thead>
</table>

I’d like ham, cheese, and tomato but no sauce, please.

Discuss with a classmate how the number of options would be affected if you were allowed to choose 2 of your 3 fillings out of the same list.

I’d like ham, cheese, and tomato but no sauce, please.

Sanjit used a short cut to help him work out the number of different combinations for the old menu.

I multiplied the number of carbohydrate options by the number of fruit options: 2 carbohydrates x 3 fruits = 6 different combinations.

Use Sanjit’s short cut to work out how many options there are with the new menu.

The tuck shop decides to add 1 more item so that they will be able to offer even more combinations. To get the highest number of different combos, should the item be a carbohydrate, fruit, or drink?

Sanjit’s short cut will help with this problem too.

The tuck shop wants to offer a wide range of toasted sandwiches.

Ask about our super-duper vegetarian option.

How many items need to be in each category to offer a choice of at least 50 different basic toasted sandwiches?

I’ll have wholemeal bread, ham, tomato, and BBQ sauce, please.