

Scheduling a Timetable

Scenario

The scheduling of a school or college timetable is a complex task. It requires problem-solving skills, meticulous care and accuracy, and a broad knowledge of the institution to produce a quality timetable which is enabling rather than restrictive.

The complexities of the task are often unappreciated by the Timetabler's colleagues.

This inservice / CPD training activity is designed to give the participants some insight into the scheduling process, by attempting a very simplified timetable.

If you are using this PDF for your personal use, in conjunction with Chapter 11 in '*Timetabling — A Timetabler's Cookbook*', then you just need sheets **S2, S3, S4**.

Activity for an Inservice Training session

After an introduction by the Tutor (using Factsheet S1), students work in pairs to solve a simple timetable (covering just two days of the week for just three classes).

The problem is posed on sheet S2, and is solved on the grid shown on sheet S3, using the movable pieces that they cut out from sheet S4.

Time = 60-80 minutes

Materials:

For the Tutor:

Documents T1, S1, S2

For Students:

Documents S1, S2, S3, S4 (S3, S4 should ideally be photocopied on thin card)

Scissors, highlighter pens, flat tables, glue.

Scheduling a Timetable

Introduction

The Tutor should set the scene by showing the school or college timetable (eg. a computer printout of it, or the timetable board if one is used) and referring to the large amounts of data that are built into it.

The complexity can perhaps be emphasised by pointing out that (for an average-sized school), the number of ways of randomly putting the classes, teachers and rooms on to the timetable greatly exceeds the number of atoms in the entire universe !

Emphasise the need for logic and planning, referring back to the earlier inservice training activities on the Combing Chart and the Conflict Matrix if these have been used.

Emphasise the need for the Timetabler to:

- include everyone's requests if at all possible,
- be meticulous (eg. in ensuring that there are no clashes, or that a teacher is not required to be in two places at once),
- ensure a quality timetable (eg. in the spread of lessons through the week).

Time: 5-10 minutes

Give out Factsheet S1 and run through the 'Five Rules' (coloured plastic cards on an overhead projector might be used to illustrate the rules clearly).

Time: 10 minutes

Activity

Give out the sheets S2, S3, S4 (and scissors, highlighter pens) and emphasise that it is a very simplified timetable.

Outline the problem (on S2) and the starting positions, emphasising that they will find it easier to solve if they:

- cut out the rectangles on S4 so that they can move them up and down the grid,
- colour the cards, eg. English = green, Science = yellow, etc.

The students should work in pairs. Cutting out the 'cards' and colouring them is a useful 'displacement activity' while students come to terms with the task.

In looking at each group's progress, be alert for any clashes (particularly for G.Chaucer and O.Cromwell and the single language lab.

After a suitable interval (perhaps 30 minutes) the Tutor can display the final solution, and discuss the answers. Alternatively, you may wish to display each answer in sequence at 2-3 minutes intervals, so that students can check their progress.

Answer:

Full answers to all 10 tasks are explained and illustrated in Chapter 11 of 'Timetabling – A Timetabler's Cook-book' by Keith Johnson (2nd edition, ISBN 978-0-9561161-0-9 published by October ReSolutions Ltd)

More details at: www.timetabler.com

If the students glue their cards in place, the results can be held up or pinned up as a display.

Time: allow 30+ minutes for the students' activity.

A brief discussion can follow on the quality of some of the solutions and the issues that have arisen. Reference can be made to the use of computers to schedule school and college timetables, eg. the **TimeTabler** program.

Scheduling a Timetable

The scheduling of a school or college timetable is a complex task, involving large amounts of information. The information has to be manipulated in such a way as to satisfy requests from colleagues, while following certain timetabling rules.

Scheduling takes place on a **grid** (either physically, or in the memory of a computer). For example:

	Monday		
	period 1	period 2	period 3
Class 7A			
Class 7B			

Into each cell of the grid is placed timetable information. For example:

7A
K.Johnson
Science
Room 2

A 'card' like this has to be placed in each cell of the grid.

When scheduling yourself you will find it very helpful to cut out the cards and then physically move them in and out of cells.

You will also find it useful to add a **colour** for each subject.

You can move the cards according to certain rules:

- Rule 1.** A card can **only** move horizontally along a class's row. This is because the cards for class 7A contain only 7A's information and do not apply to 7B or any other class.
- Rule 2.** A card **cannot** be placed to clash vertically with another card. ie. two cards with the name 'K.Johnson' cannot be placed in the same period (column) because this would require K.Johnson to teach two classes at once. In the same way, two cards requiring the same resource (same science lab, same drama studio, etc.) cannot be placed in the same period.
- Rule 3.** A card occupying a cell must be moved out before another card can move in, to 'sit down' — rather like a game of 'musical chairs'.
- Rule 4.** The cards should be spaced along the week according to the expectations of colleagues. ie. you would not normally have two lessons of Maths in the same day. Colleagues would not expect a class's French lessons to be always in the last period of the day.
- Rule 5.** In theory, any period on the timetable can be **entirely** exchanged for any other period. ie. the whole of Monday period 1 (for all classes) could be exchanged with the whole of Monday period 2; or the whole of Tuesday morning with the whole of Monday morning. In practice, a careful inspection is needed to see whether the move would improve or damage the quality that is expected by Rule 4.

Activity sheets S2, S3, S4 will give you the opportunity to try these rules.

Further reading and the Answers are in Chapter 11 in 'Timetabling – A Timetabler's Cook-book' by Keith Johnson (2nd edition, ISBN 978-0-9561161-0-9 published by October ReSolutions Ltd)

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The grid on sheet S3 shows part of a completed timetable for Year 7. It is a simplified timetable showing just three classes for just two days of the week. The activities to be timetabled are shown as 'cards' on sheet S4.

Your task is to complete the timetable according to the rules on sheet S1 and the further information provided below. Remember that each step is **in addition** to all previous steps!

Tasks:

1. The smaller grid at the bottom of sheet S3 shows the starting positions for your task. Place some cards on the large grid to copy it.
Now complete this simplified timetable by placing all the remaining cards, bearing in mind the rules on sheet S1.
Assume that you can move **any** of the cards on the grid (in a real timetable this would probably not be possible because of clashes with the teachers of other classes).
Check your timetable for quality eg. for each class, the two Science lessons should be on different days. Similarly for French and Maths. Is any subject placed at the end of both days? Does the pattern of each day feel right from a learner's point of view?
2. The Head of Maths now reminds you that you promised to ensure 'setting' in Maths across all three classes in Year 7. Can you ensure this happens on Monday and Tuesday?
Re-check for quality as in (1) above.
3. Your school is short of laboratories, and because of the requirements of other year-groups, only one laboratory is available in each period for Year 7. Can you achieve this?
Re-check for quality as in (1) above.
4. Similarly, all three classes for French need the same language lab. Can you ensure that only one class is taking French at any time, also? Re-check for quality as in (1) above.
5. The Head of Science points out that two extra laboratories can be freed elsewhere, and requests that Science be 'setted' across these three classes.
Is this possible? If not, he will settle for 7A and 7B being setted together (on both days).
Can you achieve this **and** maintain the condition for French in (4) above?
Re-check for quality as in (1) above.
6. Your timetable still has some flexibility. What alternative solutions can you find?
7. O.Cromwell, a part-timer, says he will only be available for mornings (ie. periods 1 and 2).
Can your timetable satisfy this condition **also**?
8. G.Chaucer, the Year-Tutor for Year 7, traditionally has his 'free' periods before and after lunch ie. periods 2 and 3. Can you achieve this **as well**?
9. Finally, O.Cromwell asks you to arrange for him to teach 7A immediately after 7B so that he can use the same materials conveniently! Can you attain this condition **in addition to** all the others?
10. What flexibility is left in your (section of the) timetable? ie. what interchanges can still be made?

All the answers are explained and illustrated in Chapter 11 of 'Timetabling – A Timetabler's Cookbook' by Keith Johnson (2nd edition, ISBN 978-0-9561161-0-9 published by October ReSolutions Ltd)

Laura Norder High School Timetable

	Monday				Tuesday			
	1	2	3	4	1	2	3	4
7A								
7B								
7C								

The starting positions are:

	Monday				Tuesday			
7A					English			
7B	Maths	Science	History	French	Maths	Science	French	History
7C	History		English	Maths				

Timetable Data (for use on sheet S3)



7A	7A	7A	7A	7A	7A	7A	7A
I. Newton	I. Newton	B. Russell	B. Russell	V. Hugo	V. Hugo	G. Chaucer	O. Cromwell
Science	Science	Maths	Maths	French	French	English	History
7B	7B	7B	7B	7B	7B	7B	7B
M. Faraday	M. Faraday	G. Boole	G. Boole	A. Renoir	A. Renoir	G. Chaucer	O. Cromwell
Science	Science	Maths	Maths	French	French	English	History
7C	7C	7C	7C	7C	7C	7C	7C
R. Boyle	R. Boyle	W. Hamilton	W. Hamilton	F. Voltaire	F. Voltaire	G. Chaucer	O. Cromwell
Science	Science	Maths	Maths	French	French	English	History



You are recommended to cut out the separate 'cards' from this sheet in order to move them up and down on the grid of sheet S3.

Colouring the cards will help you to see the patterns that develop.

Use: English = green, Science = yellow, Maths = red, French = orange, History = blue.

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