Complete Mathematics for Cambridge Secondary 1

TEACHER PACK

Deborah Barton

Oxford excellence for Cambridge Secondary 1
Teacher’s notes for dining investigation
This investigation is useful for problem solving. Specifically the following sections of the syllabus:

Using understanding and strategies in solving problems
- Identify and represent information or unknown numbers in problems, making correct use of numbers, symbols, words, diagrams, tables and graphs.
- Recognise mathematical properties, patterns and relationships, generalising in simple cases.
- Work logically and draw simple conclusions.
- Relate results or findings to the original context and check that they are reasonable.
- Record and explain methods, results and conclusions.
- Discuss and communicate findings effectively, orally and in writing.

The aim is to improve students’ ability to apply a variety of mathematical skills.

Introductory activity
If your students are not used to an investigational approach to maths then you may wish to discuss some of the key objectives above. Students may be unsure how to begin a task such as this. Give them a copy of the investigation sheet and discuss various strategies to approach this and write findings.

Investigation
Students are being asked to investigate dining arrangements for the school dining hall. Individual tables seat six students as shown below:

These tables can be arranged in a variety of ways, however there is clearly a limit to space in a school dining hall so tables must touch each other. Students are looking to see if they can find patterns between the number of tables and the number of chairs for different seating arrangements.

Alternative approaches
Students can work individually or in small groups to complete this investigation.

To make the task even more open you could simply present the problem as:

“You are in charge of seating arrangements in the school dining hall. Imagine that you have a large supply of tables and chairs. A table is a rectangle shape.

Tables can only seat two people along each side and one person at each end like this:

There is a limit to space in the school dining hall so the tables must touch each other.  Investigate the number of people that you can seat in the dining hall by continuing the pattern above. Consider the following:

● How many people will be able to sit at 4 tables?
● How many people can sit at more than 4 tables?
● Find a formula connecting the number of chairs to the number of tables.
● Test your formula and try to explain why it works.
● If the hall was long enough, how many people could sit at 50 tables arranged end to end?

Now investigate tables arranged side to side like this:

Extension work
Consider other arrangements of the tables.
What if you had different shaped tables, for example hexagonal?
Can you think of anything else to investigate?

Dining investigation
You are in charge of seating arrangements in the school dining hall. Imagine that you have a large supply of tables and chairs. A table is a rectangle shape.

Tables can only seat two people along each side and one person at each end like this:

There is a limit to space in the school dining hall so the tables must touch each other. Tables can be arranged end to end like this:

Investigate the number of people that you can seat in the dining hall by continuing the pattern above. Consider the following:

● How many people will be able to sit at 4 tables?
● How many people can sit at more than 4 tables?
● Find a formula connecting the number of chairs to the number of tables.
● Test your formula and try to explain why it works.
● If the hall was long enough, how many people could sit at 50 tables arranged end to end?

Now investigate tables arranged side to side like this: