Timetabling in Secondary Schools

A Guide for timetablers and trainers

This manual was produced by the Namibia Human Resource Development Programme following two workshops at the end of 2002 in Ongweviva and NIED. These workshops served the dual purpose of exploring timetable-related problems and solutions and also of training a cadre of expertise that the regions can call upon for further training of school timetablers.

The workshop participants are listed in Annex G

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Contents

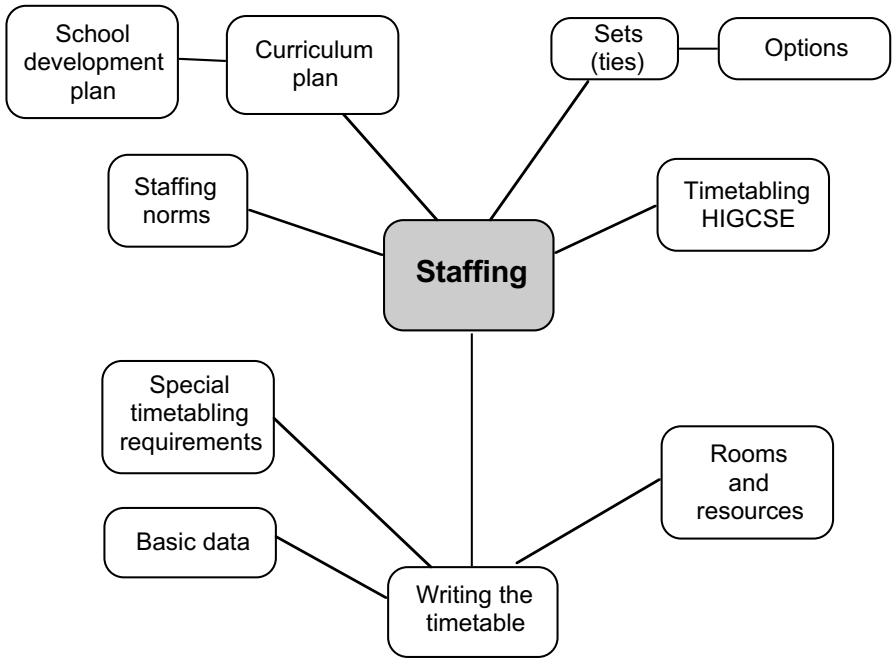
1 What is in this manual?

This manual has been written to provide help and guidance to principles and others who have the task of preparing the school timetable. It has been written mainly for senior secondary schools but many of the ideas apply to all schools. The manual also provides ideas for those who have the task of training principles and others how to draw up a school timetable.

The driving force behind the manual is the need to improve the internal efficiency of secondary schools linked to the introduction of nationwide staffing norms in 2004. The draft version of these norms is shown in Annex A.

The manual, however, is about much more than school timetabling. Timetabling is the last step in a long process that involves many decisions and the collection of much data. The process is summarised in figure 1.1. The manual addresses all the activities in the process

Figure 1.1
The timetabling process



This manual has been prepared after extensive consultations with practitioners, both in schools and in the inspectorate and advisory services in national workshops held in 2002. I am grateful for the advice and assistance given by those who attended these workshops which I have tried to incorporate into the manual

The manual is in five sections that cover the timetabling process and factors that have an impact on it. The sections are as follows.

1 This introduction.

2 Problems experienced by schools drawing up timetables.
This section collects together timetabling problems raised by teachers and suggests solutions

3 Preparing timetable data.
This is the main section which gives precise guidance on collecting the data needed to draw up a timetable.

4 Making a timetable.
This section provides a stepwise recipe for drawing up a timetable and also discusses how it can be computerised.

5 Effective use of resources.
This section analyses further some of the issues that have led to inefficiencies in the system and also looks at on the importance of medium term planning as it affects timetabling.

This manual also contains, in annexes, examples of the various data collection forms useful for timetabling.

2 Problems experienced by schools in drawing up timetables

Table 2.1 below lists a number of frequently encountered problem issues that have been identified by school administrators and inspectors that are directly related to the staffing and timetabling process. The table gives a brief analysis of the problem and also a reference to the page in this manual where solutions are discussed in more detail.

Table 2.1 Frequently encountered timetabling problems

Problem	Discussion	Page reference
No clear timetable planning	A school curriculum plan is required. This must not only show how the curriculum is being implemented each year but it should also be part of the school development plan covering the medium and longer term	Page 6
Lack of clear timetabling data	Data are needed about the curriculum to be offered, the physical facilities, subject requirements, staff capabilities and learner needs	Page 6
Skills of available teaching force do not match the needs of the timetable. Some posts unfilled. Teacher shortage in specialised subjects.	These are issues to be taken up with regional authorities but many can be solved in-house through a carefully designed professional development programme	Page 34
Lack of long and medium term planning	The school must have a medium term development plan that provides the rationale for the curriculum it offers. Only with this will it be able to identify its staffing and physical needs	Page 35
Lack of timetabling skills (particularly relating to dealing with small groups)	Timetabling can be a team activity. This leads to continuity of expertise in the school as someone is always in training in the group.	Page 24
Shortage of appropriate teaching spaces - Available rooms do not meet the needs of the timetable	Ideas are suggested for subject areas to make the best use of the facilities available	Pages 16 and 31
Timetabling HIGCSE groups	There are no easy answers to this issue. Some existing practice is described	Page 36
Permitted staffing levels are too small to staff the desired timetable	This can be improved by larger registration groups and careful use of setting (tied groups) to minimise the number of small teaching groups	Pages 8 and 32

Problem	Discussion	Page reference
Accommodation of special needs (including visual and hearing impaired learners)	Schools designated as having special classes or units should apply for additional staff above the norm. Each region has a number of allocated positions for this.	Page 34
Timetabling non-promotional subjects.	The best practice is found in schools that have teachers that are specifically trained to take these subjects and have facilities allocated to them. The worst practices occur when they are left over and timetabled last to those teachers with 'spare' periods	Page 6
Offering, and timetabling, optional subjects.	Various suggestions are made on how to organise and timetable options.	Page 6
Allocation of periods to subjects.	The broad curriculum documents provide a framework for this. Ideas for interpreting this framework are given here.	Page 22
Allocation of double periods.	A number of ways of doing this are described.	Page 24
Accomodating teacher transfer during the year (reallocation of teachers).	This is a major problem. It can be greatly assisted using computer aided timetabling which allows a new timetable to be drawn up very rapidly after a staffing change.	Page 28
Discrepancies between workloads of different teachers (overload of administrative staff) and allocation of free periods	This is often a source of dissatisfaction among teachers. Guidelines must be agreed and accepted by all staff. This manual gives ideas on how the guidelines can be followed.	Page 22
Dealing with timetable clashes.	This is a technical problem and computer assisted timetabling greatly assists in solving it.	Page 29
How many days in a cycle?	The broad curriculum documents are based on a 5 day, 40 period cycle. Many schools find that a 7 day, 49 period cycle gives a freedom that greatly reduces problems related to period length, staff shortages and other difficulties.	Page 22
Administration periods.	These can be part of the timetable or outside it (such as short periods at the beginning of the day). The 7-day timetable allows greater freedom to incorporate innovations such as this in the timetable.	
Timetabling vocational subjects and languages.	These often require small groups. It is important to timetable them in such a way that the same group does not take other subjects where a larger group can be accomodated.	Page 6
Should teachers or learners move between lessons?	At secondary level the learners should move. The idea of subject-specific facilities is developed in this manual	Page 31

3 Preparing timetabling data

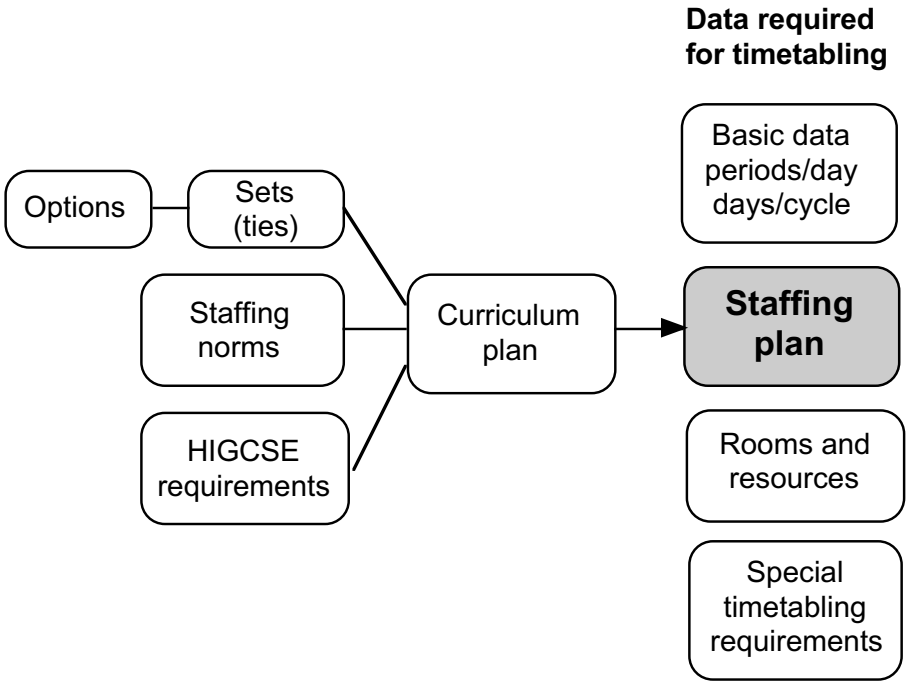


Figure 3.1
Data require before writing a timetable

Figure 3.1 shows what data are needed before a timetable can be written. Putting together these data is the most difficult task in timetabling. As a timetabler you need to have a complete knowledge of these data. They should be discussed with Heads of Departments and Subject Heads and Subject Heads should discuss them with their staff.

These data are discussed further below. All should be written down and some forms for this purpose are suggested in Annex B.

3.1 Basic data

Decisions are required on the basic shape of the timetable such as:

- The number of periods per day (usually 7 or 8)
- The number of days in a timetable cycle (usually 5 or 7)
- Where the breaks occur
- Whether any periods are to be excluded from the timetable (such as a whole school assembly period).

See the form in Annex B.

3.2 Curriculum plan

The school must have a curriculum plan for the year. This will be part of the larger School Development Plan which shows how the curriculum will evolve in the medium term.

What should be in the curriculum plan?

- What subjects are offered to each year group.
- How many periods of each subject will be offered in the cycle.
- How the optional subjects are to be catered for on the timetable? (see section 3.4 options). This is often done by a process called setting (see box).
- How many periods are there in the day and how many days are there in the cycle?
- How many periods will each subject group need in the cycle? (see section 3.5 staffing)

Setting (tying)

Setting is a process which allows learners in registration groups to choose between optional subjects. In Namibia it is frequently referred to as tying.

Two or more registration classes are placed on the timetable together and several teaching groups - called sets - are made up from them.

Setting allows you to create teaching groups that are smaller than the registraion groups as is shown in the example below where three registration classes are grouped to create four sets

Naming sets

Each set must have a unique name for the timetable. A useful way of naming a set is to assign a letter of the alphabet (not used by a registration group) to the group of classes). Thus '11X Acc' will be the Accounting group in Set X in Year 11. If there are two accounting classes in this set they can be called '11X Acc1' and '11X Acc2'

Example

3 Registration classes timetabled together		4 Sets created	
10A	38 learners	10X BM	36 learners
10B	37 learners	10X Acc	39 learners
10C	38 learners	10X HSc	18 learners
		10X CP	20 learners
Total 113 learners		Total 113 learners	

Pages 10 to 15 below show examples of curriculum plans. They have been adapted from actual examples. The advantages and disadvantages of each plan is discussed. These figures show the curriculum of each registration group.

How to make a curriculum plan

1 Decide what subjects are to be offered in each year.

2 Decide how many periods are to be allocated to each subject.

3 Decide how many groups of each optional subject are to be offered.

- For grades 9,10 and 12, this has already been done the previous year.
- For grades 8 and 11 this can either be done using experience of how learners have chosen subjects in the past, or learners in grade 7 and 10 can be asked in October, what they would like to take the following year if they proceed. This may be difficult.

4 Decide on which optional subjects are to be set together. Do not make many blocks of sets unless you are an experienced timetabler.

5 Draw up the plan.

6 Carry out the following checks to see if the plan is possible.

- Calculate the total number of group teaching periods in the plan. This is the total number of groups taught in the cycle. This calculation is shown in all the examples below. Call this number A

- Calculate the total number of teacher periods available in the cycle using the staffing norms agreed with the regional office.. This would normally assume that most teachers will teach about 90% of the periods in the cycle (44 out of 49), HoDs, 75% (36 out of 49) and principals, 25% (12 out of 49). The school may wish to use different percentages. Call this number B

- For the plan to work, B must be greater than, or the same as, A . If it is not, revise the plan (or persuade the regional office to give you an extra teacher). Or try and increase your intake over time so that you qualify for an extra teacher and persuade the regional office to give you the extra teacher before you fully qualify for one.

Examples of curriculum plans

Three examples are shown on the next pages (10 - 15) in order of complexity. For each example the following statistics are shown:

- number of registration classes
- number of taught periods
- number of teachers needed (assuming HoDs are 75% and Principals are 25%)
- number of learners required to enable this number of teachers to be employed (2004 norms)
- average size of registration group to give this number of learners. **Note that this must be in the upper 30s if the timetables are to work.**

Curriculum plan example 1
In the first example very little setting is used and not much choice is given to learners. It will be easy to timetable. Note that registration class sizes are smaller than in the other two examples. This school is phasing out some of its subjects that must be taught in small groups because of the impact such groups have on the staffing ratio when no setting process is used.

Curriculum plan example 2
This is a typical example of the way most schools manage to offer some kind of choice, particularly in languages and vocational subjects where some of the groups might be quite small. Note that to accommodate them, the registration class sizes are larger than in example 1

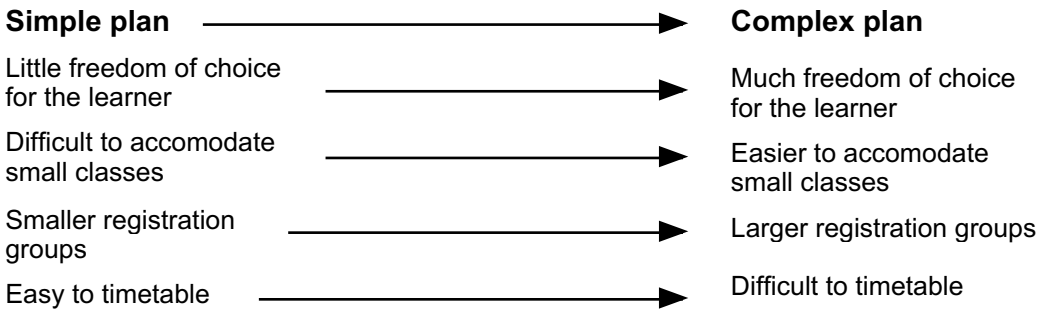
Curriculum plan example 3
In this example, much setting is used and the learner has a wide freedom of choice. It will be difficult (perhaps impossible) to timetable. Note that registration class sizes in this example are the largest of the three

It can be seen from these three examples that it is possible to offer considerable freedom of choice to learners within the 2004 norms, even when this involves language and practical classes that may be small. This is done through setting. The disadvantages of this is that timetabling becomes much more complex and also that registration group sizes become larger. Many subjects such as English,

Mathematics and the Sciences are taught in these larger registration groups.

Timetabling is therefore an activity that makes the best *compromise* between what you would ideally like and the constraints imposed by reality. This is illustrated by figure 3. 2.

Figure 3.2 **Timetabling compromises**



Subject abbreviations

Annex D shows the list of proposed abbreviations for subjects commonly used for timetabling.

Curriculum plan - example 1

(49 period cycle)

This is a large urban school taking learners with a variety of home languages. It is in the provcess of expanding its numbers to make more effective use of the physical facilities. It is also changing its language policy by offering 2 African languages instead of 1 and reducing its European languages from 3 to 2. It is also removing Hone Science from its Grade 11 and 12 curriculum in response to the new staffing norms

Grades 8-10

	Language	Vocational subjects		Compulsory subjects	
				Maths	
8A	Otj	Acc	BM	Eng2	
8B	Otj	Acc	BM	LSc	
8C	Fr	Acc	BM	PSc	
8D	Fr	WW/HSc	BM	Hist	
8E	Afr2	Acc	BM	Geog	
8F	Afr2	WW/HSc	BM	RME	
8G	Fr	Acc	BM	LSk	
8H	Ond	Acc	BM	BIS	Total Grade 8 periods
				Pr P	8 x 49 = 392
				Maths	
9A	Fr	Acc	BM	Eng2	
9B	Afr2	Acc	Typ	LSc	
9C	Fr	Acc	Typ	PSc	
9D	Fr	WW/HSc	BM	Hist	
9E	Afr2	Acc	BM	Geog	
9F	Ond	Acc	BM	RME	
9G	Ger	Acc	BM	LSk	
				BIS	Total Grade 9 periods
				Pr P	7 x 49 = 343
				Maths	
10A	Fr	Acc	BM	Eng2	
10B	Afr2	Acc	Typ	LSc	
10C	Fr	Acc	Typ	PSc	
10D	Fr	WW/HSc	BM	Hist	
10E	Afr2	Acc	BM	Geog	
10F	Ond	Acc	BM	RME	
10G	Ge	Acc	BM	LSk	
				BIS	Total Grade 10 periods
				Pr P	7 x 49 = 343

Grades 11 and 12

All grade 11 and 12 classes take the compulsory subjects, LSk, RME, BIS. PE, PrP, Eng2.
They also take the the following options

11A	PSc	Geog	NE	Biol	Maths	
11B	PSc	Geog	NE	Biol	Maths	
11C	Acc	Fr	Econ	BSt	Maths	
11D	Hist	Afr2	NE	Biol	DSt	Total Grade 11 periods
11E	Hist	Ond	NE	Geog	DSt	5 x 49 = 245
12A	PSc	Geog	NE	Biol	Maths	
12B	PSc	Geog	NE	Biol	Maths	
12C	Acc	Fr	Econ	BSt	Maths	
12D	Hist	Afr2	NE	Biol/HSc	DSt	Total Grade 12 periods
12E	Hist	Ond	NE	Geog	DSt	5 x 49 = 245

The three languages in the box are set together on the timetable allowing a freedom of choice to the learners in 11/12 CDE

Statistics for example 1

Total number of registration classes Total taught periods, all grades	8 + 7 + 7 + 5 + 5 = **32** (392 + 343 + 343) + (245 x 2) = **1568**
Teachers (full time) needed (at 44/49 teaching load)	1568 / 44 = **35.6** (32 Teachers + 5HoD + Pr)
Number of learners required for this number of teachers (from 2004 norm tables)	1065 to 1094 = 35 to 36 per registration group

For this school to operate the proposed curriculum, it must have at least 1065 learners

Notes on example 1

Junior Secondary

All learners take the compulsory subjects and a choice is offered in the second language and the vocational subjects

Language choice
This is an urban school that must offer a large number of languages to cater for the demands of its intake. It has chosen to provide the choice through linking the second language to the registration group. Note that the choice of languages has been changed for grade 8 (Otjiherero replaces German). This must be carried all the way through and this will have implications for staffing in future years as well as the current one.

Advantages - makes timetabling relatively simple.
Disadvantages - limits the choice of the learners. The learners must choose from limited alternative subjects offered. Many may be directed into subjects that are not their ideal choice.

Vocational subject choice
The vocational subject choice is made in the same way as the language. Learners must choose the vocational subjects that are available for their language option. The practical subjects WW and HSc are offered together to half classes.

Advantages - makes timetabling relatively simple.
Disadvantages - The choice is rather limited. For example, learners wanting Otjiherero in Grade 8 have no choice of vocational subjects. This choice will be further limited for some if some combinations prove more popular than others and learners are persuaded to join the smaller groups against their wishes.

WW and HSc classes will be half classes, even though the rooms can accommodate rather more. This is a traditional way of offering these subjects and there is inevitably pressure on learners to make this choice on stereotypical gender lines.

Because the typing room cannot accomodate a full class, the registration groups taking typing are rather small for *all* subjects taken by this group. This has a major impact on the staffing ratio and is one of the reasons why typing has been dropped from Grade 8 and will be phased out.

Senior Secondary

Freedom of choice of field of study
Three fields of study are offered. As with junior secondary, the choice is offered to learners by creating the curriculum of grade 11 in advance, and then fitting the learners into it, rather than finding out the preferred option combinations of the learners and devising the curriculum around it. The exception is the second language where a choice is offered through setting.

Advantages - makes timetabling relatively simple.
Disadvantages - limits learner choice of field and subjects.

Curriculum plan - example 2

(49 period cycle)

This school offers choices in second language and also a number of practical subjects using a setting process. The setting allows for small groups in both areas

Grade 8

	Lang (5)*	Voc1 (5)**	Voc2 (5)**	Compulsory subjects (34)
				Eng 2 (7) Maths (6) LSc (4) PSc (4) Hist (4) Geog (4) LSk (1) RME (1) BIS (1) AiC (1) PE (1)
8A	Afr 1	Acc	BM	
8B	Afr 2	Acc	BM	
8C	Ger 1/F	BM	Acc	
8D	Ndo	HS	CP	
	Her	CP	WW	
	Total periods 5 x 5 = 25	Total periods 5 x 5 = 25	Total periods 5 x 5 = 25	Total periods 34 x 4 = 136

Total Grade 8 periods
25 + 25 + 25 + 136 = 211

Grade 9 and Grade 10 will be the same if the curriculum and numbers of classes are stable. If not, a separate curriculum plan for thee two grades will be needed

Grade 11

	(7)	(7)	(7)	(7)	(7)	
						Eng2 (9) LSk (1) RME (1) PE (1) PrP (1) BIS (1)
11A	Afr2	Maths	PSc	Biol	CSt	
11B	Ger1/F	Maths	PSc	Biol	Acc	
	Ndo				WW	
11C	Her	Maths	BSt	Acc	HS	
11D	Geog	Maths	BSt	Acc	Geog	
					Econ	
	Total periods 7 x 5 = 35	Total periods 7 x 4 = 28	Total periods 7 x 4 = 28	Total periods 7 x 4 = 28	Total periods 7 x 6 = 42	Total periods 14 x 4 = 56

Total Grade 11 periods
35 + 28 +28 + 28 + 42 + 56 = 217

Grade 12 will be the same if the curriculum and numbers of classes are stable. The curriculum may vary slightly as different supplementary subjects and languages can be offered according to need, as long as they can be staffed.

Statistics for example 2

Total number of registration classes Total taught periods, all grades	5 x 4 = **20** (211 x 3) + (217 x 2) = **1067**
Teachers needed (at 44/49 teaching load)	1067 / 44 = **24.25** (22 Teachers + 3HoD + Pr)
Number of learners required for this number of teachers (from 2004 norm tables)	735 to 764 = 37 to 38 per registration group

• Language 2 groups are sets in order to ensure a cultural mix in registration groups. There are 5 sets for 4 classes to allow one or two smaller class numbers for some languages. German 1 and foreign are timetabled together which is unsatisfactory but numbers do not allow two classes.

•• The main vocational subjects are commercial but the sets allow for some to take 1 or 2 practical subjects instead

Notes on example 2

This is smaller school than the first example. It offers a similar choices but in a different way. This example shows how several languages may be accommodated in the same school.

Junior secondary

Languages
Five second languages are timetabled simultaneously and learners from all registration classes choose the set they want to be in. This makes five different languages available to four registration groups

Advantages
- Learners have a wide freedom of choice.
- This system can accommodate one (or more) small language group as there are five groups from four classes which will allow the small group to be offset by several larger ones

Disadvantages
- Requires 5 language teachers to be available simultaneously which may be difficult to staff.
- Not all learners may get their first choice.
- To accommodate the 5 sets from four registration groups in grades 8, 9 and 10, registration group sizes must be quite large (37+) if staffing norms are to be met.

Vocational subjects
The choice for most learners will be BM and Acc. All learners in the A and B classes take these two options. Computer practice, Woodwork and Home Science are also available to learners in the C and D classes. Because these must be taught in groups of 20, these two classes are split into three sets.

Advantages
- Gives a freedom of choice for learners to take any combination of vocational subjects
- Accommodates the smaller groups for WW, CP and HSc without making groups small for all other subjects.

Disadvantages
- CP can only be taken by 40 learners out of the 300+ in each year. Some means of selecting them fairly will be needed.
- Setting two registration classes three ways is expensive on staff. registration classes must therefore be quite large (37+)

Senior secondary

The school offers two fields of study, commercial and science. The junior secondary phase has a major emphasis on commercial vocational subjects as a preparation for this. Setting is used to allow four additional languages to be taken and most learners take two languages. Setting also permits quite a wide choice of the fifth IGCSE subject. In both setting blocks there are more teaching groups than registration classes. This allows some groups to be around 20, for subjects such as Ger, WW CSt and HSc, either for safety reasons or because they are minority interest subjects

Curriculum plan - example 3

(49 period cycle)

This school offeres a complex choice of subjects with much freedom of choice for the learner. It is able to accommodate small language and technical groups by setting.

Boxes indicate setting across registration groups. Numbers in the boxes indicte the number of teachers allocated to each block of sets in all cases the number of teaching groups in a set is more than the number of registration classes.

Grade 8

	Language	Vocational subjects		Compulsory subjects
	Set X (5)	Set Y (5)	Set Z (5)	
8A 8B 8C 8D	Afr1 Afr2 (2) 5 Ger2 Lang	Acc BM (2) WW 6 HS CP	Acc (2) 6 BM WW HS CP	Eng2 (7) Maths (6) LSc (4) PSc (4) Hist (4) Geog (4) RME (1) LSk (1) BIS (1) AiC (1) PE (4 Sets) (1)
	Total periods 5 x 5 = 25	Total periods 6 x 5 = 30	Total periods 6 x 5 = 35	Total periods 34 x 4 = 136

Total Grade 8 periods
25 + 30 + 36 + 136 = 221

Grade 9 and Grade 10 will be the same if the curriculum and numbers of classes are stable. If not, a separate curriculum plan for thee two grades will be needed

Grade 11

	Set X (7)	Set Y (8)	(8)	(8)	Set Z (8)	Compulsory subjects
11A 11B 11C	Afr1 Afr2 Ger2 4 BSt	Maths 3 Econ Maths	Acc Biol Biol	BSt PSc PSc	Geog Acc CP 4 WW	Eng2 (7) LSk (1) PE (2 sets) (1) RME (1)
	Total periods 7 x 4 = 28	Total periods 8 x 4 = 32	Total periods 8 x 3 = 24	Total periods 8 x 3 = 24	Total periods 8 x 4 = 32	Total periods 10 x 3 = 30

Total Grade 11 periods
28 + 32 + 24 + 24 + 30 = 170

Grade 12 will be the same except that RME is replaced by PrP

Boxes indicate setting across registration groups. Numbers in the boxes indicte the number of teachers allocated to each block of sets

Statistics for example 3

Total number of registration classes Total taught periods, all grades	12 + 6 = **18** (221 x 3) + (170 x 2) = **1003**
Teachers needed (at 44/49 teaching load)	1067 / 44 = **22.8** (21 Teachers + 3HoD + Pr)
Number of learners required for this number of teachers (from 2004 norm tables)	675 to 704 = 38 to 39 per registration group

Notes on example 3

The extensive use of setting

This is based on the curriculum of an urban school under pressure (from parents) to offer a large choice of subjects. Some of these subjects will be taken by quite small groups. The only way to do this involves much setting. The large amount of setting in this plan will make it very difficult to timetable and so it would be sensible for the plan to be revised, if possible, after the option choices have been made, to remove some subjects (such as perhaps one group of BM and Acc) from the sets.

Note that the setting creates more teaching groups than there are registration classes. This allows some sets to be smaller than the average class size. This in turn means that the registration class size must be quite large, 38 or more.

Advantages

- Maximises freedom of choice for learners
- Allows subjects like WW, HSc CP, and Ger to be offered to small groups (about 20)

Disadvantages

- Very difficult to timetable. Computer assisted timetabling is strongly recommended using a powerful programme.
- relatively large registration groups (37-38) are required if the staffing is to fall within the 2004 staffing norms

Although not indicated on the plan, PE is also set to allow for single sex groups of around 40 per group. It is perhaps more correct to describe this as taem teaching of a group of around 75 between two teachers

3.3 Physical facilities

Subject rooms
In the past, only certain subjects such as the sciences and technical subjects have had special facilities. Good learner-centred work, however, requires that **all** subjects must have specialised rooms because all subjects should build up a supply of learner-centred teaching materials and aids. The school should therefore be divided into subject areas. Geography, for example, will then be always taught in a few rooms that are close to each other so that teaching materials are readily available and can be shared between the rooms.

The subject teachers will be based in subject areas and the learners will move to the areas for their lessons in the subject.

This pattern must be flexible to accommodate teachers who teach more than one subject but may wish to remain mainly in one room which they can then look after properly.

Sharing rooms between subjects
Many rooms may be shared between two or more subjects to make best use of the space. Shared rooms should be used if possible by subjects requiring similar facilities - such as different languages, or life science and physical science.

Note that good science does not always need laboratories. Much science can be taught in a learner-centred way in an ordinary classroom and some classrooms near the laboratories may therefore be part of the science area.

How many rooms will be needed?
Maximum use should be made of the physical facilities. Ideally all rooms should be used in all periods but this will be impossible to timetable. As a general rule, the number of registration classes should be about 90% of the number of rooms (including specialist rooms). This should allow sufficient space for setting.

Collecting room data for timetabling
1 Make sure all rooms have a short name or number
2 Make a list of all the rooms showing their main subject.
3 Show also the teacher, or teachers who will use each room most of the time.

Annex B shows a sample of a form that can be used to collect room data

3.4 Optional subjects

There are two common ways of working out what optional subjects to offer in Grades 8 and 11

Method 1
Decide on the basis of your experience in previous years. Draw up the curriculum plan based on this. Then fit the learners into the plan. This will mean that some (or many) learners may not get what they want. The school must have ways of dealing with this problem.

Method 2
Circulate a letter showing a list of optional subject for learners to choose options **before** you draw up the curriculum plan. Learners should fill in an option form attached to the letter and return it. This must be done in September/October when the learners are in Grades 7 and 10 in the feeder and this may not be possible. This will give guidance on how the curriculum plan must be constructed. Draw up the plan and fit learners into it as in method 1. More learners should get their first choice of options buy this method than by method 1

Annex B contains an example option form that matches the Grade 11 choice for curriculum plan example 3

3.5 Subject requirements

Some subjects may have special timetabling requirements that should be noted. Examples might be:

- subjects that require double periods (such as science)
- subject staff that ask for a class to be taught if possible, once each day
- subjects that are taught away from the school at a time that is not controlled by the school.

Another requirement may be to spread subject periods for each class over the cycle fairly throughout the day, so that the subject is not always taught, say, towards the end of the day when the learners are hot and tired.

A further timetable requirement may be to ensure that all the management team are free on at least one period in the week..

Other timetable restrictions may involve extramural or training meetings. The regional or circuit office may often request meetings at a particular time in the week. There may be cluster activities that clash regularly with certain periods for certain members of staff.

The timetabler should be aware of these requirements. Whether s/he can build them into the timetable depends on how high they are placed on the timetabling priority list when the timetable is made.

3.6 Staffing

This is the key process in drawing up the timetable.

This is the process of allocating staff to teaching groups. It is this process that will identify any shortages and surpluses of teaching skills for the following year and this will determine the job descriptions for any advertisements to be made.

Tables 3.1 and 3.2 below show two examples of staffing lists for Curriculum Plan Example 3 (Page 14). The two examples of the staffing list show the same information but in a different format. Table 3.2 also shows the curriculum for each registration group.

The staffing list must show the following:
- The teacher for each teaching group
- The number of periods each group is taught in each cycle
- The overall number of periods per cycle taught by each teacher.

It is important that staffing is done in full consultation with subject and department heads in order to ensure that teaching loads are fairly allocated.

Number of periods per subject
Table 3.3 shows the approximate number of period per cycle that might be allocated to each subject in each phase and also approximate teaching loads The subject allocation reflects current practice in the way schools interpret the Broad Curriculum documents. *The figures in table 3.3 do not represent official MBESC policy.* Each principal must ensure that their subject allocation complies with the intention of the Broad Curriculum documents

Table 3.1 - Staffing table, school curriculum plan, example 3

Staff member	Subject	Classes	Periods	Total	Free
Pr	Econ	11Y, 12Y	16	19	30
	PrP	12A B C	3		
S1	Maths	9D	6	40	9
	Maths	10A B C	18		
	Maths	11Y, 12Y	16		
S2	PhSc	9A B, 10B	12	44	5
	PhSc	11B C	16		
	PhSc	12B C	16		
S3	Maths	8A B	12	44	5
	Maths	11Y C	16		
	Maths	12Y C	16		
S4	LSc	10A B C	12	44	5
	Biol	11B C	16		
	Biol	12B C	16		
S5	CP	8YZ	10	46	3
	CP	9YZ	10		
	CP	10YZ	10		
	CSt	11Z	8		
	CSt	12Z	8		
H1 (HoD)	LSc	8ABCD	16	40	10
	LSc	9D,10D	8		
	Geog	11Z, 12Z	16		
H2	Hist	8ABCD	16	42	7
	Hist	9ABCD	16		
	PE	9 Sets 1,2	2		
	PE	10 Sets 1,2	2		
	Geog	10D	4		
	PE	11,12	2		
H3	Maths	8CD	12	45	4
	Geog	9ABCD	16		
	RME	8ABCD	4		
	RME	9ABCD	4		
	RME	10ABCD	4		
	PE	10Sets 1,2	2		
	RME	11ABC	3		
H4	PE	8Sets 1,2	2	45	4
	Geog	8ABCD	16		
	Geog	10A B C	12		
	LSk	8ABCD	4		
	LSk	9ABCD	4		
	LSk	10ABCD	4		
	LSK	11ABC	3		
L1	Afr1	8X,9X,10X	15	44	5
	Afr	11X,12X	14		
	AiC	8ABCD	4		
	AiC	9ABCD	4		
	AiC	10ABCD	4		
	LSk	12ABC	3		
L2(HOD lib)	BIS	8ABCD	4	34	15
	BIS	9ABCD	4		
	BIS	10ABCD	4		
	PE	8 Sets 1,2	2		
	PE	9 Sets 1,2	2		
	Hist	10ABCD	16		
	PE	11,12	2		
L3	Eng2	8ABC	21	42	7
	Eng2	12ABC	21		
L4	Eng2	8D	7	43	6
	Eng2	9A	7		
	Afr2	8X,9X,10X	15		
	Afr2	11X,12X	14		
L5	Ger	8X,9X,10X	15	43	6
	Eng2	9C,D	14		
	Ger2	11X,12X	14		
L6	Afr2	8X,9X,10X	15	43	6
	Eng2	10ABCD	28		
L7	Eng2	9B	7	44	5
	Eng2	11ABC	21		
	Kwa	8X,9X,10X	15		
P1	PSc	8ABC	12	46	3
	PSc	9C	4		
	HSc	8Y,9Y,10Y	15		
	HSc	8Z,9Z,10Z	15		
P2	WW	8Y,9Y,10Y	15	46	3
	WW	8Z,9Z,10Z	15		
	WW	11Z,12Z	16		
C1(HoD)	Acc	8Z,9Z,10Z	15	31	18
	Acc	11Z,12Z	16		
C2	BM	8Y,9Y,10Y	15	42	7
	BM	8Z,9Z,10Z	15		
	LSc	9BCD	12		
C3	BM	8Y,9Y,10Y	15	45	4
	BSt	11A, 12A	16		
	BSt	11X,12X	14		
C4	Acc	8Y,9Y,10Y	15	46	3
	Acc	8Z,9Z,10Z	15		
	Acc	!!A,12A	16		
	Total taught periods				**1003**
	Total free periods				**173**

Table 3.2 - Staffing table, school curriculum plan, example 3

Teacher	Subject	8A	8B	8C	8D	9A	9B	9C	9D	10A	10B	10C	10D	11A	11B	11C	12A	12B	12C	Total periods	Free periods
Pr	Econ PrP													SetY Econ 8	SetY Econ 8		SetY Econ 8 PrP 1	SetY Econ 8 PrP 1	PrP 1	19	30
S1	Maths								Maths 6	Maths 6	Maths 6	Maths 6		SetY Maths 8	SetY Maths 8		SetY Maths 8	SetY Maths 8		40	9
S2	PSc					PSc 4	PSc 4						PSc 4		PSc 8	PSc 8		PSc 8	PSc 8	44	5
S3	Maths	Maths 6	Maths 6											SetY Maths 8	SetY Maths 8	Maths 8	SetY Maths 8	SetY Maths 8	Maths 8	44	5
S4	LSc/Biol									LSc 4	LSc 4	LSc 4			Biol 8	Biol 8		Biol 8	Biol 8	44	5
S5	CP/CSt	SetY CP 5, SetZ CP 5	SetY CP 5, SetZ CP 5	SetY CP 5, SetZ CP 5	SetY CP 5, SetZ CP 5	SetY CP 5, SetZ CP 5	SetY CP 5, SetZ CP 5	SetY CP 5, SetZ CP 5	SetY CP 5, SetZ CP 5	SetY CP 5, SetZ CP 5	SetY CP 5, SetZ CP 5	SetY CP 5, SetZ CP 5	SetY CP 5, SetZ CP 5	Set Z CSt 8	Set Z CSt 8	Set Z CSt 8	Set Z CSt 8	Set Z CSt 8	Set Z CSt 8	46	3
S6	Maths PsSc				PSc 4	Maths 6	Maths 6	Maths 6	PSc 4	PSc 4	PSc 4	PSc 4	Maths 6							44	5
H1(HoD)	Geog LSc	LSc 4	LSc 4	LSc 4	LSc 4				LSc 4				LSc 4	Set Z Geog 8	Set Z Geog 8	Set Z Geog 8	Set Z Geog 8	Set Z Geog 8	Set Z Geog 8	40	9
H2	Hist Geog PE	Hist 4	Hist 4	Hist 4	Hist 4	Hist 4 PE Gp1 1	Hist 4 PE Gp1 1	Hist 4 PE Gp2 1	Hist 4 PE Gp2 1	PE Gp1 1	PE Gp1 1	PE Gp2 1	Geog 4 PE Gp2 1	PE Gp1 1	PE Gp1 1	PE Gp1 1	PE Gp1 1	PE Gp1 1	PE Gp1 1	42	7
H3	Geog Maths PE RME	RME 1	RME 1	Maths 6 RME 1	Maths 6 RME 1	Geog 4 RME 1	Geog 4 RME 1	Geog 4 RME 1	Geog 4 RME 1	PE 1 RME 1	RME 1	PE 1 RME 1	RME 1	RME 1	RME 1	RME 1				45	4
H4	Geog PE LSk	Geog 4 PE Gp1 1 LSk 1	Geog 4 PE Gp1 1 LSk 1	Geog 4 PE Gp2 1 LSk 1	Geog 4 PE Gp2 1 LSk 1	LSk 1	LSk 1	LSk 1	LSk 1	Geog 4 LSk 1	Geog 4 LSk 1	Geog 4 LSk 1	LSk 1	LSk 1	LSk 1	LSk 1				45	4
L1	Afr1 AA	Set X Afr1 5 AA 1	Set X Afr1 5 AA 1	Set X Afr1 5 AA 1	Set X Afr1 5 AA 1	Set X Afr1 5 AA 1	Set X Afr1 5 AA 1	Set X Afr1 5 AA 1	Set X Afr1 5 AA 1	Set X Afr1 5 AA 1	Set X Afr1 5 AA 1	Set X Afr1 5 AA 1	Set X Afr1 5 AA 1	Set X Afr1 7	Set X Afr1 7	Set X Afr1 7	Set X Afr1 7 LSK 1	Set X Afr1 7 LSK 1	Set X Afr1 7 LSK 1	44	5
L2(lib)	BIS PE Hist	BIS 1 PE Gp1 1	BIS 1 PE Gp1 1	BIS 1 PE Gp2 1	BIS 1 PE Gp2 1	BIS 1 PE Gp1 1	BIS 1 PE Gp1 1	BIS 1 PE Gp2 1	BIS 1 PE Gp2 1	BIS 1 Hist 4	BIS 1 Hist 4	BIS 1 Hist 4	BIS 1 Hist 4	PE Gp1 1	PE Gp1 1	PE Gp1 1	PE Gp1 1	PE Gp1 1	PE Gp1 1	34	15
L3	Eng2	Eng2 7	Eng2 7	Eng2 7													Eng2 7	Eng2 7	Eng2 7	42	7
L4	Afr2 Eng2	Set X Afr2 5	Set X Afr2 5	Set X Afr2 5	Set X Afr2 5 Eng2 7	Set X Afr2 5 Eng2 7	Set X Afr2 5	Set X Afr2 5	Set X Afr2 5	Set X Afr2 5	Set X Afr2 5	Set X Afr2 5	Set X Afr2 5	Set X Afr2 7	Set X Afr2 7	Set X Afr2 7	Set X Afr2 7	Set X Afr2 7	Set X Afr2 7	43	6
L5	Ger2 Eng2	Set X Ger2 5	Set X Ger2 5	Set X Ger2 5	Set X Ger2 5	Set X Ger2 5	Set X Ger2 5	Set X Ger2 5 Eng2 7	Set X Ger2 5 Eng2 7	Set X Ger2 5	Set X Ger2 5	Set X Ger2 5	Set X Ger2 5	Set X Ger2 7	Set X Ger2 7	Set X Ger2 7	Set X Ger2 7	Set X Ger2 7	Set X Ger2 7	43	6
L6	Afr2 Eng2	Set X Afr2 5	Set X Afr2 5	Set X Afr2 5	Set X Afr2 5	Set X Afr2 5	Set X Afr2 5	Set X Afr2 5	Set X Afr2 5	Set X Afr2 5 Eng2 7	Set X Afr2 5 Eng2 7	Set X Afr2 5 Eng2 7	Set X Afr2 5 Eng2 7							43	6

L7	Eng2 Kwa	Set X Kwa 5	Set X Kwa 5	Set X Kwa 5	Set X Kwa 5	Set X Kwa 5	Eng2 7 Set X Kwa 5	Set X Kwa 5	Set X Kwa 5	Set X Kwa 5	Set X Kwa 5	Set X Kwa 5	Set X Kwa 5	Eng2 7	Eng2 7	Eng2 7				43	6
P1	PSc HSc	PSc 4 SetY HSc 5, SetZ HSc 5	PSc 4 SetY HSc 5, SetZ HSc 5	PSc 4 SetY HSc 5, SetZ HSc 5	SetY HSc 5, SetZ HSc 5	SetY HSc 5, SetZ HSc 5	SetY HSc 5, SetZ HSc 5	PSc 4 SetY HSc 5, SetZ HSc 5	SetY HSc 5, SetZ HSc 5	SetY HSc 5, SetZ HSc 5	SetY HSc 5, SetZ HSc 5	SetY HSc 5, SetZ HSc 5	SetY HSc 5, SetZ HSc 5							46	3
P2	WW	SetY WW 5, SetZ WW 5	SetY WW 5, SetZ WW 5	SetY WW 5, SetZ WW 5	SetY WW 5, SetZ WW 5	SetY WW 5, SetZ WW 5	SetY WW 5, SetZ WW 5	SetY WW 5, SetZ WW 5	SetY WW 5, SetZ WW 5	SetY WW 5, SetZ WW 5	SetY WW 5, SetZ WW 5	SetY WW 5, SetZ WW 5	SetY WW 5, SetZ WW 5	SetZ WW 8	SetZ WW 8	SetZ WW 8	SetZ WW 8	SetZ WW 8	SetZ WW 8	46	3
C1(HoD)	Acc	SetZ Acc 5	SetZ Acc 5	SetZ Acc 5	SetZ Acc 5	SetZ Acc 5	SetZ Acc 5	SetZ Acc 5	SetZ Acc 5	SetZ Acc 5	SetZ Acc 5	SetZ Acc 5	SetZ Acc 5	SetZ Acc 8	SetZ Acc 8	SetZ Acc 8	SetZ Acc 8	SetZ Acc 8	SetZ Acc 8	31	18
C2	BM LSc	SetY BM 5, SetZ BM 5	SetY BM 5, SetZ BM 5	SetY BM 5, SetZ BM 5	SetY BM 5, SetZ BM 5	SetY BM 5, SetZ BM 5 LSc 4	SetY BM 5, SetZ BM 5 LSc 4	SetY BM 5, SetZ BM 5 LSc 4	SetY BM 5, SetZ BM 5	SetY BM 5, SetZ BM 5	SetY BM 5, SetZ BM 5	SetY BM 5, SetZ BM 5	SetY BM 5, SetZ BM 5							44	5
C3	BM/BSt	SetY BM 5	SetY BM 5	SetY BM 5	SetY BM 5	SetY BM 5	SetY BM 5	SetY BM 5	SetY BM 5	SetY BM 5	SetY BM 5	SetY BM 5	SetY BM 5	BSt 8, SetX BSt 7	SetX BSt 7	SetX BSt 7	BSt 8, SetX BSt 7	SetX BSt 7	SetX BSt 7	45	4
C4	Acc	SetY Acc 5, SetZ Acc 5	SetY Acc 5, SetZ Acc 5	SetY Acc 5, SetZ Acc 5	SetY Acc 5, SetZ Acc 5	SetY Acc 5, SetZ Acc 5	SetY Acc 5, SetZ Acc 5	SetY Acc 5, SetZ Acc 5	SetY Acc 5, SetZ Acc 5	SetY Acc 5, SetZ Acc 5	SetY Acc 5, SetZ Acc 5	SetY Acc 5, SetZ Acc 5	SetY Acc 5, SetZ Acc 5	Acc 8			Acc 8			46	3
																			Total periods	**1003**	**173**

Number of period per teacher

The teaching allocations in table 3.3 are based on the 2004 norms for HoDs and principals and assume a 90% teaching load for other staff. The figure of 90% has been suggested purely in order to ensure that the timetable can be written. Schools may wish to use a different figure.

Table 3.3 - Allocations of period per subject - based on current practice

	40 Period cycle (5 x 8)	**49 Period cycle** (7 x 7)	**56 Period cycle** (7 x 8)
Junior Secondary			
Eng2	5	7	9
Lang	4-5	5	5-6
BIS	1	1	1
Maths	5	6	7
PSc	3-4	4	5-6
LSc	3-4	4	5-6
Geog	3	4	4
Hist	3	4	4
AiC	1	1	1
RME	1	1	1
LSk	1	1	1
PE	1	1	1
Voc1	4	5	5
Voc2	4	5	5
Total	**40**	**49**	**56**
Senior secondary			
Eng	7	8	10
5 subjects	5 x 6	5 x (7-8)	5 x (8-9)
PE	1	0 - 1	0 -1
KLSk	1	1	1
PrP/RME	1	1	1
Total	**40**	**49**	**56**
Teaching loads (based on 2004 norms)			
Classroom teacher	36	44	50
HoD	30	36	42
Pr	10	13	14

These suggested loads do not represent any official MBESC recommendation. They are recommended loads *from the point of view of timetabling*. This freedom is required for the timetable to be theoretically possible. This is particularly important if there are many other constraints on the timetable such as much setting.

Team teaching
Team teaching is rare in Namibia. This happens when one group is allocated more than one teacher. An example might be a PE group made up of two classes being taught by a male and female teacher and this is seen in curriculum plan example 3. It is important to allow for this when carrying out the statistical checks on the data described below.

Checking data
You must check that the total number of staff teaching periods is the same as the total number of class periods taught. If it is not, you have made a mistake and staffing data must be checked.

Carry out the following checks
- Add up the total number of periods being taught per cycle by all the teachers.
- Add up the total number of teaching group periods.

These numbers should be the same.

How to check data using tables 3.1 and 3.2
In tables 3.1 and 3.2 the numbers of periods taught by each teacher appears in the column on the far right of the table. The total number of taught periods is the sum of these at the bottom of the table. Note that when these numbers are calculated in table 3.2 you must only include each set *once* even though it will appear several times in this table.

The number of teaching group periods is shown in the corresponding curriculum plan.

Computerised staffing lists
A spreadsheet, such as Excel, is an extremely useful tool for developing staffing tables. It allows changes to be made easily and can be made to calculate all sums automatically.

4 Making the timetable

This process is largely a mechanical one and it can be done using a computer. This section covers first, manual timetable construction and second, computer-assisted timetable construction.

4.1 Manual timetable construction

If all the preparation work has been done well, making the timetable is not a difficult exercise. But it is mechanical and time consuming. Mistakes are very easy to make and very difficult to spot and correct once they are made. There are two useful rules to minimise mistakes

Rule 1
Develop a standard routine for entering a group on the timetable. *Always* follow the same routine. The last step in this routine must be to check that the entry is correct

Rule 2
Carry out the work in a neat, orderly and systematic way.

If you always follow the same routine, it is possible for the timetable to be done by a team, each working on part of it during a free period.

There are two commonly used ways of making a timetable. One uses sheets of paper and a pencil (a rubber in the end is very useful) and the second uses a wall display board.

You will need:
- pencil (HB or B, not H)
- rubber
- Sheets of A4 paper with a grid on them showing one complete cycle with days numbered across the top and periods numbered down the side. They should be in three different colours, one colour for registration classes, one for staff and the third for rooms. Annex C gives examples for the 49 period cycle.

Method 1 - Pencil and paper

Note - this is just one of many variations on how this may be done. You will develop your own special technique.

What to do:

Preparation

1 Label white sheets of paper clearly with the names of each registration class, one sheet per class

2 Do the same with one of the colours for each staff member.

3 Do the same with another colour for each room.

4 Arrange the sheets in a sensible order so that you can quickly find any sheet you want. Staple them or clip them.

5 Ensure you have all your data ready to hand; staffing, rooms, curriculum plan and special requirements.

6 Make a plan for the order of entering the data. This should start with the most difficult and end with the easiest. Table 4.1 shows a typical plan. You will develop your own order with experience.

Table 4.1 A possible order for entering timetable data

• Sets (ties) with specific teachers (ie grade 12 sets that must be taught by the same teacher as in grade 11)
• Sets (ties) that could be taken by more than one teacher (although one has been defined in the staffing list, this could be changed if difficulties are encountered)
• Subjects involving double periods
• Subjects that have special room requirements
• Subjects involving large numbers of periods that must be taught by a specific teacher
• Subjects involving large numbers of periods that could be taken by more than one teacher
• Subjects involving small numbers of periods that must be taught by a specific teacher
• Subjects involving small numbers of periods that could be taken by more than one teacher.

Entering the data

1 Select a group or set at the top of your list.

2 Enter all the periods for the group (or set) in the white sheets. Enter the following in the period box:

- subject
- set name if appropriate
- teacher code
- room code.

3 Then enter the teacher in the teacher sheet. In the teacher sheets put in the class or set code and the room code.

4 Then complete the room sheet. In the room sheet put in the subject, the class or set code and the staff code.

When entering the group, take note of any special requirements that have been requested for it. Spread the periods appropriately and fairly through the day and the cycle

5 Check your entries on all the sheets to see that they are correct.

6 Repeat with the next set or subject

7 Continue entering groups, teachers and rooms in blank spaces in the sheets until you have finished the timetable.

Of course, its not quite so simple. The time will come when you find that a group subject will not go into the timetable. There will be no periods left when the teacher, the class and the room are free at the same time. This where the difficulties start. You will probably spot a reason why the class will not go in; it will probably be that there are no more periods when the teacher and the class are free at the same time. Or it may be that a room that you want is not free.

What to do when the class 'won't go in'

Let's call the class you are working with Class A. Here are some suggestions to help you fit class A in the timetable.

1 Can you solve the problem easily by using another teacher? If so swap the teachers round on your staffing list. Enter the class on the timetable.

2 Identify the difficult periods and go back to classes that have already been entered with the teacher concerned to see if there is a class (call it class B) that can be changed to free the teacher on the required period(s). If there is, change the entry for this class B and then enter the original class A in the space you have freed. Do not forget to change the details on all three papers.

(After you have done this once or twice you will understand the reason for using a pencil with a rubber in the end to enter the data)

3 If you cannot find a change one level back that will make the class 'go in', you will have to try going back two levels. Find a class C that can be moved to free a space for class B. The space then freed by class B can be used for class A.

4 This gets more and more complicated but it can be done for many levels. However, experience shows that if a class cannot fit after considering 4 level changes, it probably cannot be fitted.

What to do when the class still 'wont go in'
Now is the time to go back to the staffing data, or the curriculum plan, or the special requirements and make changes that you know are likely to ease the problem. Often quite small changes can make a big difference.

Some useful tips to help avoid these difficulties

- Look again at your 'difficulty' list. (Table 4.1). It may not be correct.

- When there is a choice of periods to enter a group choose the period that already has a lot in it. This maximises your freedom later on. This is a useful timetabling hint - *keep periods as free as possible for as long as possible.*

Final check
Eventually all the data will have been entered. Now check the whole timetable for mistakes. Get two colleagues to help. You read out the white sheet and they check that the coloured ones are correct, **This check is essential.** Remember the most important rule of timetabling Nobody will thank you for a good timetable but everyone will blame you for mistakes.

You will need:
- A display board with a grid on it showing all periods in the cycle across the top and all the registration classes down the side. At the bottom of each column there should be two additional cells for free staff and free rooms . This shown in Figure 4.2

- Three different kinds of drawing pin to represent subjects, staff and rooms

- Coloured paint or coloured felt pens

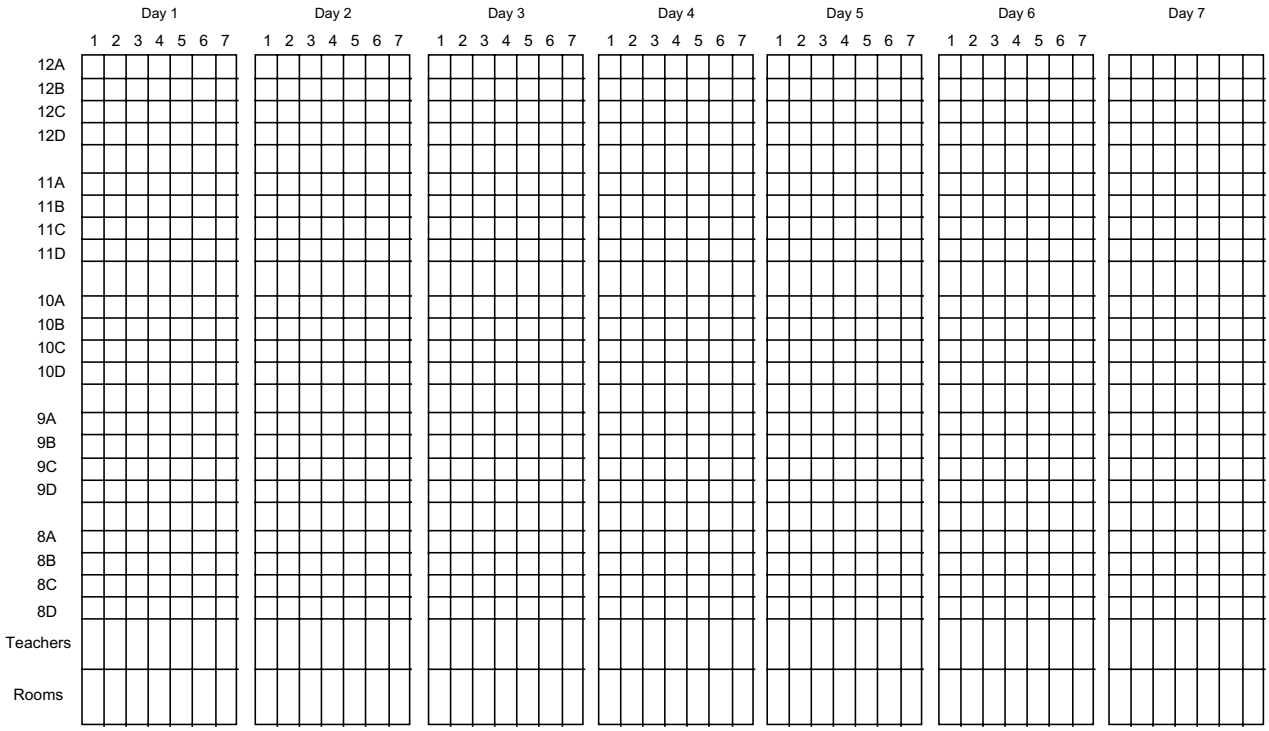
Method 2 - Using a display board

With this method you construct the whole timetable on a display board. You use different coloured drawing pins for staff subject and rooms

Preparing the drawing pins:
1 Make a set of pins for each member of staff. You could paint the staff code on the top of the pin. For each staff member you will need a pin for each period in the cycle. Put a pin for each member of staff in each of the staff cells at the bottom of the display board.

2 Make a set of pins for each room. Do the same as for the staff pins but use a different shaped drawing pin. Put a pin for each room in each of the room cells at the bottom of the display board.

Figure 4.2 - a display board prepared for constructing a timetable



3 Make a lot of subject pins. The best way is to use a different coloured pin for each subject. Write down your colour code!! Alternatively you can write the name of the subject on a small piece of card and pin it to the board with the teacher pin.

4 Sets (ties). Write the name of the set on a card and pin it to the board with the teacher or subject pin.

Making the timetable
This is done in the same way as the paper method but instead of writing in the subject, teacher and room code,

you place the corresponding pins in the period cell on the grid. The staff and room pins are moved to this cell from the cells at the bottom of the same column.

It is important to take great care when you have to make changes, not to lose any of the pins in the process or to forget to which day they apply.

4.2 Timetabling by computer

This process has a number of advantages and a number of disadvantages. The advantages usually outweigh the disadvantages.

Advantages
1 It is fast. Entering and checking the data takes time but making the timetable when the data is entered often takes only a few minutes.

2 It can easily be redone quickly when staffing data changes

3 There are usually options for printing out not only the master timetable but other data such as:

- individual room use timetables
- individual class timetables
- individual staff timetables
- a timetable showing empty rooms
- a timetable showing 'free' staff.

Disadvantages
1 It can be expensive. Complex timetables will require expensive software (around NAD 10 000 per licence). The cheaper software (around NAD 3000) will not handle the more complex issues

2 It does not easily handle some of the special requirements such as the need to spread subject groups out over the day across the cycle. The more expensive the software, generally the more of these it can handle. One expensive programme allows the user to accept or reject each suggestion.

How to timetable using the computer

Most software packages work in the same way and the following steps must be followed:

1 Enter the basic data about the school day and cycle and breaks.

2 Enter the room code names.

3 Enter the code names of the staff.

4 Enter the staffing data. There will be instructions to follow on how to enter data about sets that must be timetabled together and also about special conditions such as double periods, etc.

5 Carry out checks on the data that are entered. These checks are usually built into the software and can be done very quickly.

6 (Advisable) Make printouts of the data you have entered. This will allow you to identify any mistakes that the checks indicate

7 Run the timetable builder programme.

The more expensive programmes will tell you all the time what the computer is doing. This allows you to identify any problems it encounters. The cheaper programmes do not do this. The more expensive programmes also allow you to accept or reject any suggested entry. This very useful.

Saving and backing up the data you have entered
Ensure you have at least two copies of the data you have entered. Follow the instructions to create these.

Changing data
This is the biggest advantage of computerised timetabling. If you need to make changes to the timetable, because of staff changes perhaps, you can just make changes to the data you have entered and rerun the programme. In minutes you have a new timetable.

Some examples of software for making timetables

It is important to distinguish between to kinds of software
1 Software that generates a timetable
2 Software that generates useful printouts of a timetable once the timetable has been entered. This is often part of school management packages and can generate room timetables, individual staff timetables etc, but it does not actually work out the timetable. This is of no help, however, to timetablers.

Two software packages have been tried out in the country and many schools have their own experience of other packages on the market. These two are Timetabler 4.0 and Rotary Timetabler

Timetabler 4.0
This is a comprehensive and expensive UK package suitable for large schools with complex timetabling problems. It is relatively easy to use for anyone willing to devote a few hours to their comprehensive tutorial. It is expensive, however, costing in excess if NAD 8 000

Rotary timetabler
This is a simple very intuitive software from Canada built round Microsoft Foxpro Database, which is included in the price. It is not suitable for large schools with much setting. It costs around NAD 3000. There is no tutorial with this package but annex E gives instructions on how to use it which may be simpler to follow than the help files. Ms Henriette Speelman of Goreangab JSS has considerable expertise with this package.

Regionally developed software
A number of packages are available that have been developed in southern Africa but the versions available to the author at the time of writing are all MS-DOS-based systems which are limited in their capabilities and will not run on the later versions of Windows which are not built on MS-DOS.

It is reported that a Windows upgrade of one package, **Compuroster** is soon to be available and the increasing interest in school administration software throughout the region is very likely to result in more developments. These will be cheaper than the packages above but must be carefully evaluated.

5 Effective use of resources

This section focuses on a number of common issues related to timetabling. Most have been raised in earlier sections; here they are examined further.

5.1 Making the best use of rooms

In many schools the physical facilities are under-used. This arises partly because some specialist rooms, such as laboratories, remain outside the timetable and are used by classes normally timetabled elsewhere whenever the teacher wishes to conduct practical work. Such rooms are not used for registration. One effect of such a policy is that the unused rooms tend to be stripped of moveable furniture, such as chairs, when there is a shortage, and so the rooms become effectively unusable.

In some of the schools, the science laboratory is a suite of two rooms, one a laboratory and one a lecture room separated by a preparation room. This suite is invariably timetabled as a single room. This also represents inefficient use of resources. There is a common argument that if the laboratory is used all the time, damage would result. This, however, is a management and disciplinary issue, not a timetabling one, and many schools have shown that it can be overcome.

All rooms should be timetabled. If classes timetabled elsewhere wish to make use of specialist rooms, a room exchange can be arranged on an *ad hoc* basis. Specialist rooms should be used as registration rooms if necessary, with due attention to safety issues.

As a general rule, the number of registration classes should be not less than 90% of the number of rooms. This will allow for setting which usually increases the number of teaching groups above the number of registration classes.

5.2 Subject facilities

Learner-centred teaching requires teaching aids and facilities for every subject. This means that each subject should have a base consisting of one or more rooms where these materials and facilities can be stored and developed. The

school should therefore contain different subject areas and the learners should move to these areas when that subject is timetabled. Teachers, as far as possible, should remain in one room and take ownership of it, and be responsible for its upkeep and security.

Clearly, in reality, there will be overlap of subject facilities, particularly as teachers usually teach more than one subject.

5.3 Class sizes within the 2004 draft staffing norms

Annex A shows the draft teaching norms planned for 2004 and beyond. The implementation of these norms will be subject financial constraints. The norms contain a provision for an extra 2% of teachers to provide additional staff in schools that require them for reasons that cannot be avoided. This additional 2% is intended mainly for additional staff to assist with special educational needs and also for additional staff in schools that offer a significant and regionally important technical programme that involves classes that often cannot be more than 20. *Schools must make a case for an additional staff member to the regional office.*

To function within the 2004 norms a school must minimise the factors which tend to reduce the learner:teacher ratio. A list of these factors is given below and each is the discussed further.

Factors which tend to reduce the learner:teacher ratio
- teacher non-teaching periods
- technical classes where the size is limited by safety issues or equipment availability
- small registration class size
- smaller -than-necessary teaching groups
- special needs groups

Teacher non-teaching periods

The recommended teaching load under the 2004 norms is:

Principal	25%
Head of Department	75%
Class teacher	100%

Note however that teachers require time to prepare during the day and also that it is not possible to write a timetable without the 'slack' of non-teaching periods. A load of 90% is therefore suggested for class teachers. This means a teaching load of 36/40 or 44/49 periods (see table 3.3).

Technical classes

In some technical classes, the size is limited by safety issues or equipment availability. Technical classes can normally be as much as 20 without compromising safety. Home science teachers often like 18 (three learners to one cooker). Normal sized classrooms can accommodate 20 typewriters or computers.

Timetabling these smaller classes should be done by setting. This smaller number should not be a normal class size for any other subject. If registration class sizes are large (36-40), technical classes can be accommodated by splitting the class in two and giving them an option to take one of two technical subjects which are timetabled together.

If a school is specifically designated as a technical school and has a large number of technical options, a case may be made to the regional office for additional staff.

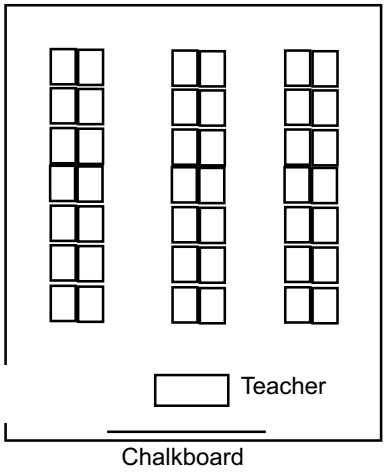
Registration class size

In order to meet the 2004 staffing norms, registration classes must be quite large. This will allow the school to offer a number of classes, through a setting procedure, that may be smaller than the norm average of 30. A registration class size of 37 - 40 is suggested. Because of drop-outs, the Grade 8 intake should be at the top end of this range.

Learners will take all compulsory lessons and many optional lessons in their registration group. Teachers often find that a classroom with 40 learners in it is unacceptably crowded but this can be improved considerably by experimenting with desk arrangement to minimise wasted space in the classroom.

A classroom plan that is often used by science teachers places the desks in three double rows as shown in figure

Figure 5.1 - Optimising use of space in a learner-centred classroom



5.1. Learners sit facing each other in the rows 42 Learners can readily be accommodated in this way.

Although the learners are not facing the front in this arrangement, learner-centred work does not require them to face the front for much of the lessons. This arrangement is also suitable for group work without any rearrangement of desks. The rows of learners can easily be serviced with materials from the front.

Smaller than necessary teaching groups

Inefficient timetabling can often result in group sizes that are smaller than necessary. Curriculum plan 1 (page 10) shows this. Several of the registration classes are smaller than necessary because the class takes Typing as a group. These classes are therefore smaller than they need be for all the other subjects.

This can be overcome by setting. If, for example, three registration classes are set together and split into four teaching groups, one, or two of those groups can be smaller than normal. The others will be nearer the normal size. Setting is a useful technique for timetabling minority languages, which the school may be under an obligation to offer.

5.4 Special needs groups

It is ministry policy to integrate learners with special needs into mainstream schools as far as possible. If such learners are to be supported as well as possible, small classes will be needed, particularly in subjects like mathematics. Alternatively, two teachers will be needed in a large class, one of whom will have the task of assisting special needs learners,

Schools with a significant number of learners with special needs, or with a small number of learners who need considerable addition help such as hearing or visually impaired learners, should apply to the regional office for additional staffing above the norm.

5.5 Shortages of particular teaching skills

Schools frequently find that they are short of skilled teachers in one or another subject. This is particularly common in mathematics and the sciences. There are two ways in which the impact of this problem can be reduced that have timetabling implications.

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- Temporarily reduce the number of periods per cycle in the shortage subject until teaching staff are available.

- Set up a programme of in-school continuous professional development (CPD) to retrain teachers to teach the shortage subject.

The former must be seen as a temporary measure only as it is contrary to the spirit of the broad curriculum rules.

A CPD programme has been used with considerable success by some schools for increasing the numbers of mathematics and science teachers. Such a programme will have timetabling implications as it is desirable that the person (subject head) who is carrying out the training should have some non-teaching periods at the time when the trainee teacher is teaching the subject and can be observed and assisted. This may be one of the 'special requirements' that the timetabler must be aware of.

5.6 Long and medium term planning

School development plans

A school development plan is essential for good timetabling. All schools are required to have a school development plan and the school curriculum is a key element in the plan. The plan will show how changes in the curriculum will affect the school in the longer term. Any changes made in Grade 8 will have an impact on the curriculum and timetable through to grade 12, five years later.

The plan will contain a number of components that affect the curriculum and hence the timetable. Some of the more important ones are as follows:

- entry numbers in grades 8 and 11 and how these are planned to change over the medium term
- what fields of study are to be offered in grades 11 and 12.

- whether HIGCSE is to be offered in any subjects
- what optional subjects are to be offered in both phases
- what languages are offered to what level
- relations with feeder schools and other local secondary schools
- changes in physical facilities
- the role of the school in the cluster.

Why is the medium term plan needed?

The medium term plan will stabilise the curriculum. The curriculum offered by the school, in broad terms, for the next five years, will be known. This allows the school an opportunity to solve many common timetabling-related problems. The list below shows a number of timetable-related issues that can be clarified by a medium term plan.

- Parents and learners have a clear idea of what the school offers and what is expected of them.
- Schools can plan a CPD programme to allow young staff eventually to take on higher classes in shortage subjects.
- The school can liaise with its feeder schools to ensure that the curriculum of the feeder schools articulates effectively with the curriculum of the senior school. This is particularly important for senior schools taking a new intake at Grade 11.
- Proposed changes in the subject offerings can be properly planned so that facilities are created and qualified staff are available and the feeder schools and parents notified well in advance.
- The number of learners entering the school can be planned so that the number of teaching staff allowed each year can be planned well in advance.
- The school will have a clear idea of the long term need in terms of teaching subjects when new staff are hired.
- New building programmes can be planned with the regional authorities. Often a school is unable to make optimal use of existing buildings because the number of classrooms is slightly below the number required to fit the optimum timetable. In such a case, the construction of a small additional classroom block can be a cost effective way of improving the efficiency of the use of existing buildings.
- Any school expansion can be properly planned because needs are clearly identified. (Changing a curriculum takes 5 years in a secondary school).

- Cooperative relationships can be developed with neighbouring schools so that curricula are complementary rather than competing. This gives parents real choice. In some cases this could even lead to shared teaching facilities and staff.

5.7 Timetabling HIGCSE

HIGCSE groups are normally timetabled together with IGCSE groups and the teacher will then make arrangements to teach both in the same class. This is often not particularly difficult as HIGCSE learners should have reached the stage in their educational development when they need more time on their own to internalise their work, rather than being continually directed by the teacher. This technique is easiest for subjects (such as physical science where the subject content of HIGCSE and IGCSE is very similar, differing mainly in the depth of treatment, and most difficult in subjects (such as mathematics) where the subject content of the two syllabuses differs greatly.

If numbers are large enough, HIGCSE sets can be created but this can only be done if there are two IGCSE teachers of the subject in the school as the HIGCSE set must be set against the IGCSE set of the same subject.

Novel timetabling techniques have been tried such as setting a group by HIGCSE/IGCSE according to ability in one subject (such as mathematics) and setting that subject against a second (such as physical science). This means that the IGCSE mathematics group will be taught science when the HIGCSE group is taught mathematics, and vice versa. This presupposes that learners who take HIGCSE in mathematics will also wish to take HIGCSE in physical science. This is not always the case.

One school is experimenting with a wholly HIGCSE registration class. All learners in the class take the same combination of IGCSE and HIGCSE subjects. They have no choices.

Annex A

Staffing norms 2004

(MBESC 2001)

Teaching posts in secondary schools, 2004

Number of lerners		Principal	Deputy Principal	HoDs	Teachers	Total
from	to					
1	44	1				1
45	74	1			1	2
75	104	1			2	3
105	134	1			3	4
135	164	1			4	5
165	194	1			5	6
195	224	1			6	7
225	254	1		1	7	8
255	284	1		1	8	10
285	314	1		1	9	12
315	344	1		1	10	12
345	374	1		1	11	13
375	404	1		1	12	14
405	434	1		2	12	15
435	464	1		2	13	16
465	494	1		2	14	17
495	524	1		2	15	18
525	554	1		2	16	19
555	584	1		2	17	20
585	614	1		3	17	21
615	644	1		3	18	22
645	674	1		3	19	23
675	704	1		3	20	24
705	734	1		3	21	25
735	764	1		3	22	26
765	794	1		4	22	27
795	824	1		4	23	28
825	854	1		4	24	29
855	884	1		4	25	30
885	914	1		4	26	31
915	944	1		4	27	32
945	974	1		5	28	34
975	1004	1		5	29	35
1005	1034	1		5	30	36
1035	1064	1		5	31	37
1065	1094	1		5	32	38
1095	1124	1		6	33	39
1125	1154	1		6	33	40
1155	1184	1		6	34	41
1185	1214	1		6	35	42
1215	1244	1		6	36	43
1245	1274	1		6	37	44
1275	1304	1		6	38	45
1305	1334	1	1	6	38	46
1335	1364	1	1	6	39	47
1365	1394	1	1	6	40	48
1395	1424	1	1	6	41	49
1425	1454	1	1	6	42	50
1455	1484	1	1	6	43	51
1485	1514	1	1	7	44	53
1515	1544	1	1	7	45	54
1545	1574	1	1	7	46	55
1575	1604	1	1	7	47	56
1605	1634	1	1	7	48	57
1635	1664	1	1	7	49	58
1665	1694	1	1	8	49	59
1695	1724	1	1	8	50	60
1725	1754	1	1	8	51	61
1755	1784	1	1	8	52	62
1785	1814	1	1	8	53	63
1815	1844	1	1	8	54	64
1845	1874	1	1	9	54	65
1875	1904	1	1	9	55	66
1905	1934	1	1	9	56	67
1935	1964	1	1	9	57	68
1965	1994	1	1	9	58	69
1995	2024	1	1	9	59	70

Annex B
Examples of data collection forms

Data collection form - Room data

Room	Code	Capacity	Facilities

Data collection form - Registration class data

Class	Number of learners	Year totals	Class	Number of learners	Year totals

School total [ ]

Data collection form - Teacher data

Name	Code	Teaching subjects	Special timetabling requirements

Data collection form - Subject data

Number of periods per day

Number of days per cycle

Junior secondary phase

Subject	Period per cycle
Eng	
Lang2	
Voc1	
Voc2	
Maths	
LSc	
PSc	
Hist	
Geog	
RME	
LSk	
BIS	
AiC	
PE	
PrP	
Total	

Senior secondary phase

Subject	Period per cycle
Eng	
Lang2	
Field of Study 1	
Field of Study 2	
Field of Study 3	
Field of Study 4	
Option 1	
Option 2	
RME	
LSk	
PE	
PrP	
Total	

Option choice

Grade 8 options

Choose **one** subject from the language option list and **two** subjects from the vocational subject option list. Choose one another option from each of the alternative choice lists.

Language options

First choice
Choose one subject

Afrikaans First language	
Afrikaans second language	
German	
Oshikwanyama	

Alternative choice
Choose one other language

Afrikaans First language	
Afrikaans second language	
German	
Oshikwanyama	

Vocational subject options

First choice
Choose two subjects

Accounting	
Business Management	
Woodwork	
Home Science	
Computer practice	

Alternative choice
Choose one other subject

Accounting	
Business Management	
Woodwork	
Home Science	
Computer practice	

This sample form allows learners to opt for the alternatives offered in curriculum plan example 3. It willneed further sections for name, address etc.

Note that the form allows an alternative choice as it is unlikley that all learners will get their first choice.

Annex C

Timetabling blank sheet

Class / Staff member / Room _____

	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7
Period 1							
Period 2							
Period 3							
Period 4							
Period 5							
Period 6							
Period 7							

Annex D

Subject abbreviations

Afr1	Afrikaans First Language
Afr2	Afrikaans Second Language
Acc	Accounting
BIS	Basic Information Skills
BM	Business Management
Biol	Biology
BSt	Business Studies
CP	Computer Practice
CSt	Computer Studies
DSt	Development Studies
Econ	Economics
Eng1	English First Language
Eng2	English Second Language
Geog	Geography
Hist	History
HSc	Home Science
Kwa	Oshikwanyama
LSc	Life Science
LSk	Life Skills
Maths	Mathematics
NE	Natural Economy
Ndo	Oshindonga
Otj	Otjiherero
PE	Physical Education
PrP	Principal's period
PSc	Physical Science
RME	Religious and Moral Education
Typ	Typing
WW	Woodwork

Annex E

Rotary Timetabler - Basic Guide

The following notes will help operators of' Rotary timetabler'software when they meet it for the first tim. Use the **Help file** in the software for more details.

The principle of this software is simple - you make up three linked databases on Rooms, Teachers and Classes/subjects. If all these are consistent with each other (it checks) and you have made no mistalkes, it will then write a timetable

Start with the **basic data** of the cycle

Menu bar - File - configuration

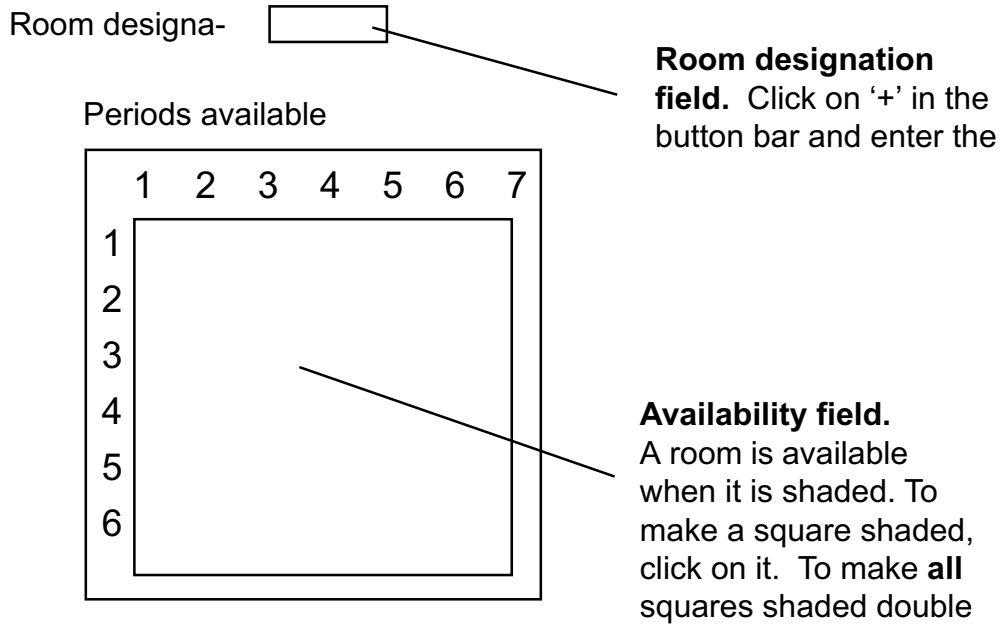
Complete this with the school name, the days in the timetable and the periods in the day.

The three databases

A database is like a cardindex. The database file is the pack of cards. Each card has on it a number ofspaces, or fields, that must be completed to proved the information needed. there are three databases, the room database, the teacher database and the Timetable database. Complete them in this order.

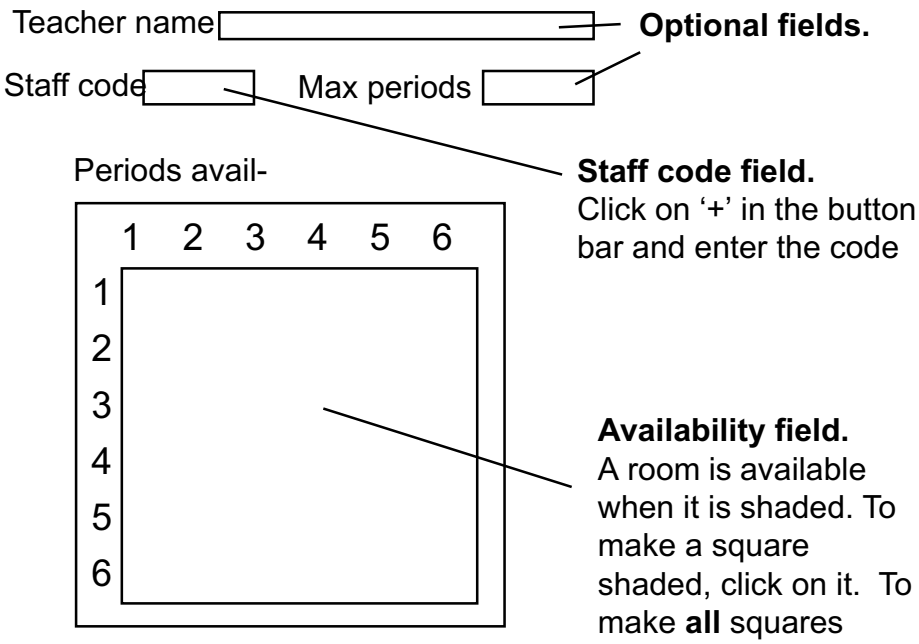
1 The Room database

Menu bar - Areas - Room information. There are two fields as shown



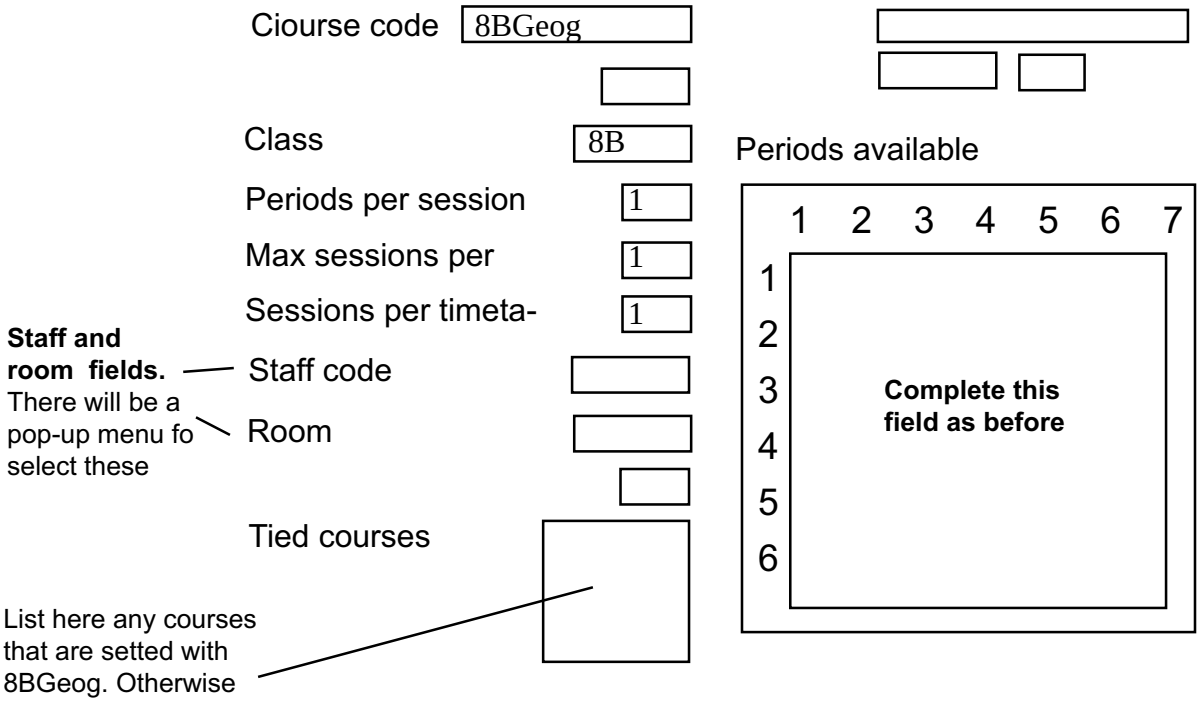
2 The Teacher database

Menu bar - Areas - Teacher information. There are four fields as shown



3 The Timetable database

Menu bar - Areas - Timetable information. The compulsory fiilds are labelled. Some are completed with examples



Annex F
Running a timetabling workshop

A timetabling workshop should be as interactive as possible. Ideally, the participants should be taken through the process of drawing up their own school timetable but time will not permit all of this. The workshop should therefore aim to foster an understanding of the various processes and give participants the tools to go away and write their timetable.

Workshop objectives

1 To identify, and assist to overcome, problems that workshop participants have related to the timetabling processes.
2 To familiarise participants with timetabling processes and to provide them with the understanding and the tools to undertake them.
3 To provide an opportunity for participants to construct, in part, a timetable for their school.
4 To provide hands-on experience of the use of computers in timetabling.

Workshop programme outline

The following sections are suggested for a 2-3 day workshop
1 Analysis of timetabling problems.
2 The data needed.
3 Drawing up a curriculum plan for the school.
4 Staffing the curriculum plan.
5 Timetabling.
6 *(If time permits)* The school development plan
7 Conclusion - reflections on the workshop.

Before the workshop

All invitees should be asked to bring to the workshop
- school statistics - number of learners in each class/year/phase
- a copy of the current timetable

- a list of current staff and their teaching subjects
- a list of rooms in the school and their capacity

Registration

Give out at registration
- pencil with rubber in the end
- squared exercise book
- pencil sharpener
- pages from Broad Curriculum Guides referring to number of periods per subject in the curriculum
- ruler (optional)

Do not hand out the manual until after session one
Ask for email addresses at registration and circulate them to all participants by email afterwards to encourage networking.

You will need
- flip chart sheets and pens
- Prestik

Session 1
Introduction and analysis of timetabling problems
30 - 45 minutes

Participants work in small groups and produce a list of the main timetabling issues they have encountered on a flip-chart sheet. These are then presented to the others. Keep the sheets for the final session.

This session allows frustrations to rise to the surface so they have a clearer idea of what they want from the workshop. It also acts as an icebreaker for participants to get to know each other.

Try and make sure that the workshop sessions address the problems raised.

You will need
- copies of the manual for each participant

Session 2
Basic data
20 minutes

This can be a brief exposition of the data needed including a discussion on the number of periods per subject in each phase. Do not take long.

Session 3
Drawing up a curriculum plan for the school
One hour (perhaps more depending on how much previous work the participants have done)

Part 1
Exposition and plenary discussion
Review of different types of curriculum plans and their advantages and disadvantages. The three in the manual can serve as examples. Make sure that there is an understanding that for a good plan to work, quite high registration class numbers are needed.

Part 2
Drawing up a plan
Working in small groups or individually, all participants should draw up a curriculum plan for their own school suitable for the next year.

They should work out all the statistics of the plan, particularly the staffing ratio. This should be checked against the 2004 norms table to see if it is possible. If it is not, a strategy should be developed so that it is. This strategy could be to admit more learners or to lose some staff - which staff?)

Session 4
Staffing the curriculum plan
2 hours

A start should be made on this. There will not be time to complete it. Participants should use the two examples in the manual to guide them. They must get as far as experiencing the difficulty involved in giving everyone a fair timetable.

You will need
• Access to a computer suite

Session 5
Timetabling
Half a day

Go through the manual process. Give participants the opportunity to start the process. Discuss/demonstrate the difficulties that arise when a subject will not 'go in'. Allow them time to enter their own data.

Allow those with computer experience to run through the process of entering data into 'Rotary Timetabler'. After they have entered data for about 30 minutes they can run through the timetabling writing process even though much data will still to be entered.

Have ready the complete data files for a school. Load and run them as an example. Print out the timetable and any other printed products that it offers.

Session 6 *(If time permits)*
The school development plan

There is a short session on this in the manual. The importance and content of such a plan can be discussed. The discussion can centre around any examples that can be produced by participants. A development plan is essential for a sound curriculum plan.

You will need
• flip chart sheets from session 1

Session 7
Final session

Use the problem sheets from session 1. Go through them and discuss whether the problems have been addressed. Spent a little time on those that have not.

Ask participants to complete an evaluation form. What is on the form is a matter for the workshop organiser. A simple evaluation form will ask which sessions they found most and least useful. An interesting question that could be asked is what changes would they make if they were to present the workshop

Annex G
Workshop participants

Workshop 1
Ongwediva
24-25 September 2002

Ms	N	Amuthenu	Onathinge Circuit
Mr	JS	Asino	Omuthiya Circuit
Ms	C	Buys	Ponhofi SSS
Mr	S	Eelu	Oshakati SSS
Mr	T	Iimene	Onguti SSS
Ms	PK	Iipinge	Mwaala SSS
Mr	M	Iiyambo	Ruacana SSS
Mr	TK	Johannes	Ohangwena Circuit
Mr	LG	Kamati	Etelaleko SSS
Mr	N	Kandjiri	Okalongo SSS
Mr	LJ	Kankondi	Ondangwa E REO
Mr	AN	Nafine	Eegedjo SSS
Ms	LN	Nakamwe	Okongo Circuit
Ms	F	Nangolo	Ondangwa East
Mr	VL	Nangombe	Ondangwa W REO
Ms	LN	Ndaoya	Nuuyoma SSS
Mr	JN	Nghifikwa	Negumbo SSS
Mr	MN	Nhinda	Eenhana Circuit
Mr	HN	Shemuketa	David Sheehama SSS
Mr	BJ	Sheya	Ongha SSS
Mr	W	Shilepo	Shituwa JSS
Ms	N	Shivoro	Gabriel Taapopi SSS
Ms	NP	Vatilifa	Oluno SSS
Dr	R	West	MBESC Head office

Workshop 2
NIED
1-2 Octoberr 2002

Mr	JK	Ausiku	NIED
Mr	PR	Boost	Centaurus HS
Mr	FT	Chaka	Katima Mulilo
Mr	CC	Cloete	Braunfels High School
Mr	DB	de Bruin	Outjo SS
Ms	MN	de Waal	Windhoek REO
Mr	R	Dikuwa	Max makushe SSS
Mr	BN	Eiseb	Pioneer Boys School
Ms	EC	Erasmus	Herman Gmeiner SS
Mr	AB	Hammond	Ernst Jager SS
Ms	SS	Hendricks	Rehoboth HS
Ms	J	Hoebel	Delta High School
Ms	CM	Jantjies	Lüderitz SS
Mr	GL	Kanyinga	Linus Shashipapo SS
Mr	AM	Kudhumo	Leevi hakusembe SS
Mr	W	Kudumo	Kandjimi Murangi SS
Mr	AS	Malesu	P/Bag 5006 Katima Mulilo
Mr	EM	Manga	Swakopmund SS
Mr	AG	Pitt	Jan Jonker HS
Mr	MN	Shimhopileni	MBESC
Ms	LL	Shivute	Himarwa Iithete SS, Rundu
Mr	GS	Sibuku	P/Bag 1019 Katima Mulilo
Mr	AM	Siloka	P/Bag 1044 Katima Mulilo
Mr	R	Smith	Suiderlig High School
Ms	H	Speelman	Goreangab JSS
Mr	JA	van Wyk	De Duine SS
Mr	D	Verral	Mariental High School