2   Planning the Curriculum

When planning changes to the curricular structure of your school, it is very important to describe this structure unambiguously.

A **Curriculum Diagram** is a way of showing the curricular structure of your school graphically. It shows clearly and unambiguously the Subject Teaching Groups that you are going to offer to each cohort of students, and whether any of these groups are to be 'blocked' together on the timetable.

A Curriculum Diagram is an essential planning tool. It is the only way to show your curricular structure unambiguously.
To have meaningful staff discussions about the curriculum or the timetable, each member of staff should be familiar with it. A copy will normally be required by visiting inspectors.

The simplest way to draw a Curriculum Diagram is to use a spreadsheet (such as Excel) because the diagram is essentially a grouping of rectangular boxes, and the spreadsheet makes it easy to draw the boxes and align the items.
An example of a Curriculum Diagram drawn this way can be downloaded from:
http://www.timetabler.com/SupportCentre/CurriculumDiagram.xls

The next 12 pages show a series of Curriculum Diagrams, of varying complexity. You may find them useful when discussing the development of the curricular structure in your school.

The second part of the chapter discusses the management of changes to the curricular structure, the effects of innovation, and ways for the Timetabler to look at the feasibility of changes. One common change, changing the timetable cycle, is looked at in detail.

2.2 Curriculum Notation

7A (28)	En_4	Ma_4	Hi_2	Gg_2	Ar_2	Mu_1	Re_1	Se_1	Pe_1	Sc^{27} Sc^{27}	Fr^{30} Fr^{24}	Te^{18} Te^{18} Te^{18}	Ga^{27}
7B (26)	En_4	Ma_4	Hi_2	Gg_2	Ar_2	Mu_1	Re_1	Se_1	Pe_1				Ga^{27}
										4	4	2	
7C (27)	En_4	Ma_4	Hi_2	Gg_2	Ar_2	Mu_1	Re_1	Se_1	Pe_1	Sc^{20} Sc^{20} Sc^{20} Sc^{20}	Fr^{27} Fr^{26} Fr^{27}	Te^{16} Te^{16} Te^{16} Te^{16} Te^{16}	Ga^{26} Ga^{26} Ga^{26}
7D (27)	En_4	Ma_4	Hi_2	Gg_2	Ar_2	Mu_1	Re_1	Se_1	Pe_1				
7E (26)	En_4	Ma_4	Hi_2	Gg_2	Ar_2	Mu_1	Re_1	Se_1	Pe_1				
										4	4	2	
7F (25)	En_4	Ma_4	Hi_2	Gg_2	Ar_2	Mu_1	Re_1	Se_1	Pe_1	Sc^{25} Sc^{25}	Fr^{25} Fr^{25}	Te^{17} Te^{17} Te^{16}	Ga^{26} Ga^{26}
7G (25)	En_4	Ma_4	Hi_2	Gg_2	Ar_2	Mu_1	Re_1	Se_1	Pe_1				
										4	4	2	2
	SSSS	SSSS	SS	SS	D	S	S	S	S	DSS	SSSS	D	D

The Curriculum Diagram above is shown with full 'Curriculum Notation'.
Normally you will not need this level of detail.
It is decribed in detail, step by step, below.

It shows a Year which has 7 basic groupings, labelled 7A to 7G. These are usually called '**Registration Groups**' or '**Tutor Groups**' or '**Forms**'.
Such a year is often called '7 f.e.' (7 form entry), though this term may also mean a school designed to accept an intake of 7 x 30 = 210 students.

The number (28) shows the number of students in TutorGroup 7A.

In this school Year 7 is divided into 3 curriculum-populations or '**bands**', 7AB, 7CDE, 7FG.

Against each TutorGroup the **Subjects** are shown. See also the blue box on the opposite page.
The subscripts show the number of periods of teaching time for each subject (in each timetable cycle, normally per week or per fortnight).
So En_4 means the students have access to 4 periods of English.

The diagram also shows the '**period-breakdown**' for each subject.
English is to be taught as 4 Single lessons (SSSS), whereas Art is to be timetabled as a Double-period (D). (If the period-breakdowns were different for each band they would be shown in a row under each band.)

The subjects En, Ma, Hi, ...Pe are 'pure class' activities, and for each of these subjects the students are taught in their Tutor Groups.

Let's look now at the **Science** part of the curriculum, which is '**blocked**'. The students in 7AB are *re-grouped* into 2 Science groups, with 27 students in each. (The superscript Sc^{27} shows the number of students in each group.)

Similarly the students in 7CDE are re-divided into 4 Science groups.

If we look at the **French** blocks, the box-line is shown only on 3 sides of the rectangle. This is the convention for groups that are '**setted**', in this case by their attainment (or ability) in French. On a timetable they will normally be labelled Set 1, Set 2.

The box round the **Technology** groups has arrows on it. This is the convention for a rotating '**circus**' or '**carousel**' or '**rota**', when the students change groups according to a calendar. Perhaps the students study a different technology each term.

The box for whole-year **Games** shows that all the groups for this subject take place simultaneously. They may be divided by sex or some other criterion.

In fact, for *scheduling* purposes, the distinction between these types of blocks is irrelevant and will be ignored in the diagrams on the following pages. In each case the block shows Teaching Groups in parallel and so we just have to schedule a team of teachers *at the same time*.

Even for the 'rota' block, the arrows are irrelevant for scheduling purposes. They are only needed for the calendar aspect of the rota when you put the timetable into your MIS (admin) system.

In looking at the Curriculum Diagrams on the following pages, you may wish to evaluate your existing curricular structure, to consider to what extent it fulfils the requirements of your students.

Too often a school's structure may reflect the idiosyncrasies of a previous timetabler or the particular enthusiasm of a previous Head; the intransigence of an influential Head of Department or the advice of an inspection from eight years ago. Is it still fit for purpose?

Subject Codes
Traditionally, subjects have been shown with 2-letter codes, like **En** (English), **Ma** (Maths), **Sc** (Science), etc, with the only surprises being **Se** (for PSHE), **De** (for German) and **Gg** (for Geography) .
Occasionally there have been moves by the government to standardise on 3-character codes, using upper-case only.
For example, ENG, MAT, SCI, PSH, GER, GEO for these 6 subjects.
However in the following diagrams we have kept to the traditional labels (which are more legible and more compact).

2.3   2-form-entry school   All 'pure-class' activities

| 7A	En	Ma	Sc	Fr	Hi	Gg	Ar	Mu	Re	Se	Te	Pe
7B	En	Ma	Sc	Fr	Hi	Gg	Ar	Mu	Re	Se	Te	Pe
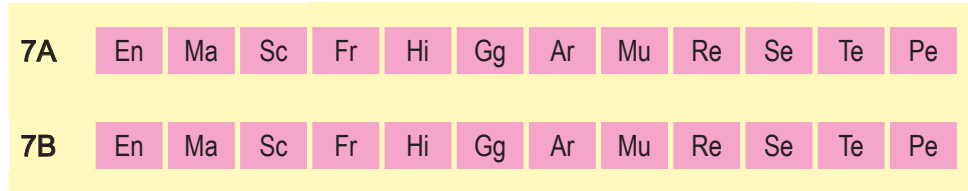
In this simple example of a Curriculum Diagram all the students in 7A follow a series of lessons as class 7A, and without ever mixing with 7B.
As in all timetabling diagrams, time runs horizontally.

2.4   2-form-entry school   With some joint activities

7A	En	Ma	Sc	Fr	Hi	Gg	Ar	Mu	Re	Se	Te	Pe
7B	En	Ma	Sc	Fr	Hi	Gg	Ar	Mu	Re	Se	Te	Pe
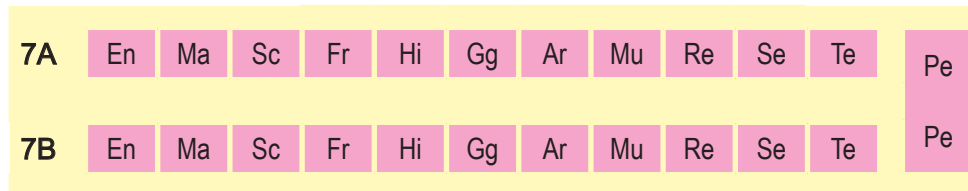
7A and 7B students now join together for one subject (Pe), with two teachers, who may divide them up in any way they wish.
While scheduling we have to ensure that these two Pe teachers are teaching at the same time, whereas for all the other subjects there is not the same restriction. In mixed schools it is normal for two classes to be paired for Pe, so as to allow a girls group and a boys group.

2.5   2-form-entry school   With more joint activities

7A	En	Ma	Sc	Fr	Hi	Gg	Ar	Mu	Re	Se	Te	Pe
											Te	
7B	En	Ma	Sc	Fr	Hi	Gg	Ar	Mu	Re	Se	Te	Pe
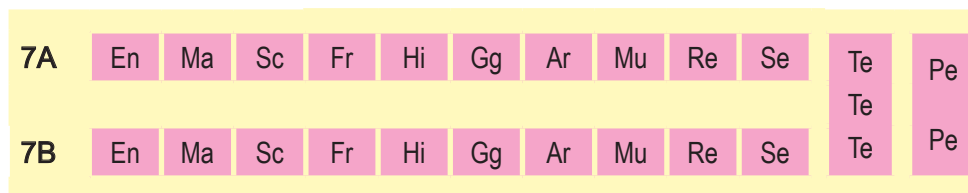
In this example, 7A and 7B also join together for Technology, with three teachers (teaching at the same time).
The composition of the Technology groups can be decided by the Technology staff, independently of any other subject, and they can also rotate the groups during the course of the year, if and when they wish.

2.6   4-f.e. school   With more joint activities

8A	En	Ma	Sc	Fr	Hi	Gg	Ar	Mu	Re	Se	Te Te	Pe
8B	En	Ma	Sc	Fr	Hi	Gg	Ar	Mu	Re	Se	Te	Pe
8C	En	Ma	Sc	Fr	Hi	Gg	Ar	Mu	Re	Se	Te Te	Pe
8D	En	Ma	Sc	Fr	Hi	Gg	Ar	Mu	Re	Se	Te	Pe

In this example the school is bigger, with 4 tutor groups, and most subjects are still taught in those tutor groups, with all the flexibility that that gives.

Technology is taught with 3 groups across each half-year-band ...probably the school cannot afford Technology to go across the whole year because of a shortage of Technology teachers and/or Technology rooms.

As well as Pe across the whole year, PSHE ('Se') is also taught across the whole year ...and perhaps at the same time of the week for the *whole* school, not just Year 8.

2.7   4 f.e.   varied groupings

9A	En	Ma	Sc	Fr	Hi	Gg	Ar	Mu	Re	Se	Te Te	Pe
9B	En	Ma	Sc	Fr	Hi	Gg	Ar	Mu	Re	Se	Te	Pe
9C	En	Ma	Sc	Fr	Hi	Gg	Ar	Mu	Re	Se	Te Te	Pe
9D	En	Ma	Sc	Fr	Hi	Gg	Ar	Mu	Re	Se	Te	Pe
periods:	4	4	4	4	2	2	2	1	1	2	2	2	=30
	SSSS	SSSS	DSS	SSSS	SS	SS	D	S	S	SS	D	D

In this example, the English and Maths are setted across the Year, giving more flexibility to those departments (but less flexibility to the timetabler).

Science is setted across only 3 TutorGroups. This may be because the school has only 3 Science teachers (or labs).

As timetabler you will find it essential to always show the number of periods for each subject, and also the period-breakdown (into S=Single, D=Double), as shown above. It is *vital* to check that the total (eg. 30) is correct for your cycle.

2.8 Half-year Bands for Core Subjects

	En	Ma	Sc	Fr	Sp	Hi	IT	Te
10A	En	Ma	Sc	Fr	Te	Hi	Te	Dr
10B	En	Ma	Sc	Fr	Mu	Ar	Fo	Pe
					Gg	Gg	Gr	Ar
10C	En	Ma	Sc	Fr	Hi	Dr	Ar	IT
	En	Ma	Sc	Fr	Ss	Te	Hi	Bs
10D	En	Ma	Sc	Fr	Pe	Tx	Bs	Re

← core subjects → ← optional subjects →

The core subjects are setted across the half-year bands ...often because of the difficulty of getting enough teachers of the same subject to go across the full year.

The blocks of 'optional' or 'elective' subjects go across the full year. The varied subjects mean there is no difficulty in staffing the groups, but as we shall see later the varied teacher-team for each block can cause difficulty in scheduling (as the mixed teams interact with any single-subject setted blocks in lower school with the same teachers).

Some schools will have fewer core blocks and more option blocks.

Some schools may have (some) option-blocks across the half-year band.

2.9 Blocks across the year

	En	Ma	Sc	Fr	Sp	Hi	IT	Te
10A	En	Ma	Sc	Fr	Te	Hi	Te	Dr
10B	En	Ma	Sc	Fr	Mu	Ar	Fo	Pe
	En	Ma	Sc	Gg	Gg	Gg	Gr	Ar
10C	En	Ma	Sc	Gg	Hi	Dr	Ar	IT
	En	Ma	Sc		Ss	Te	Hi	Bs
10D	En	Ma	Sc	Mu	Pe	Tx	Bs	Re

← core blocks → ← option blocks →

A scheme like this depends on having sufficient teachers (and labs) for the whole year at once. Its value lies in having more groups to differentiate teaching in the core subjects (eg. a Maths set 1 for the most able mathematicians).

Option blocks can include 'sets' (see French in the diagram above).

Options are discussed in more detail in Chapter 3.

2.10 'Consistent setting'

				container block								
8A	En	Ma	Sc	**Fr**	Hi	Gg	Ar	Mu	Re	Se	Te Te Te	Pe Pe
8B	En	Ma	Sc	**Fr**	Hi	Gg	Ar	Mu	Re	Se		
8C	En	Ma	Sc	**Fr**	Hi	Gg	Ar	Mu	Re	Se	Te Te	Pe Pe
8D	En	Ma	Sc	**Fr**	Hi	Gg	Ar	Mu	Re	Se	Te	Pe

← container block →

In this school they would like to have French setted by attainment (ability) but they do not have 4 French teachers. So the curricular structure above, which implies 4 French groups scheduled at the same time, would appear at first sight to be impossible. It also implies that the school would need 4 Music teachers and 4 Re teachers, which may be even more impossible!

However, if several subject departments can agree between themselves on how to group the students, then a '**consistent setting**' arrangement can give a solution, as explained here.
In the diagram above, the French, History, Geography, Art, Music, Re and PSHE teachers have agreed to divide all the students in 8ABCD into 4 consistent groups. The criterion may be their ability (attainment) in French, or it could be based on some other factor(s).

From a scheduling perspective we then have to ensure that these seven subjects are treated as though they are in a **Container Block**, which isolates them and ensures that these 7 subjects do not get mixed up with the other subjects, which are grouped using different criteria.
(Dealing with a Container Block is difficult in manual scheduling, but it is much easier using timetabler software, see chapter 15).

Within the Container Block (which of course is spread out across the timetable cycle) the subjects can slide against each other, so that there is never a need for more than one French (or Music or Re) teacher.

The diagram below shows one solution but there are others:

8A	En	Ma	Sc	**Fr**	Hi	Gg	Ar	Mu	Re	Se	Te Te Te	Pe Pe
8B	En	Ma	Sc	Hi	**Fr**	Mu	Gg	Ar	Se	Re		
8C	En	Ma	Sc	Gg	Se	**Fr**	Hi	Re	Ar	Mu	Te Te	Pe Pe
8D	En	Ma	Sc	Se	Re	Hi	**Fr**	Gg	Mu	Ar	Te	Pe

2.11 Consistent setting in Science

9A	En	Ma	Ph-1	Ch-1	Bi-1	Fr	Hi	Gg	...
9B	En	Ma	Ph-1	Ch-2	Bi-2	Fr	Hi	Gg	...
9C	En	Ma	Ph-1	Ch-1	Bi-2	Fr	Hi	Gg	...
9D	En	Ma	Ph-2	Ch-2	Bi-1	Fr	Hi	Gg	...
			Ph-2	Ch-1	Bi-3				

A common requirement for teaching Coordinated Science is that the same group of students should be taught by a Physicist, a Chemist and a Biologist.

In the Year 9 shown above, the 4 Tutor Groups (9A, 9B, 9C, 9D) are re-divided into 5 Science groups (shown by the 5 rows) ...but the school has only 2 Physics teachers, 2 Chemistry teachers and 3 Biology teachers!

(The labelling on this diagram is a little different ...as well as the subject (Ph, Ch, Bi) it also shows the teacher that is required for each of the 5 Science groups (Ph-1, Ph-2, etc).
The top strip in the diagram shows that the 'top' Science group should be taught by teachers Ph-1, Ch-1 and Bi-1 (but in any order).

At first sight (in the diagram above) this seems an impossible situation as it appears that Ph-1 must be in 3 places at the same time!

However, using a Container Block (as in section 2.10) allows the Science groups to slide against each other (but only within the Container Block).

This gives several solutions, one of which is shown below:

9A	En	Ma	Ph-1	Ch-1	Bi-1	Fr	Hi	Gg	...
9B	En	Ma	Ch-2	Ph-1	Bi-2	Fr	Hi	Gg	...
9C	En	Ma	Ch-1	Bi-2	Ph-1	Fr	Hi	Gg	...
9D	En	Ma	Ph-2	Bi-1	Ch-2	Fr	Hi	Gg	...
			Bi-3	Ph-2	Ch-1				

←— container block —→

The Chapter continues with 12 more Curriculum Diagrams, of increasing complexity, followed by sections on:

2.17 Vertical curriculum design : some examples

2.18 Managing change : the effect of innovations
The effects of introducing 14-19 consortia, more part-timers, and a 'primary' curriculum in Year 7

2.19 Managing change : practical ways forward for the Timetabler
How to do 'What if...?' investigations

2.20 New challenges for schools : Is this the Future?

2.21 Changing the time-frame : what are the factors involved?
Reasons for changing the timetable cycle

2.22 Changing the time-frame : sharing out the time

2.23 Summary